The Chalatenango Technical Institute (ITCHA) Strengthening Intervention of the Human Development Project, El Salvador

Interim Report:
Implementation from 2007 to 2011

Final Draft: October 9, 2013

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EXECUTIVE SUMMARY

Background

The Human Development Project is one of three large-scale projects financed under the 2006 compact between the Millennium Challenge Corporation (MCC) and the Government of El Salvador.[1] The project is composed of two activities: (1) The Education and Training Activity, which will invest nearly $28 million (U.S. dollars) to expand the quality of, and access to, vocational and technical education and training in El Salvador's Northern Zone; and (2) the Community Development Activity, which will invest over $67 million to increase the coverage of water supply, sanitation facilities, electricity, and community infrastructure in the Northern Zone.

Budgeted at $19.8 million over five years (from 2007 to 2012), the largest of the three sub-activities of the Education and Training Activity is the Formal Technical Education Sub-Activity. The goal of this sub-activity is to strengthen technical and vocational educational institutions in the Northern Zone, "so that more youth can gain marketable skills and thereby increase their opportunities for employment and income generation."[2] As with other sub-activities of the Education and Training Activity, the Formal Technical Education Sub-Activity was designed to directly address human development constraints in the Northern Zone, particularly youths' limited educational attainment. According to the compact, "The average number of years of formal education in the Northern Zone stands at 3.7 years, compared to 5.6 years in the rest of the country."[2] By improving schools and offering scholarships, the sub-activity finances efforts to increase youths' access to high-quality technical education in the region, thus increasing their achievement levels, secondary (and post-secondary) school graduation rates, and prospects for gainful employment.

By 2012, the Formal Technical Education Sub-Activity was scheduled to spend $7 million in investments to strengthen the Chalatenango Technical Institute (known as ITCHA for its initials in Spanish), an existing post-secondary institute in the Northern Zone. These investments include new ITCHA facilities, equipment, curricula, and teacher training programs. According to preliminary budgets, the sub-activity would also provide $9 million to improve 20 technical middle schools (or secondary schools) in the Northern Zone with infrastructure investments and additional teacher training programs. In addition, the sub-activity was scheduled to invest $3.8 million in scholarships for students enrolled in middle and post-secondary technical schools in the Northern Zone, as well as $2.7 million in a labor insertion program to help recent technical school graduates (and non-formal education program participants) obtain employment.

The Salvadoran Ministry of Education (MINED) was designated as the principal implementing entity for the Formal Technical Education Sub-Activity, and the Millennium Fund (known as FOMILENIO in Spanish) was established as the entity responsible for the oversight and

[1] The other two projects funded by the compact are the Productive Development Project (with a budget of $87 million) and the Connectivity Project (with a budget of $234 million). The Productive Development Project funds material and technical assistance to agricultural producers and artisans in the Northern Zone, and the Connectivity Project funds the construction of a transnational highway and tertiary roads linking 57 municipal capitals in El Salvador.

[2] Schedule 1-3 to Annex I, Human Development Project, Compact between MCC and the Government of El Salvador.

management of the sub-activity (as well as all other activities and sub-activities outlined in the compact). In addition, the Consortium for International Development in Education (CIDE) was the primary entity contracted to provide technical support for the sub-activity, including developing architectural plans for school improvements, designing new curricula, and training all teachers at the ITCHA and the 20 middle schools receiving assistance.

Research Questions and Methods

In 2007, MCC contracted with Mathematica Policy Research to evaluate the ITCHA strengthening intervention. After studying the intervention design and implementation plans, Mathematica staff recommended and initiated an implementation study of the ITCHA intervention. The main objective of this study is to document the process of ITCHA's transformation from 2010 to 2011, the role of key players involved in the process, the barriers and facilitators to transforming the institute, and key student outcomes of enrollment, graduation, and employment. Because information on student graduation and employment (following the intervention) were largely unavailable during the first round of data collection, this interim report focuses on documenting ITCHA's transformation and analyzing 2010 and 2011 student enrollment. This report draws from several qualitative and quantitative sources, including program manuals, FOMILENIO and CIDE reports, interviews with FOMILENIO, CIDE, and MCC staff, as well as focus groups and interviews with middle school and ITCHA teachers, administrators, and students.

Findings

1. Project Design

The decision to strengthen the ITCHA in Chalatenango originated with MINED staff and other representatives of the government of El Salvador during compact negotiations in 2005 and 2006. The Formal Technical Education Sub-Activity drew heavily from MINED's initiatives and future plans during that period. One of these initiatives was the Gradual Educational Model of Technical and Technological Learning (known as MEGATEC for its initials in Spanish), an educational model based on the premise that technical education should be tailored to regional economies' labor market demands and structured to impart key competencies required of professionals in technical fields. Under the compact, MINED proposed creating two new MEGATEC post-secondary institutes in the Northern Zone. One of these institutes, the ITCHA, was an existing post-secondary school that would be converted to a MEGATEC, whereas the other new MEGATEC would be built in Ilobasco. After negotiations, however, stakeholders agreed to create one MEGATEC (i.e., convert the existing ITCHA to a MEGATEC) and strengthen 20 technical middle schools in the Northern Zone. Strengthening middle schools would serve as a complement to the ITCHA intervention, as improved middle schools would supply ITCHA (and other existing or new MEGATEC facilities in and near the Northern Zone) with students who were better prepared for post-secondary education. As stated in the compact, the converted ITCHA would offer courses to up to 1,100 students annually, serve as a national hub for advanced technology training, and become a resource center for vocational teacher training and curriculum development.

In 2008, CIDE proposed several new MEGATEC degree programs based on labor market demands in the Northern Zone. After discussions between MINED, CIDE, and FOMILENIO, MINED chose two new degrees—civil engineering and alternative tourism—to be developed as MEGATEC degree programs at ITCHA and its four linked middle schools.[3] (At ITCHA, these new programs complemented existing degree programs such as computer science and marketing.) As the program's primary technical contractor, CIDE was charged with developing the curricula for these two new degree programs and training all newly hired ITCHA and middle school teachers who would teach these programs. Throughout 2009, CIDE staff worked with various stakeholders to develop and refine the programs' core competencies and teaching modules. In December 2009, CIDE staff conducted the first of several training workshops for ITCHA and technical middle school teachers.[4] In January 2010, post-secondary civil engineering and alternative tourism programs began at ITCHA, and civil engineering and alternative tourism programs began at ITCHA's four linked middle schools.

In addition to financing ITCHA and middle school improvements, FOMILENIO offered $1,500-a-year scholarships to ITCHA students and $400-a-year scholarships to students enrolled in 17 of the 20 middle schools strengthened under the sub-activity. From 2009 to 2012, FOMILENIO awarded 586 first-year ITCHA scholarships and 3,409 first-year middle school scholarships.[5] ITCHA scholarships were disbursed by the institute's administrative staff, and middle school scholarships were administered by the Entrepreneurial Foundation for Educational Development (known as FEPADE for its initials in Spanish). As a counterpart contribution, MINED began financing and administering second- and third-year middle school scholarships in 2010.[6]

Although it was not originally included in the Human Development Project, FOMILENIO and MCC staff designed and implemented the Sustainable Labor Insertion Program (knows as PILAS for its initials in Spanish) as a complement to the compact's educational investments. The objective of PILAS is to support productive employment for youths in the Northern Zone who have benefited from FOMILENIO's Human Development Program, including non-formal training workshops, scholarships, enhanced technical middle schools, and the new ITCHA. PILAS assistance to beneficiaries with potential to establish their own business includes help with business plans and technical training in business administration and accounting. In contrast, PILAS assistance to beneficiaries with potential for formal employment includes job placement services, interview preparation assistance, and job fairs. With a budget of $2.7 million, PILAS implementation began in 2010.

[3] These "linked" middle schools were designed to serve as ITCHA feeder schools: they would offer the same MEGATEC programs as ITCHA, and provide students with the opportunity to transfer to ITCHA as second-year post-secondary students upon their completion of a technical middle school degree.

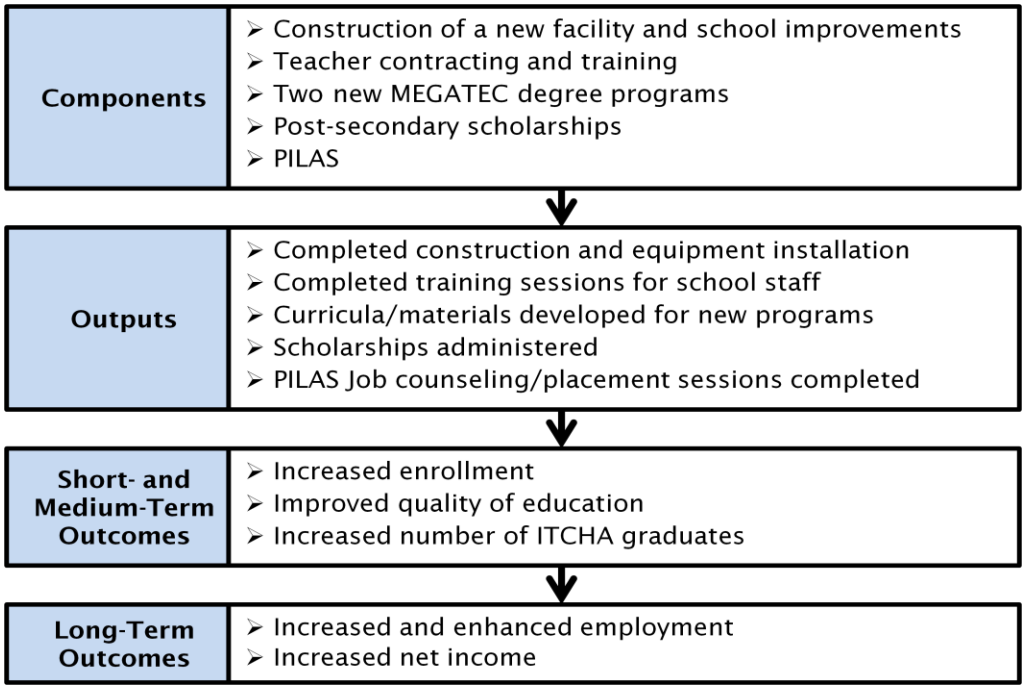
[4] Teacher training would extend from December 2009 to August 2010. In total, training included seven workshops and 136 hours of instruction, and 9 months of follow up and support.

[5] These figures reflect the number of scholarships awarded to first-year ITCHA and middle school students, but not the number of renewed scholarships granted to second- and third-year students. Scholarships can be renewed for additional years of study, contingent upon students' continued studies and academic performance.

[6] These second- and third-year scholarships are renewed first-year scholarships that were originally financed by FOMILENIO.

As illustrated in Figure 1, the three primary components of the ITCHA intervention—school construction, degree program development, and teacher training—were designed to work in conjunction with scholarships and PILAS to generate the key long-term outcomes of increased employment and increased net income among post-secondary technical graduates. First, MINED and FOMILENIO would develop two new degree programs, and new teachers would be hired and trained (along with existing teachers) to teach and administer these programs. Next, school construction and improvements would provide a new locale with high-quality facilities in which these programs could be taught. Regarding short-term outcomes, more students would be motivated to enroll in ITCHA due to its new facility and new programs, as well as the prospect of FOMILENIO scholarships. In the medium- and long-term, the intervention was designed to increase the number of ITCHA graduates, as well as generate increased employment and income among graduates. The compact cites goals of a 70 percent employment rate of ITCHA graduates, as well as a 42 percent increase in ITCHA graduates' income (compared to incomes of middle school graduates). To facilitate these key outcomes of employment and increased income, FOMILENIO's PILAS program was designed to link trained graduates with employment opportunities.

Figure 1. Logic Model of the ITCHA Strengthening Intervention



2. Implementation

Implementation of the ITCHA strengthening component generally followed the original design outlined in the compact, except that stakeholders opted to build a new facility instead of remodeling the existing ITCHA. Stakeholders agree that given large increases in ITCHA enrollment in 2010 and 2011, this was a good decision despite its additional costs and delays. After construction was complete in April 2011, ITCHA's new facilities included 9 classrooms, 10 technical labs, 4 computer labs, an auditorium, and an outdoor cafeteria (Table 1). Overall, ITCHA construction costs totaled around $5 million, or $3.4 million more than the $1.6 million originally budgeted for renovations. Interviewed stakeholders, including ITCHA administrators, teachers, and students, reported high satisfaction with the new facility and its classrooms and laboratories. ITCHA staff stated that the new buildings were the best advertisement for the school's new MEGATEC degree programs.

In addition to ITCHA improvements, 20 middle schools in the Northern Zone received infrastructure improvements from August 2009 to March 2010, including 49 new classrooms, 15 new laboratories, 8 new computer labs, and 124 new sanitary services (Table 1). Payments to contractors related to middle school infrastructure improvements totaled around $4 million, or $1.5 million more than the $2.5 million originally budgeted for construction. Middle school principals and students reported high satisfaction with the improvements, but some interviewed students reported a lack of access to computers to complete their schoolwork.

Table 1. Formal Technical Education Outputs

ITCHA Construction		
Infrastructure	9 classrooms, a multiple-use auditorium, and an outdoor cafeteria	
Laboratories	4 computer labs and 10 technical labs	
Middle School Improvements		
	New Infrastructure	Improved Infrastructure
Classrooms	49 classrooms in 14 schools	18 classrooms in 2 schools
Laboratories	15 laboratories in 12 schools and 8 computer labs in 8 schools	1 laboratory in one school and 3 computer labs in 3 schools
Sanitary Services	124 sanitary services in 19 schools	26 sanitary services in 2 schools
Teacher Training		
Number of MEGATEC workshops conducted	7 workshops totaling 136 hours, and 9 months of follow-up training and support.	
Number of teachers trained in MEGATEC workshops	11 teachers participated in nearly all workshops and sessions (4 ITCHA teachers and 7 middle school teachers).	
Number of stakeholders trained in additional middle school workshops	540 teachers, administrators, parents, MINED staff, and other stakeholders as of September 2011.	
Scholarships		
ITCHA students	586 scholarships awarded (61 in 2009, 200 in 2010, and 325 in 2011)	
Middle school students	3,409 scholarships awarded (150 in 2009, 921 in 2010, 1,197 in 2011, and 1,141 in 2010)	

Source: CIDE administrative data.

From November 2009 to August 2010, CIDE conducted MEGATEC training for ITCHA staff, as well as teachers and principals at the four linked middle schools with new MEGATEC programs. Training featured 7 workshops totaling 136 hours (Table 1). All participants viewed MEGATEC training and program design workshops as well implemented and useful. Stakeholders credited CIDE's professional and capable instructors, as well as teachers' enthusiasm and strong communication skills, as the major facilitators of the productive training experience. Due in part to this successful training, the two new MEGATEC programs were implemented effectively in 2010 and 2011 by newly contracted and trained teachers at ITCHA and its linked middle schools. Implementation presented several challenges, such as large class sizes in some middle schools and the need to develop common achievement requirements among middle schools offering the same MEGATEC program. However, several key factors made implementation successful, including teachers' strong personal motivation, communication skills, and rapport with one another. The new programs' competency-based modules were very popular with interviewed students, teachers, and

school administrators. In particular, students appreciated that teachers did not advance to new modules until students had mastered the previous module.

From 2009 to 2012, FOMILENIO awarded 586 first-year ITCHA scholarships and 3,409 first-year middle school scholarships (Table 1). Scholarships administered directly by ITCHA and middle school scholarships administered through FEPADE were efficient and prompt, but MINED had difficulties completing second- and third-year middle school scholarship disbursements in a timely manner. Despite these operational issues, ITCHA and middle school scholarships served as strong motivators for students' enrollment in middle and post-secondary technical programs. ITCHA students reported that their $1,500-a-year scholarship covered all their expenses, whereas middle school students stated that their $400-a-year scholarships did not sufficiently cover food, transportation, and other education-related costs.

3. Student Enrollment, Graduation and Employment

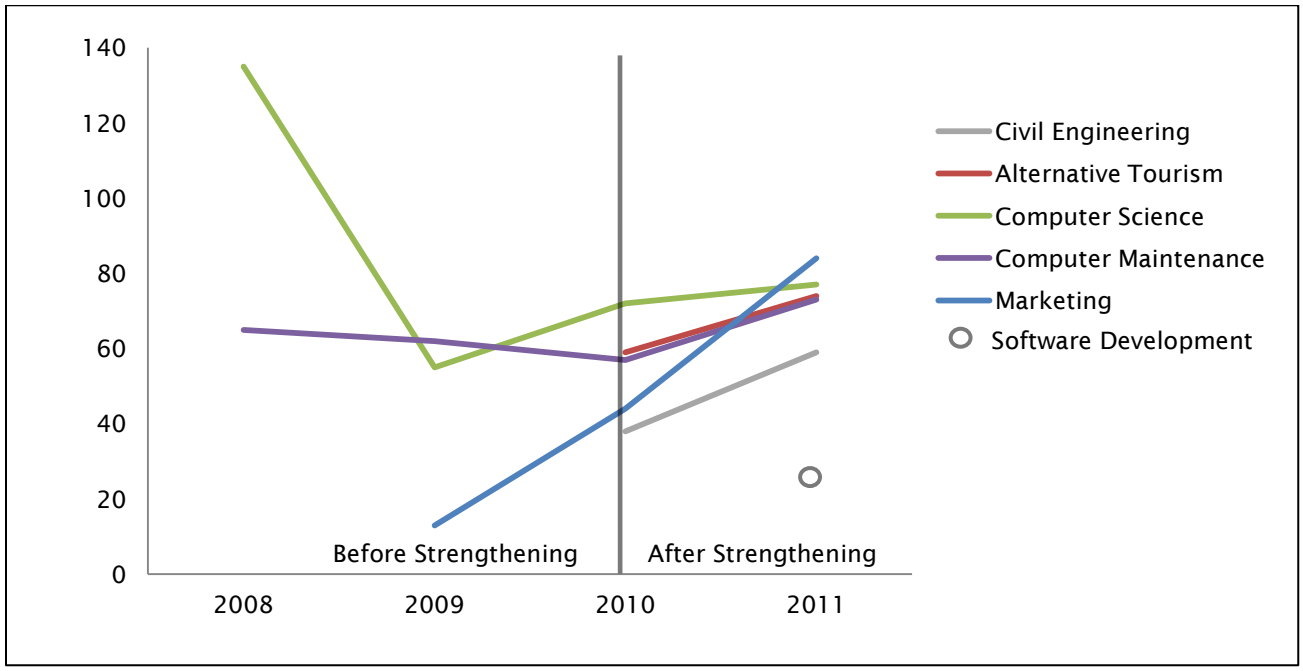
Due to the ITCHA's new facility and additional degree programs, the institute's enrollment more than doubled from 309 students in 2008 to 663 in 2011. Enrollment during the 2011 school year already exceeded the 2012 enrollment target of 540 students set by MCC and FOMILENIO in their monitoring and evaluation plan. However, due to space constraints and a limited number of instructors, ITCHA enrollment in 2012 is not likely to meet the compact's original goal of 1,100 students. Since 2009, the ITCHA program that experienced the highest enrollment increase is the marketing program, with 13 first-year students in 2009 and 84 first-year students in 2011 (Figure 2). Introduced in 2010, the two MEGATEC programs also experienced an increase in first-year enrollment from 2010 to 2011. Civil engineering enrollment increased from 38 first-year students in 2010 to 59 first-year students in 2011 (a 55 percent increase), and alternative tourism enrollment increased from 59 first-year students in 2010 to 74 first-year students in 2011 (a 25 percent increase).

Across all programs (including MEGATEC and non-MEGATEC programs), ITCHA's 2011 second-year retention rate was around 96 percent. This rate exceeded MINED's expectation of an 80 percent continuation into the second year of post-secondary studies. In addition, the student retention rate for ITCHA's MEGATEC programs was around 92 percent in 2011. This is comparable to the 2011 retention rate for the school's non-MEGATEC superior technical programs, and both rates are much higher than the 2009 retention rate of less than 70 percent preceding ITCHA's conversion.

At 88 percent, the overall graduation rate for the 2010-2011 ITCHA cohort had already surpassed the monitoring and evaluation goal of a 73 percent graduation rate for the 2012 school year. Graduation rates for MEGATEC programs (89 and 83 percent for civil engineering and alternative tourism, respectively) were similar to graduation rates for the school's non-MEGATEC programs, which averaged around 90 percent among all three programs. Interestingly, non-MEGATEC graduation rates for the 2010-2011 cohort (after ITCHA strengthening) were substantially higher than graduation rates for the 2008-2009 cohort (before ITCHA strengthening) enrolled in the same academic programs (an average of 91 percent versus 56 percent).

Regarding students' employment, long-term employment prospects for MEGATEC graduates cannot be determined with certainty. In future years, there may not be enough labor market demand in the area to absorb middle school and ITCHA graduates, particularly graduates with alternative tourism degrees. In the short term, the PILAS program could help students find employment or start their own businesses. In the long term, ITCHA administrators appear poised to modify degree programs in response to shifting labor market demand in the Northern Zone.

Figure 2. ITCHA First-Year Enrollment, by Academic Program (Number of Students)



Source: ITCHA administrative records, 2011.

4. ITCHA Sustainability

By late 2011, MINED's formal commitment to technical education in the Northern Zone appeared strong. As a result of this commitment, MINED will likely provide ITCHA staff with sufficient financial and human resources to maintain the school's degree programs and facilities in upcoming academic years. However, ITCHA's continued successful implementation of MEGATEC and non-MEGATEC degree programs is not guaranteed given two primary considerations. First, as of late 2011, there was no formal MEGATEC training program for newly hired teachers or designated financial and human resources to conduct such training. Second, the amount and method of payment of ITCHA scholarships under MINED's administration was not yet defined, nor was the extent to which MINED would continue to offer new middle school scholarships after 2012. Because scholarships play a large role in students' decisions to enroll in MEGATEC programs, any substantive changes to the availability of scholarships, the payment amount, the form of payment, or the timeliness of disbursements could have negative implications for ITCHA and middle school enrollment and continuation rates.

Report update: In 2013, MINED representatives informed Mathematica staff that the Ministry had begun a quality control program at ITCHA in 2011. Under this Ministry-financed program, all teachers are trained and provided with support services. As such, a formal teacher training program is in place for ITCHA teachers. In addition, MINED representatives informed Mathematica staff that starting in 2011, ITCHA students began receiving scholarships through the "Let's Go To School" program. Under this program, MINED provides primary, secondary, and post-secondary school students with scholarships to cover educational expenses. From 2011 to 2013, nearly 400 scholarships were awarded to ITCHA students. According to data provided by MINED, these scholarships appear to be approximately $1,350 per student per year. The availability of these scholarships would likely encourage students' enrollment in ITCHA programs.

Lessons Learned

One key lesson learned from the ITCHA intervention is that the need for an institutionalized training program for MEGATEC teachers could have been anticipated before CIDE training began in 2010, and stakeholders could have taken measures in (or before) 2010 to ensure that a formal training program would be available for newly hired teachers in 2011. In a best-case scenario, CIDE trainers could have worked more closely with MINED staff in late 2009 and 2010 to develop the Ministry's internal capacity to train technical middle and post-secondary school teachers. In 2011, CIDE staff could have assisted MINED staff as the Ministry assumed leadership in conducting the technical training sessions, thus promoting a seamless transition from CIDE's technical assistance to MINED's internal technical capacity.

A second lesson from the ITCHA intervention is that large investments in school infrastructure, new curricula, and teacher training programs—even when they are designed to directly address local labor market demand—may not be sufficient to generate positive employment outcomes. Additional programmatic support may be needed to: (1) ensure that trained graduates are prepared to interact with potential employers, (2) facilitate interactions between recent graduates and employers with the objective of formal and informal job placements, and (3) assist some trained graduates in starting their own business. This additional support is likely more necessary in developing countries than developed countries, given information constraints and a general unavailability of job coaching, job placement services, and seed capital in developing countries. Recognizing this need once implementation was underway, MCC and FOMILENIO staff designed and implemented PILAS following the compact's mid-term review. Whereas PILAS was likely a positive development, its relatively late implementation precluded an extended pilot phase and potential gains in efficiency and effectiveness that could have resulted from a multi-year implementation period.

To help formulate new degree programs and assess the need for employment support programs at the outset of large-scale education interventions, future compact development and implementation teams could benefit from a targeted preliminary analysis of: (1) the intervention's target population, (2) labor market demand related to this target population, (3) existing and potential linkages between the target population and employers, and (4) constraints to gainful salaried employment and self-employment. Such a diagnostic could help identify and isolate job-relevant skills constraints, job search constraints, small business start-up constraints, and overarching constraints in labor demand that directly affect the target population. Identified job-relevant skills constraints could inform the development of new degree programs, whereas job search constraints and firm start-up constraints could inform the development of employment support programs, if necessary. Identified constraints in labor demand in specific economic sectors would be particularly informative, as they would signal areas in which investments in new degree programs would not likely generate significant employment.[7]

[7] See World Bank Employment Policy Primer, November 2010, No. 16 for more detail regarding a constraint-driven framework to formulating employment-focused training and support programs for youths. This document is available at: http://siteresources.worldbank.org/INTLM/214578-1103128720951/22795057/EPPNoteNo16_Eng.pdf.

I. BACKGROUND AND STUDY DESIGN

A. Introduction

The Human Development Project is one of three large-scale projects financed under the 2006 compact between the Millennium Challenge Corporation (MCC) and the Government of El Salvador.[8] The project is composed of two activities: (1) The Education and Training Activity, which will invest nearly $28 million (U.S. dollars) to expand the quality of, and access to, vocational and technical education and training in El Salvador's Northern Zone; and (2) the Community Development Activity, which will invest over $67 million to increase the coverage of water supply, sanitation facilities, electricity, and community infrastructure in the Northern Zone.

Budgeted at $19.8 million over five years (from 2007 to 2012), the largest of the three sub-activities of the Education and Training Activity is the Formal Technical Education Sub-Activity.[9] According to the compact, the goal of this sub-activity is to strengthen technical and vocational educational institutions in the Northern Zone, "so that more youth can gain marketable skills and thereby increase their opportunities for employment and income generation."[10] (See Appendix A for the compact's full description of the sub-activity.) The sub-activity is composed of four distinct, but related, interventions:

1. Strengthening the Chalatenango Technical Institute (known as ITCHA for its initials in Spanish), an existing post-secondary institute in the Northern Zone. Strengthening efforts include new facilities and equipment, teacher training, and the introduction of two new competency-based degree programs designed under the Gradual Educational Model of Technical and Technological Learning (known as MEGATEC for its initials in Spanish);
2. Strengthening ITCHA to become a resource center for in-service and pre-service vocational teacher training, curriculum experimentation and other forms of resource development in support of technical middle schools in the Northern Zone and throughout El Salvador;
3. Improving 20 technical middle schools (or secondary schools) in the Northern Zone with infrastructure investments and teacher training programs; and
4. Establishing a scholarship program for youths who enroll in technical middle and post-secondary schools in the Northern Zone.

[8] The other two projects funded by the compact are the Productive Development Project (with a budget of $87 million) and the Connectivity Project (with a budget of $234 million). The Productive Development Project funds material and technical assistance to agricultural producers and artisans in the Northern Zone, and the Connectivity Project funds the construction of a transnational highway and tertiary roads linking 57 municipal capitals in El Salvador.

[9] The other two sub-activities are the Non-Formal Skills Development Sub-Activity and the Technical Assistance Sub-Activity.

[10] Schedule 1-3 to Annex I, Human Development Project, Compact between MCC and the Government of El Salvador.

The Salvadoran Ministry of Education (MINED) was designated as the principal implementing entity for the sub-activity, and the Millennium Fund (known as FOMILENIO in Spanish) was established as the entity responsible for the oversight and management of the sub-activity (as well as all other activities and sub-activities outlined in the compact). In addition, the Consortium for International Development in Education (CIDE) was the primary entity contracted to provide technical support for the sub-activity, including developing architectural plans for school improvements, developing new curricula, and training all teachers at the ITCHA and the 20 middle schools receiving assistance.

In addition to the four interventions mentioned above, in 2010 FOMILENIO and MCC planned a related intervention, the Sustainable Labor Insertion Program (knows as PILAS for its initials in Spanish). PILAS is intended to support productive employment for students in the Northern Zone who have benefited from FOMILENIO's Human Development Program, including non-formal training workshops, scholarships, enhanced technical middle schools, and the new ITCHA. With funding of $2.7 million, the program is implemented by grantee organizations with guidance from FOMILENIO, MINED, and the Salvadoran Institute for Professional Training (known as INSAFORP for its initials in Spanish). The activity officially began in 2010 and will conclude in 2012.

B. Study Design and Approach

In 2007, MCC contracted Mathematica Policy Research to evaluate several components of the Human Development Project in El Salvador, including the ITCHA strengthening intervention. After studying the intervention design and preliminary implementation plans, Mathematica staff determined that a rigorous impact evaluation of the ITCHA intervention was infeasible. Theoretically, an impact evaluation would require information on an alternate institution (or institutions) to which ITCHA could be compared—for example, a similar technological center (or centers) that did not introduce MEGATEC degree programs. However, finding suitable comparison schools would be very difficult because technical institutes in El Salvador offer a different mix of technical degrees and serve different student populations across the country (not only in the Northern Zone). Even if more than one valid comparison school were available, however, comparing these schools to ITCHA would not allow us to isolate the impact of the intervention from the other factors at ITCHA—including the school's administration and existing teachers—that influence key outcomes of student enrollment and graduation.

Based on these considerations, Mathematica staff recommended and initiated an implementation study of the ITCHA intervention in 2011. The main objective of this study is to document the process of ITCHA's transformation from 2010 to 2011, the role of key players involved in the process, the barriers and facilitators to transforming the institute, and key student outcomes of enrollment, graduation, and employment. Because information on student graduation and employment (following the intervention) largely unavailable during the first round of data collection, this interim report focuses on documenting ITCHA's transformation and analyzing

2010 and 2011 student enrollment.[11] Potentially, this report's findings could serve as a resource to MCC staff as they formulate similar formal education interventions in future compacts.

This study primarily focuses on activities covered in the first intervention of the Formal Technical Education Sub-Activity: strengthening the ITCHA's teacher skills, facilities, equipment, and curricula. In addition to these investments in ITCHA infrastructure, personnel and programs, a large portion of ITCHA and middle school students received scholarships during 2010 and 2011 under the sub-activity's scholarship program (outlined above as a separate intervention of the sub-activity). In this study, we document the implementation of the scholarship program as it relates to the ITCHA strengthening intervention. We also document improvements to technical middle schools that feed into ITCHA (also called "linked" middle schools) due to their integral role in the MEGATEC model. In addition, we briefly document the design and implementation of the PILAS program, which provides ITCHA graduates with job placement services.

In this report, we will address the following research questions:

1. **How were ITCHA strengthening efforts planned?** What were the primary goals of the intervention? What role did each stakeholder play in the design and planning process?
2. **How did construction and improvements proceed?** What was the original timeline for completing the new facility? Did actual completion deviate from this timeline? What were the final products of construction and improvements, in terms of completed classrooms, laboratories, and other amenities? What were barriers to, and facilitators of, successful and prompt construction?
3. **How were teachers trained?** What were barriers to, and facilitators of, successful teacher training? Did teachers use the skills and techniques they learned in training?
4. **How were the new programs designed and introduced?** What were barriers to, and facilitators of, introducing the new degree programs? How did the link between ITCHA and its linked middle schools function?
5. **Did student enrollment, achievement, and graduation meet expectations?** Were students satisfied with the new degree programs and their teachers? What were barriers to, and facilitators of, student enrollment and achievement? Did FOMILENIO scholarships play a role in motivating youths to enroll in MEGATEC programs? What were graduation rates for the first cohort of ITCHA students who benefited from the intervention?
6. **Are MEGATEC degree programs preparing students for employment and university-level studies classes?** What are students' and teachers' goals and expectations for employment and university education following completion of the technical degree? What factors may affect employment and university enrollment? Do stakeholders believe the PILAS program will help students find employment?

[11] As part of this study, Mathematica staff plans to conduct another round of data collection in late 2013. This second round of data collection will focus on key outcomes of graduation and employment, and the final report is scheduled to be submitted in 2014.

To answer these questions, Mathematica staff conducted semi-structured, in-person interviews and focus groups with the following stakeholders: (1) MINED, CIDE, FOMILENIO, and MCC representatives, (2) ITCHA administrators, (3) middle school principals, (4) students from ITCHA and two of its linked middle schools, and (5) teachers from ITCHA and its linked middle schools.[12] Mathematica staff conducted the interviews and focus groups (in Spanish) with most of these stakeholders during a one-week visit to San Salvador and Chalatenango in late August 2011. Additional phone interviews were conducted with MCC staff in October 2011. All interviews and focus group sessions were recorded for analysis.

The rest of the report is organized as follows: In Section II, we provide a summary of the design of the ITCHA strengthening intervention. In Section III, we summarize how the intervention was implemented. In Sections IV and V, we describe several key outcomes of the intervention and discuss the sustainability of ITCHA improvements, respectively. In Section VI, we present conclusions and lessons learned.

[12] Students, teachers, and principals from three of ITCHA's four linked middle schools (San Ignacio, Aguilares, and La Palma) were interviewed for this study. A total of 3 middle school students, 1 middle school teacher, and 2 middle school principals completed interviews. In addition, a total of 3 administrators, 1 teacher, and 20 students at ITCHA completed interviews. A total of 4 MINED, 3 CIDE, and 3 FOMILENIO representatives were also interviewed.

II. DESIGN OF THE ITCHA INTERVENTION

As stated, FOMILENIO has strengthened the ITCHA through three primary types of interventions: (a) constructing a new facility and purchasing new furniture, didactic materials, computers, and other equipment; (b) developing two new degree programs using the MEGATEC competency-based educational model; and (c) contracting new teachers and conducting teacher training. In addition, FOMILENIO has granted academic scholarships to ITCHA and technical middle school students and introduced the PILAS program to link students with employment opportunities.

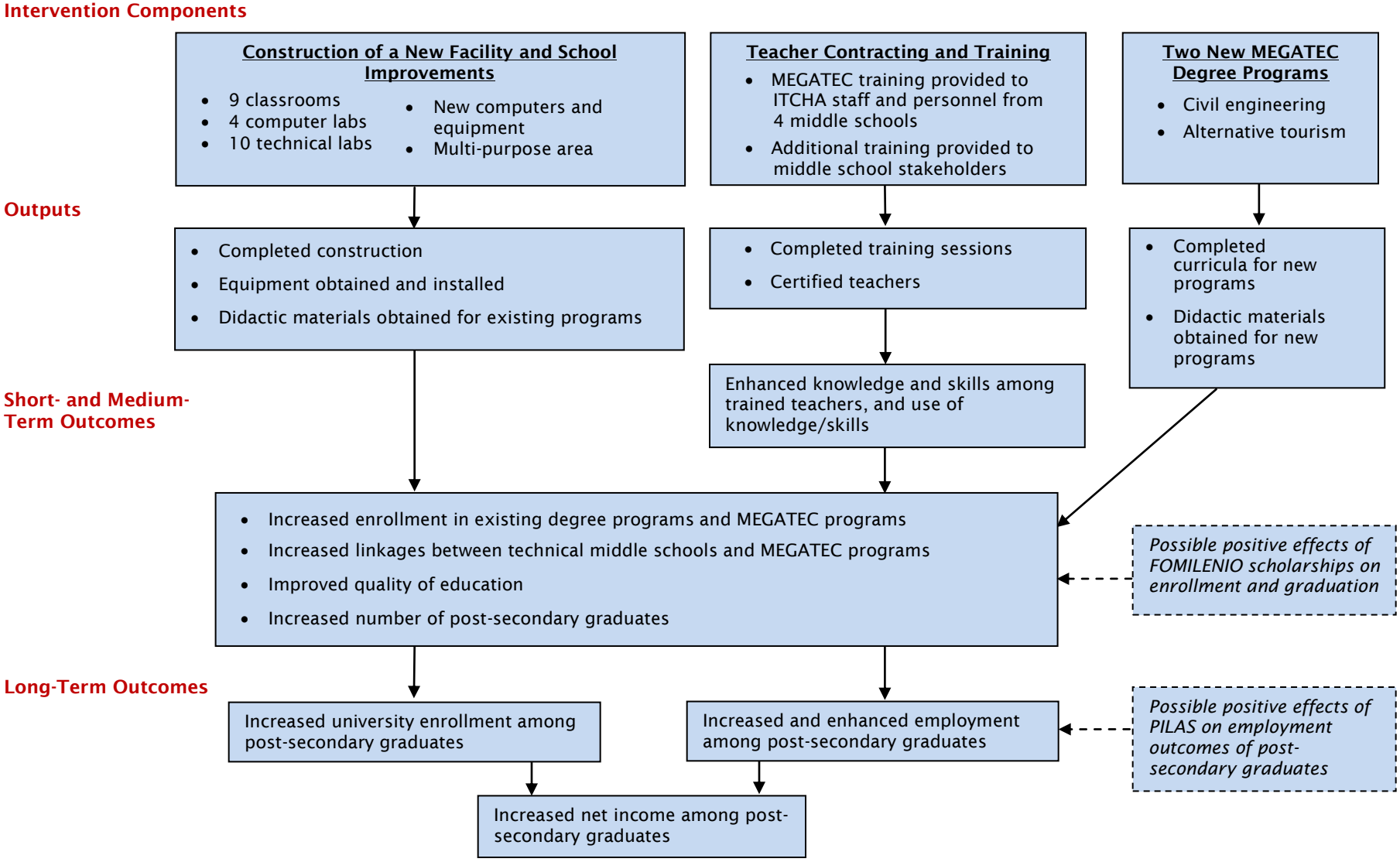
As illustrated in Figure II.1, the three primary components of the ITCHA intervention—school construction, degree program development, and teacher training—were designed to work in conjunction with scholarships and PILAS to generate the key long-term outcomes of increased employment and increased net income among post-secondary technical graduates. First, MINED and FOMILENIO would develop two new degree programs, and new teachers would be hired and trained (along with existing teachers and administrators) to teach and administer these programs. Next, school construction and improvements would provide a new locale with high-quality facilities in which these programs could be taught. Regarding short-term outcomes, more students would be motivated to enroll in ITCHA due to its new facility and new programs, as well as the prospect of FOMILENIO scholarships. In the medium- and long-term, the intervention was designed to increase the number of ITCHA graduates, as well as generate increased employment and income among graduates. The compact cites goals of a 70 percent employment rate of ITCHA graduates, as well as a 42 percent increase in income of ITCHA graduates compared to incomes of graduates of the 12th grade.[13] To facilitate these key outcomes of employment and increased income, FOMILENIO's PILAS program was designed to link trained technical school graduates with employment opportunities.

Additional objectives of the intervention included stronger linkages with middle schools and a reduced timeline from middle school enrollment to a post-secondary degree. (MEGATEC middle school graduates can enroll directly in the second year of a superior technical program at ITCHA). University enrollment among ITCHA graduates was also a desired objective of the intervention and the MEGATEC model. However, direct employment and income generation were favored outcomes among stakeholders, and of primary importance in evaluating the intervention's success.

In this section, we summarize the design of these components of the ITCHA intervention, the rationale behind each component, and the role each stakeholder had in developing them. First, we discuss ITCHA infrastructure improvements, followed by the development of the two new MEGATEC degree programs. Next, we outline original plans for teacher training, scholarships, and PILAS.

[13] The 70 percent employment rate goal was based on employment rates of existing post-secondary programs at ITCHA in 2005, and the 42 percent increase in income is based on the projected income increase of post-secondary MEGATEC graduates versus post-secondary non-MEGATEC graduates, predicted using a Mincer regression analysis of data from a household survey of the Northern Zone conducted in 2004. Baseline values of these measures were not available because at the time of the compact's development, ITCHA did not function as a MEGATEC.

Figure II.1. Logic Model of the ITCHA Strengthening Intervention



A. Planning ITCHA Improvements

The decision to strengthen the ITCHA in Chalatenango originated with MINED staff and other representatives of the government of El Salvador during compact negotiations in 2005 and 2006. The Formal Technical Education Sub-Activity drew heavily from MINED's initiatives and future plans during that period. One of these initiatives was the MEGATEC competency-based technical education model, which was based on the premise that technical education should be tailored to regional economies' labor market demands and structured to impart key competencies required of professionals in technical fields. MINED's leadership envisioned building a network of MEGATEC post-secondary institutes throughout the country.[14] When the compact was developed, MINED had already leveraged international donations to construct a MEGATEC post-secondary school in La Unión, a department in eastern El Salvador.

Under the compact, MINED proposed to create a MEGATEC in the department of Ilobasco and another in the department of Chalatenango, both located in the Northern Zone. In Chalatenango, MINED proposed to upgrade the existing ITCHA into a MEGATEC. This entailed adding new MEGATEC programs as well as enhancing ITCHA's existing infrastructure. MINED staff saw the ITCHA as functioning quite well under the administration of AGAPE, a faith-based non-profit organization with extensive experience implementing formal and non-formal education programs. As such, donated funds could be targeted toward key infrastructure and training investments at the existing ITCHA, rather than the extensive task of building and establishing a new post-secondary institute elsewhere in the Northern Zone.

When MCC received MINED's proposal, they performed due diligence on proposed MEGATEC improvements. Based on independent analysis and subsequent negotiations, MCC, FOMILENIO, and MINED representatives decided that establishing two MEGATECs—one in Chalatenango and another in Ilobasco—would fail to address a fundamental weakness in the country's educational system: the low quality of middle school institutions that would serve as feeder schools for MEGATECs and other post-secondary institutes. Under this reasoning, stakeholders chose to proceed with the ITCHA intervention, but canceled plans to construct a MEGATEC in Ilobasco. Instead of financing this second MEGATEC, compact funds would be used to strengthen 20 technical middle schools in the Northern Zone. Strengthening middle schools would serve as a supplement to the ITCHA intervention, as better middle schools would supply ITCHA (and other existing or new MEGATEC facilities in and near the Northern Zone) with students who were properly prepared for post-secondary education. As stated in the compact, the converted ITCHA would offer courses to up to 1,100 students annually, serve as a national hub for advanced technology training, and become a resource center for vocational teacher training and curriculum development.

As the Formal Technical Education Sub-Activity was originally designed, the existing ITCHA site in Chalatenango would undergo a series of infrastructure improvements, including large improvements to existing buildings. However, this plan was abandoned during 2008 due to three main considerations. First, it became apparent that the ITCHA's existing lot size was not large

[14] In El Salvador, students enroll in post-secondary institutes after graduating from middle school. Middle school studies are the equivalent of 9th and 10th grade in the U.S. (for a general degree) or 9th through 11th grade in the U.S. (for a technical degree). Post-secondary degree programs are generally two years in length.

enough to accommodate all the planned infrastructure improvements or the school's projected enrollment of 650 students in future years. Second, students' access to the institute was also a factor. FOMILENIO and MINED identified an alternate location for the ITCHA (already owned by MINED) at the entrance of the city of Chalatenango and near a well established bus stop. Stakeholders agreed that this location would have better student access than the existing ITCHA site, especially among students who traveled from distant locations. Third, the alternate location had access to farmland, which could be used in future years for a new program in agriculture that ITCHA administrative staff was planning.

Given these considerations, FOMILENIO, MINED, and MCC staff considered building a new structure at the alternate location. This decision had additional costs, given that construction costs of a new facility would be higher than modifying an existing facility (and blueprints had already been developed to enhance the existing ITCHA's infrastructure). To inform the decision, FOMILENIO reviewed the projected economic rates of return (ERRs) related to rehabilitating the old building versus constructing a new facility.[15] Although the ERR of rehabilitating the old building was substantially higher than constructing a new facility, FOMILENIO leadership chose to construct the new building.[16] FOMILENIO, MCC, and MINED staff believed that moving to a new location was the best decision in the long-term, as a larger facility would better accommodate future enrollment increases and the alternate location provided an opportunity to establish an agricultural program.

During interviews in late 2011, all stakeholders agreed that the decision to build a new facility in an alternate location was the correct one, particularly given actual large enrollment increases at ITCHA in 2010 and 2011. An MCC representative cited stakeholders' flexibility and initiative as fundamental to making this large modification to existing plans. According to the interviewee, FOMILENIO staff demonstrated a high degree of leadership in organizing meetings with MINED and other stakeholders to secure stakeholder support for the new facility.

As shown in Table II.1, the original budget for the Formal Technical Education Sub-Activity was nearly $20 million. Budgeted at $7 million, MEGATEC construction included $1.6 million for new ITCHA buildings, labs and physical assets; $2.1 million for instructional equipment; $2.1 million for ITCHA learning resources, including computers and software licenses; and $1.2 million for program design and training for MEGATEC personnel. A total of $9 million was allocated for improvements to 20 technical middle schools in the Northern Zone, including new infrastructure, computer labs, learning resources, and training for principals and teachers. In addition, nearly $4 million was allocated to scholarships to ITCHA and middle school students. However, given the uncertainties associated with construction and training costs, FOMILENIO and MCC staff viewed each subcategory in this preliminary budget as fungible. Some investments were expected to surpass their original budgets, and some investments were expected to cost less than originally budgeted.

[15] The economic rate of return (ERR) is defined as the interest rate at which the cost and benefits of a project, discounted over its life, are equal. In general, MCC selects and finances investments with an ERR above 10 percent. However, ERR thresholds differ across sectors and projects.

[16] According to analysis conducted by a FOMILENIO employee in 2009, remodeling the existing ITCHA had a projected ERR of 51 percent, whereas the projected ERR associated with building a new facility was between 9 and 11 percent, depending on whether an auditorium and other additions were included in program costs. However, MCC staff did not verify the validity of these estimates.

Table II.1. Formal Technical Education Sub-Activity Budget (in US$)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
MEGATEC Construction						**7,000,000**
Buildings, workshops, labs and physical assets	50,000	800,000	550,000	200,000		1,600,000
Instructional Equipment	250,000	1,200,000	300,000	250,000	100,000	2,100,000
Learning Resources (software, instructional materials)	100,000	800,000	800,000	250,000	150,000	2,100,000
Program design and training for MEGATEC personnel	250,000	300,000	500,000	100,000	50,000	1,200,000
Middle School Strengthening						**9,000,000**
Buildings, workshops, labs and physical assets	100,000	1,500,000	500,000	400,000		2,500,000
Instructional Equipment	250,000	1,200,000	800,000	250,000		2,500,000
Learning Resources (software, instructional materials)	250,000	750,000	500,000	250,000	250,000	2,000,000
Program design and training for middle school principals, teachers and staff	100,000	500,000	500,000	500,000	400,000	2,000,000
Scholarships						**3,800,000**
MEGATEC and middle schools		200,000	800,000	800,000	1,655,000	3,455,000
Administration		20,000	80,000	80,000	165,000	345,000
Totals	**1,350,000**	**7,270,000**	**5,330,000**	**3,080,000**	**2,770,000**	**19,800,000**

Source: Preliminary Human Development Project budget, October 2006.

B. Developing Two New Degree Programs Using the MEGATEC Model

The MEGATEC component of the ITCHA strengthening intervention was originally envisioned by the Government of El Salvador as part of its 2021 National Education Plan, developed in 2005. The plan defined four key goals to be met by the Salvadoran educational system by 2021. First, educational programs should support students' holistic development. Second, the entire Salvadoran population should attain at least 11 years of education (the equivalent of a general middle school degree). Third, Salvadorans should have access to high-quality technical and technological education. Lastly, technology and science education should advance the social well-being of the country's citizens. The plan presented the MEGATEC middle and post-secondary school model as one of the key educational initiatives to achieve these goals—particularly the third goal of high-quality technical and technological innovation (See Figure II.2 for a summary of the MEGATEC model and other competency-based education approaches).

Figure II.2. Competency-Based Education and the MEGATEC Model

First developed in the United States in the 1970s, Competency Based Education (CBE) is an educational approach that prioritizes what learners are expected to do rather than on what they are expected to learn. Although a variety of CBE models currently exist in several countries, CBE advocates generally define educational goals in terms of precise measurable descriptions of knowledge, skills, and behaviors that students should possess at the end of a course of study.

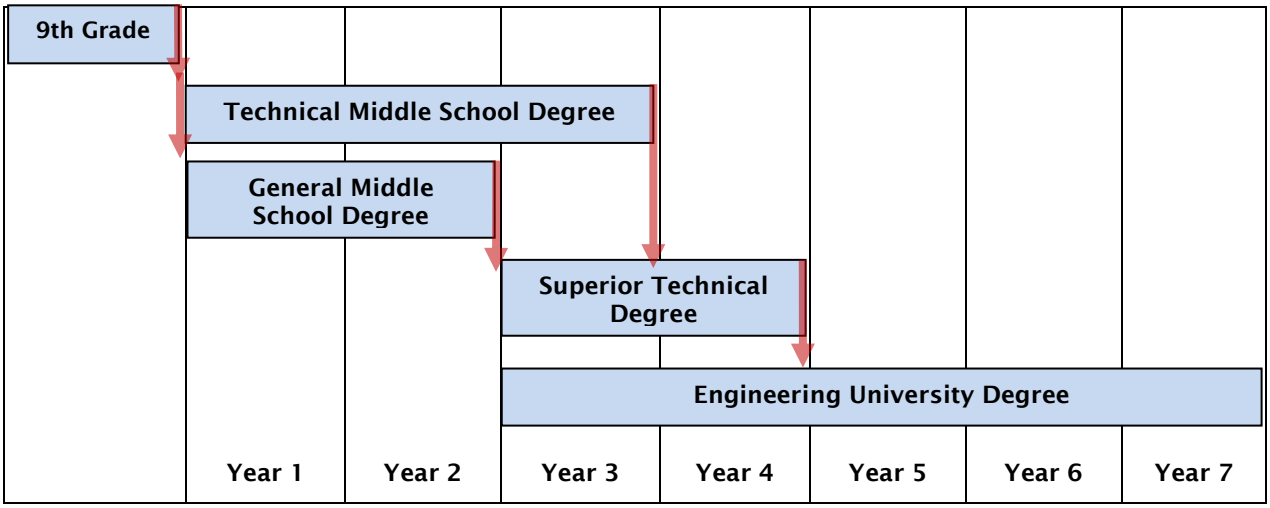
According to research by educational specialists including Foyster (1990), Delker (1990), and Norton (1987), common characteristics of competency-based education approaches include the following**:**

- Competencies are carefully selected based on key skills needed to perform a function or profession.
- Supporting theory is integrated with skill practice.
- Detailed training materials are tailored to the competencies to be achieved and are designed to support the acquisition of knowledge and skills.
- Methods of instruction involve mastery learning, the premise that all participants can master the required knowledge or skill with sufficient time and appropriate training methods.
- Flexible training approaches, including large group methods, small group activities and individual study, are essential components.
- A variety of support materials is used, including print, audiovisual and simulations tailored to the skills being mastered.
- Satisfactory completion of training is based on achievement of all specified competencies.

In addition to following these training principles, the government of El Salvador's MEGATEC model has a strong labor market focus: all degree programs must directly meet regional and national labor market needs. This is not inherent to a competency-based approach, but is common among established competency-based models in Canada, Chile, and other countries. Through CIDE's assistance in recent years, the MEGATEC model has come to share key characteristics of the Quebec competency-based approach. This approach involves an employment situation analysis (ESA), a joint session between educators and labor market representatives in which a degree program's core competencies are developed and refined. The Quebec model also involves the creation and use of various other planning documents, including a pedagogical and learning material guide and a competency evaluation guide. These guides serve to standardize the quality of education among different institutes that offer the same competency-based degree.

Developed for technical middle schools and post-secondary institutions, a key aspect of the MEGATEC model is that it links the curricula of secondary (or middle school) technical education programs to the curricula of post-secondary programs. This link allows a reduction in the total time of study needed to complete a post-secondary technical degree without sacrificing the quality of education. After completing two years of middle school, students can obtain a general middle school degree. Alternatively, students can complete three years of middle school and obtain a technical middle school degree. At this point, students with a technical middle school degree can transfer directly to the second year of a post-secondary institution and obtain a superior technical degree within a year—as opposed to the typical two-year timeframe required of students with a general middle school degree. The model also presents the possibility of obtaining a university engineering degree with only three additional years of study following graduation from a post-secondary MEGATEC (See Figure II.3).

Figure II.3. Students' Progression through the MEGATEC System



Source: Fundamentals of Technical Middle School and Superior Technological Education." MINED, 2008.

To adopt the MEGATEC model in the Northern Zone, FOMILENIO staff needed a strong understanding of the region's labor market needs. In 2008, FOMILENIO contracted CIDE to analyze the labor market demands in the Northern Zone and develop new MEGATEC degree programs that responded directly to these demands. As instructed by FOMILENIO, CIDE staff focused this analysis on potential job markets related to interventions financed under the MCC-El Salvador compact, including the Productive Development Project and the Connectivity Project. Based on this analysis, CIDE recommended six programs with the potential for a high degree of labor insertion of technical education graduates. After discussions between MINED, CIDE, and FOMILENIO, MINED chose two new degrees—civil engineering and alternative tourism—to be developed as MEGATEC programs in ITCHA.[17] According to MINED and FOMILENIO sources, the civil engineering program was chosen due to the proximity of road construction related to the Connectivity Project, and the alternative tourism program was chosen because the Northern Zone,

[17] The other four programs that were not selected included mechanical engineering, local and community development, handicraft production, and marketing (with a specialization in fair trade). These four programs were not selected under the rationale that they did not have strong potential for labor insertion following graduation, compared to the two selected programs.

and particularly the department of Chalatenango, has several natural and historical locales that are conducive to national and international tourism. Stakeholders believed an academic program in alternative tourism had potential synergies with FOMILENIO investments in tourism and handicrafts under the Productive Development Program. In addition, it was deemed important to include a program that would attract female students given that the new civil engineering program would likely attract primarily male students.[18]

Developing the two new programs' objectives, competencies, and curricula was a collaborative process. In 2009, CIDE held three-day workshops with key stakeholders—including representatives from the private sector—to determine which competencies were needed in each program. Next, CIDE analyzed and proposed curricula for these competencies and conducted additional workshops with participants with all levels of expertise to develop and evaluate teaching and training plans. Key players in this process were ITCHA's education council[19] (known as CDE for its initials in Spanish), as well as teachers and MINED representatives. Below is a description of the two selected MEGATEC degrees and their primary competencies that resulted from this participatory process:

- ***Civil engineering.*** This degree program trains students to design and build structures, roads, and other key infrastructure projects. Upon completion of the program, civil engineering graduates should be able to analyze soil and materials, design and build infrastructure, manage construction projects and budgets, and inspect public works.
- ***Alternative tourism.*** This degree program develops professionals in the industries of tourism and ecotourism who can create touristic services and products at a minor scale. Upon completion of the program, graduates will be trained to identify potential tourist attractions, create quality services and products, lead tours and coordinate touristic activities, and create and maintain ecotourism sites.

According to the intervention's timeline, these new two-year MEGATEC programs would be made available to ITCHA students during the 2010 school year, which began in January 2010. In early 2012, the first graduates in the two new programs would complete their technical education and receive a superior technical degree. These two programs would be offered in addition to ITCHA's four existing technical programs—marketing, computer programming, computer maintenance, and software development.[20]

A key factor for incorporating ITCHA into the MEGATEC model was the linkage with middle schools. Under the MEGATEC model, four middle schools near ITCHA would offer a similar technical middle school degree in alternative tourism or civil engineering. These "linked" middle schools would provide ITCHA with trained students who could forego the first year of technical superior education and enroll directly in the second year of ITCHA's MEGATEC programs.

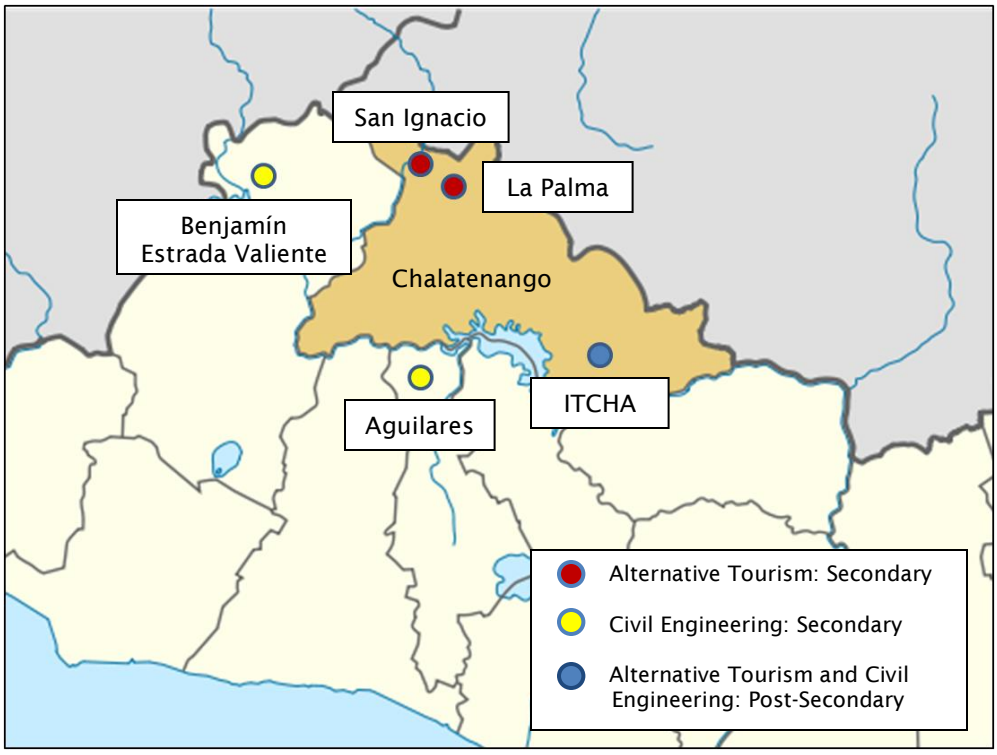
[18] In written comments to a draft of this report, one CIDE staff-member expressed that the two selected academic programs were unlikely to provide as many "opportunities" to youths as other programs proposed by CIDE. However, no additional details were provided regarding this opinion.

[19] Comprised of teachers and parents, each school's education council (CDE) designates the use of the school's resources, including investments in teaching materials, computers, and other technologies. The CDE is analogous to parent-teacher organizations (PTOs) in the U.S.

[20] The software development is also a new (non-MEGATEC) degree program. It was first offered in the 2011 academic year.

MINED, CIDE, and FOMILENIO determined that two middle schools, the La Palma National Institute and the San Ignacio National Institute, would offer the MEGATEC alternative tourism degree. Similarly, two middle schools, the Benjamin Estrada Valiente National Institute and the Aguilares National Institute, would offer the civil engineering MEGATEC degree. These middle schools were selected due to their geographic proximity to ITCHA, as well as their potential for employment related to the two new degree programs. For example, the technical middle schools chosen for the alternative tourism program—La Palma and San Ignacio—are located in one of the areas in the Northern Zone with the most potential for eco-tourism. (See Figure II.4 for the locations of ITCHA and its linked middle schools).

Figure II.4. Map of ITCHA and Linked MEGATECs



After the four middle schools were identified, MINED secured the consent of these institutes' principals and teachers to add the new MEGATEC programs. Approval for the MEGATEC programs was also granted from the CDEs at these middle schools. According to project timelines, the new middle school degrees would be introduced in 2010, and the first cohort of MEGATEC students would graduate from the middle schools at the end of 2012. In 2013, these students would be able to register in the second year of ITCHA and obtain a superior technical degree within a year.

C. Contracting New Teachers and Planning Teacher Training

Because the MEGATEC competency-based approach was new in El Salvador, training was essential to introduce the two new degree programs at ITCHA and its linked middle schools. Intensive curriculum planning for the new degree programs was also important because the new programs' modules had to be designed with a global understanding of program objectives and competencies, as well as a nuanced understanding of interrelationships between competencies. In preparation for the 2010 academic year, CIDE staff and other stakeholders would develop and refine curricula for the new programs, and CIDE would train middle school and post-secondary staff to teach each of the programs' modules.

As the program's primary technical contractor, CIDE recommended that MINED hire teachers who already had the technical knowledge covered by MEGATEC programs (such as an engineering degree), and provide them with training in pedagogy and the competency-based approach. The rationale for this proposal was that it was possible to train a person with technical knowledge to become a teacher in one year, but not vice versa. MINED staff agreed with this approach, and individuals with technical backgrounds were hired to teach ITCHA and middle school classes.

According to its training timeline, CIDE planned to administer training in three phases. In the first phase, CIDE staff would conduct a diagnostic of new teachers' needs,[21] in the second phase they would teach newly hired teachers the appropriate pedagogical practice, and in the third phase they would provide technical training for specific topics in which teachers were deficient. The first two-week training was scheduled for December 2009, before the 2010 school year's commencement. In addition, CIDE planned to provide follow-up training during the school year and an additional week of training in internships, competency-based evaluation, and suggested improvements based on classroom observations.

CIDE also planned to administer basic training on the competency-based approach to ITCHA administrative staff and non-MEGATEC teachers. The rationale for teaching non-MEGATEC teachers was that they needed to understand the new competency-based approach and learn new evaluation techniques. In contrast to MEGATEC teachers, however, non-MEGATEC teachers would not receive any technical training.

As mentioned above, MEGATEC program design and training costs were originally projected to be $1.2 million dollars. This budget would cover training for all ITCHA and middle school teachers for MEGATEC programs approved by MINED, estimated at between 10 and 20 individuals. It would also cover training in competency-based education for all non-MEGATEC teachers at ITCHA. Through these training efforts, a total of over 60 individuals would receive intensive training in leadership, competency-based education, and formative evaluation methodologies.

Under the middle school strengthening component, CIDE would also provide training in competency-based education and leadership to principals, teachers, and other stakeholders at the 20 technical middle schools that were scheduled to receive infrastructure improvements. The total budget for middle school strengthening program design and training was $2 million.

D. Scholarships and PILAS

According to the compact, FOMILENIO would administer an estimated 3,600 scholarships to post-secondary and middle school students during the compact period. At the post-secondary level, FOMILENIO allocated a number of scholarships for students enrolled in both MEGATEC and non-MEGATEC programs at the ITCHA. The MEGATEC model defines scholarships as essential to increase enrollment, along with other incentives such as school-sponsored internships. In addition, students enrolled in 17 of the 20 technical middle schools strengthened under the sub-activity would be awarded scholarships. Due to an effort on the part of MINED and FOMILENIO

[21] This diagnostic largely focused on determining teachers' needs relative to the technical content featured in the new degree programs.

to incentivize enrollment in technical programs, a higher percentage of middle school students in technical and linked MEGATEC programs would receive FOMILENIO scholarships than students in general programs. According to the sub-activity's initial budget, $3.8 million was devoted to middle school and post-secondary scholarships over four years (from 2009 to 2012).

According to original plans, ITCHA and middle school scholarships would be awarded based on financial need, but they would also have an academic performance requirement. CIDE was responsible for the initial design of the scholarship program. Submitted in May 2008, CIDE's proposal recommended scholarships of at most $500 per year for middle school scholarships and $1,500 per year for post-secondary scholarships.[22] The final scholarship amounts approved by MINED and FOMILENIO were $400 per year for middle school students and $1,500 annually for post-secondary students.[23] The difference in the scholarship amounts between middle school and post-secondary education was largely based on higher transportation and living expenses associated with post-secondary education. Many ITCHA students live with relatives or rent apartments several kilometers from their parents' houses, whereas most middle school students live with parents within a few kilometers of middle schools. ITCHA students' larger scholarship amounts would also cover their higher inscription costs relative to middle school students.

In addition, CIDE proposed basic eligibility requirements for scholarships, which MINED and FOMILENIO approved. The final eligibility requirements for middle school scholarships were the following: applicants must be a resident of the Northern Zone, be a Salvadoran citizen, have limited economic resources (a household income of less than three times the minimum wage of around $6 a day), have completed a year of education in the previous three years, have passed 9th grade with a minimum of a 6.0 grade point average (out of 10 points), be interested in studying one of the selected degrees offered by eligible middle schools, and meet the requirements set by the school in which they planned to enroll. Because of its extensive experience in granting and administering scholarships, the Entrepreneurial Foundation for Educational Development (known as FEPADE for its initials in Spanish) was charged with administering FOMILENIO's middle school scholarships. Middle school scholarships would be awarded in the first year and could be renewed in additional years if students were in good academic standing.

Because there was a need to conduct a rigorous impact evaluation of the effect of middle school scholarships, CIDE, MCC, FOMILENIO, MINED, and Mathematica staff agreed that when the number of eligible applicants exceeded the number of scholarships available, scholarships would be awarded through a lottery system. In 2009, FOMILENIO awarded only 150 middle school scholarships in a small number of schools, and there was no need for random assignment. In 2010, FOMILENIO received 1,898 scholarship applications, of which 1,524 were eligible. Mathematica staff randomly assigned the available 1,000 scholarships among these 1,524 eligible applicants, and 921 scholarships were awarded.[24] In 2011, the number of eligible applications did not exceed the

[22] CIDE. "Scholarship Program Proposal, El Salvador" May 2008.

[23] Based on data from a 2009 survey of young adults previously enrolled in the 20 schools chosen for the intervention, these students' average household income is around $4,000. As such, the middle school scholarship represents about 10 percent of students' household income, and the ITCHA scholarship represents about 38 percent of students' household income.

[24] The discrepancy between 1,000 available scholarships and 921 scholarships awarded is largely due to students' decision to not enroll in classes during the 2010 school year.

number of scholarships available (1,200 scholarships), so random assignment was not necessary. In 2011, a total of 1,197 middle school scholarships were awarded, and another 1,141 were awarded in 2012.

Regarding post-secondary scholarships at ITCHA, CIDE, MINED, and FOMILENIO staff predicted that the number eligible applicants would be lower than the number of scholarships available. As a result, random assignment of ITCHA scholarships was also unnecessary. As determined by stakeholders, the requirements for ITCHA scholarships were residing in the Northern Zone, having a middle school degree, being in economic need, and meeting all ITCHA requirements for acceptance as a first-year student. As long as students maintained passing grades, the scholarship could be renewed during students' second year at ITCHA. In 2009, 61 first-year ITCHA students were awarded a scholarship. In 2010, 200 first-year students received a scholarship, and in 2011, 325 first-year students were awarded a scholarship. ITCHA scholarships were administered directly by AGAPE.

In addition, in 2010 FOMILENIO and MCC planned a related intervention, the Sustainable Labor Insertion Program (knows as PILAS for its initials in Spanish). PILAS is intended to support productive employment for students in the Northern Zone who have benefited from FOMILENIO's Human Development Program, including non-formal training workshops, scholarships, enhanced technical middle schools, and the new ITCHA. More specifically, the objective of PILAS is to link beneficiaries with potential employers and provide beneficiaries with incentives to engage in entrepreneurial activities. PILAS assistance to beneficiaries with potential to establish their own business includes help with business plans and technical training in business administration and accounting. In contrast, PILAS assistance to beneficiaries with potential for formal employment includes job placement services, interview preparation assistance, and job fairs. In addition, the program offers scholarships to students with potential for advanced studies. With funding of $2.7 million, the program is implemented by grantee organizations with guidance from FOMILENIO, MINED, and the Salvadoran Institute for Professional Training (known as INSAFORP for its initials in Spanish). The activity officially began in 2010 and will conclude in 2012.

The PILAS program originated from conversations between FOMILENIO and MCC staff regarding the best way to maximize the job placement rate of students benefited under the Formal Technical Education Sub-activity. The program was also formulated in response to interim feedback from beneficiary students, who requested additional help for seeking and obtaining jobs following graduation in an informal survey conducted by FOMILENIO. Examining the educational system in 2009, FOMILENIO and MCC staff perceived a dearth of career counseling and job placement services available to youths in the Northern Zone. According to stakeholders, there was a labor market failure in the Northern Zone: there were talented, trained people looking for employment as well as viable employers, but not enough information to help market supply and demand converge. The proposed solution, the PILAS program, was intended to correct this market failure by preparing recent graduates for the job market and allowing targeted and up-to-date information sharing to facilitate the linkage of trained individuals with potential employers.

Although FOMILENIO and MCC staff primarily designed the activity, CIDE also made contributions to the model based on its experience with job placement services. In addition, many key stakeholders were consulted regarding the new project's design and objectives. (See Figure II.5 for a summary of the effectiveness of similar labor insertion programs in developed and developing countries.)

Figure II.5. Existing Evidence on the Effectiveness of Labor Insertion Programs

According to research published in the last decade, employment services and small business assistance programs—similar to PILAS in their offer of job coaching, business plan assistance, and job fairs—can have a positive effect on employment rates and income, particularly in developed countries such as the U.S. and Britain (Rodriguez-Planas, 2007). In addition, studies of employment assistance programs in five transition countries (Bulgaria, Czech Republic, Hungary, Poland, and Romania) found that these programs can have a positive effect on employment rates, as well as a positive effect on income (in the case of programs in Poland and Romania) (Betcherman, et al, 2004). As documented in several studies, the costs of simple employment assistance programs are often relatively low in comparison to their generated benefits. However, these studies suggest that programs are more likely to generate positive employment outcomes under favorable economic conditions. In addition, there is some evidence that job search assistance and employment services are unlikely to have a measured effect where labor demand is weak (Betcherman, et al, 2004).

Currently, there is very little research regarding the effectiveness of employment services in developing countries. However, new evaluations from two Latin American countries paint a more nuanced picture of the impact of job search assistance in developing countries. A 2002 study of a public employment service in Brazil found that the use of these services did not increase participants' probability of finding formal work, but did have a weak positive impact on their likelihood of finding informal employment (Woltermann, 2002). This finding suggests that in economies with large informal sectors, workers often prefer alternate job search channels and contacts outside of those provided by formal employment programs. Other studies of an employment assistance program in Uruguay found that the impact of labor market information services on youth employment rates was linked to their education, with better-educated young workers registering the greatest gains from these programs (Fawcett, 2001).

Given this evidence, more research is needed to assess the success of labor insertion programs in developing countries, particularly in countries in which informal sectors are large and hiring often occurs through informal networks. Future research may also provide insight into whether additional labor insertion programs in Latin American countries are more likely to benefit better-educated youths than their less-educated counterparts.

III. IMPLEMENTATION

In this chapter, we discuss the implementation of the key components of the ITCHA strengthening intervention, as well as additional interventions under the Formal Technical Education Sub-Activity. First, we present a summary of the new ITCHA's construction and middle school improvements, followed by a discussion of teacher training sessions and the introduction of MEGATEC degree programs. Lastly, we discuss implementation of FOMILENIO's scholarship and job placement programs. When relevant, we provide summaries of key program outputs as well as stakeholder perceptions of each component's implementation.

A. Construction of a New Facility and Infrastructure Improvements

After some delays related to the project's architectural plans, construction on the new ITCHA facility started on April 19, 2010. Under the original plan, all construction would be completed in 10 months. However, two significant rainstorms in 2010 slowed progress on the new ITCHA facilities. Flooding was widespread on the ITCHA lot when workers constructed the new buildings, and several leaks emerged near a new building's foundation. Stakeholders reported that these leaks were actually helpful, as they helped the construction firm make the necessary modifications to drainage systems and reroute rainwater away from the facility's foundation.

Construction workers finish drainage systems surrounding the ITCHA, 2010.

AGAPE staff expected to start teaching classes in the new ITCHA facility in January 2011, the start of the 2011 school year. However, the building was not yet operational at that date. From January to April 2011, temporary classrooms were created at the old ITCHA to house the school's four pre-existing academic programs and the two new MEGATEC programs. By all accounts, the old ITCHA institute in Chalatenango was overcrowded during these months, as enrollment practically doubled from 2009 to 2011. Said one ITCHA administrator, "We had to make a sacrifice and we communicated to parents, the community, and the students about making a similar sacrifice." The old building didn't have enough capacity for all students, so AGAPE staff staggered classes between 11 AM and 1 PM. These months were challenging for ITCHA staff, teachers, and students. However, an MCC representative stated that all parties involved, particularly AGAPE, managed the transition well.

Construction was completed April 3, 2011, and ITCHA classes began at the new facility shortly thereafter (see Figure III.1 for a timeline of ITCHA construction and middle school improvements). Considering the weather constraints, MCC and FOMILENIO viewed the facility's completion in April as an impressive feat. According to one FOMILENIO representative, the most important reason construction was completed nearly on schedule was the shared commitment among all parties involved. The representative said, "We took care of many issues to see the project through. Timelines were compressed to complete construction quickly."

Completed ITCHA classrooms, 2011.

Following improvements, the new ITCHA facility had 9 functioning classrooms, a multiple-use auditorium, and an outdoor cafeteria. In addition, it had 4 computer labs and 10 technical labs, as well as 170 new computers (Table III.1). As reported by FOMILENIO in March 2012, the construction costs of these new installations totaled around $5.1 million. This is well above the $1.6 million originally budgeted for construction, as original budget figures were based on plans to remodel the existing ITCHA. However, according to FOMILENIO sources, all ITCHA expenses—including construction, instructional equipment, learning resources, and program design and training—may not exceed the original budget of $7 million by a substantial amount. This is largely because actual expenses on equipment, resources, and training were far lower than originally budgeted. As reported by FOMILENIO in March 2012, a total of $2.3 million was spent on instructional equipment and learning resources for ITCHA and middle schools.[25] This was far below the combined $8.7 million budgeted for these expenses.

In addition to ITCHA improvements, 20 middle schools in the Northern Zone received substantial infrastructure improvements from August 2009 to March 2010, including 49 new classrooms, 15 new laboratories, 8 new computer labs, and 124 new sanitary services (Table III.1). In a survey conducted by FOMILENIO, personnel at all 20 middle schools reported receiving FOMILENIO assistance, including improved building infrastructure and new or improved

[25] Unfortunately, FOMILENIO's accounting system does not separate ITCHA and middle school strengthening expenses related to instructional equipment and learning resource purchases, and well as design and training expenses. As such, there is no way to determine if actual costs associated with ITCHA exceeded the original ITCHA budget.

computer laboratories (FOMILENIO 2011). By all accounts, implementers met the compact's target of 20 remodeled and equipped technical middle schools by the third year of the compact period.

By March 2012, payments to contractors related to middle school infrastructure improvements totaled around $4.0 million, or $1.5 million more than the $2.5 million originally budgeted for construction. Due to lower equipment, resources, and training costs than projected, however, all middle school expenses—including construction, instructional equipment, learning resources, and program design and training—may not exceed the original budget of $9 million for middle school strengthening activities.[26]

Table III.1. ITCHA and Middle School Improvements

ITCHA		
Infrastructure	9 classrooms, a multiple-use auditorium, and an outdoor cafeteria	
Laboratories	4 computer labs and 10 technical labs	
Computers	170 new computers. As of August 2011, ITCHA had 6 classrooms with 24 computers each (for use in MEGATEC and non-MEGATEC programs).	
Middle Schools		
	New Infrastructure	Improved Infrastructure
Classrooms	49 classrooms in 14 schools	18 classrooms in 2 schools
Laboratories	15 laboratories in 12 schools and 8 computer labs in 8 schools	1 laboratory in one school and 3 computer labs in 3 schools
Additional Infrastructure	1 administrative office, 3 libraries, 1 multipurpose room, and 4 roofs	2 administrative offices, 2 libraries, 2 cafeterias, 2 parking lots, and 1 retaining wall
Sanitary Services	124 sanitary services in 19 schools	26 sanitary services in 2 schools

Source: CIDE administrative data.

According to FOMILENIO, CIDE, and MINED interviewees, all expectations for ITCHA construction and improvements were met. Interviewed stakeholders, including ITCHA administrators, teachers, and students, reported being very satisfied with the new facility. ITCHA staff stated that the new buildings were the best advertisement for the school's new degree programs.

Following ITCHA improvements, civil engineering students reported having advanced digital equipment and a well-equipped computer center. In addition, students reported that new classrooms were large and each student had a desk, in contrast to the previous ITCHA. Students said that these improvements were more conducive to learning than previous arrangements. ITCHA teachers made similar statements, reporting that new, larger classrooms made teaching easier. In addition, teachers stated that ITCHA's new offices met their needs and the school's administrative area had greatly improved.

[26] Unfortunately, FOMILENIO's accounting system does not separate ITCHA and middle school strengthening expenses related to instructional equipment and learning resource purchases, and well as design and training expenses. As such, there is no way to determine if actual costs associated with middle school strengthening have exceeded the original budget.

Although new ITCHA facilities and materials were largely a positive development, there were some delays during the 2010 school year related to teaching materials and technology. GPS units, which were scheduled to be used by first-year tourism students, arrived several months later than scheduled. As a result, ITCHA teachers planned to administer a remedial course in GPS use to second-year tourism students, who had GPS classes in 2010 but no practice with the equipment. In addition, some technological issues had not been resolved as of August 2011. First, some software licenses were still not available or were too expensive to purchase, and institute staff was attempting to obtain less expensive software at the time of interviews. Students also noted that classrooms often reached very high temperatures, and ventilation could be improved.

During focus groups, some ITCHA teachers reported that the configuration of new non-MEGATEC labs was not optimal. One teacher remarked, "The old labs had been designed to meet our needs, but the new design is not functional." The teachers reasoned that if they had been consulted, they could have helped design labs that were more conducive to high-quality instruction. Related to this point, there was some discontent among teachers in the traditional non-MEGATEC programs, who felt that their needs and programs were not considered by the school administration to be as important as MEGATEC needs and programs. One teacher of a non-MEGATEC program said, "Even if the new building is much better, the focus has been on the new programs and the traditional programs have stayed at the margins." One ITCHA administrator expressed a contradictory point of view by saying, "We spoke about the needs according to the different programs regarding equipment, etc. For the work stations, people who know the area gave opinions and they are fine. They are missing a few things, but they are fine."

Regarding improvements in ITCHA's four linked technical middle schools, principals mentioned that they were consulted regarding nearly all improvements before they occurred. According to one principal, there was more interest from potential students after the institute had been improved. Students at one middle school acknowledged these improvements, but also reported lacking access to computers at school. To complete their coursework, the students regularly paid for computer time at a nearby cybercafé. According to some tourism students at La Palma, the school's computer center is available, but there is no Internet service, some computers are already broken, and there is no ongoing maintenance. (See Table III.2 for a summary of stakeholders' perceptions of ITCHA and middle school improvements.)

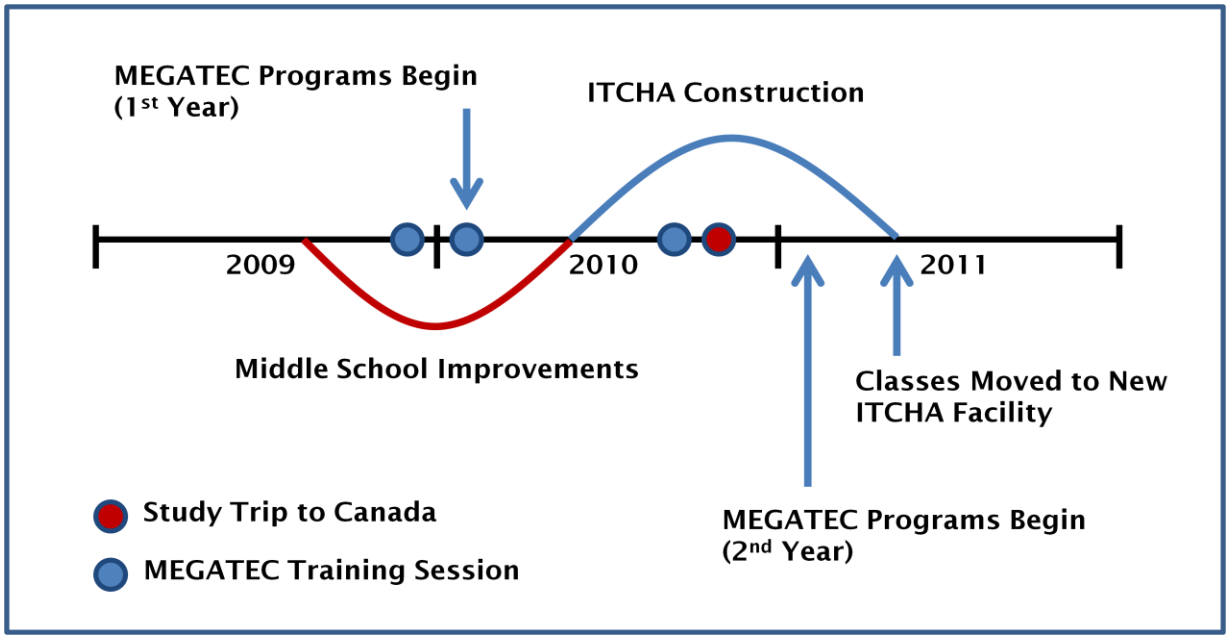
In summary, both the ITCHA and linked MEGATEC middle schools have undergone significant improvements in the past two years. Students and teachers alike praised these improvements, but cited additional technological issues that were still unresolved mid-way through the 2011 academic year.

Table III.2. Perceptions on New Facilities and Improved Infrastructure

Student Perceptions	
ITCHA Students	ITCHA students viewed the new facility as superior to the previous facility. The students reported that more space and better equipment at the new school had facilitated learning. The only negative comment was that classrooms often reached high temperatures, and ventilation could be improved.
Middle School Students	Tourism students at La Palma reported that the computer center had initial improvements, but by mid-2011, there was no Internet service, some computers were already broken, and there was no ongoing maintenance.
Teacher and Administrator Perceptions	
ITCHA Teachers and Administrators	In general, teachers expressed satisfaction with the new infrastructure. ITCHA teachers reported that new classrooms were larger, and this made teaching easier. The labs were also larger, the offices met their needs, and the administrative area had improved. However, some teachers expressed dissatisfaction that strengthening efforts appeared to prioritize the needs of MEGATEC programs over those of the traditional programs.
Middle School Principals	According to one principal, there was more interest from potential students after institutes had been improved.

Source: In-person interviews conducted in August 2011.

Figure III.1. Timeline for ITCHA Construction and MEGATEC Training



B. Contracting New Teachers and Conducting Teacher Training

In preparation for the 2010 school year, CIDE and MINED recruited and contracted four ITCHA teachers (two civil engineering teachers and two tourism teachers) and five technical middle school teachers (three civil engineering teachers and two tourism teachers). In particular, contracting these five middle school teachers presented a key challenge. As described above, CIDE, MINED, and FOMILENIO agreed to hire middle school teachers with technical knowledge and train them in pedagogy. Existing MINED regulations permitted middle schools to hire only teachers with a formal teaching certification, which most of these individuals did not posses due to their technical background. To allow these new technical middle school teachers to be contracted for the 2010

school year, MINED passed a decree that allowed teachers with technical training to be hired without an official teaching certification; these teachers would be required to obtain this certification within a year. During training and before the decree was passed, however, CIDE assumed responsibility for hiring and paying technical middle school teachers. Because these teachers were contracted and paid by CIDE, all actors avoided violating MINED policy.

Once qualified MEGATEC teachers were selected and contracted, school principals and teachers were trained in a series of workshops. First, CIDE staff trained ITCHA and linked middle school principals and administrative staff in competency-based education models in a 10-day workshop in November 2009 (see Figure III.1). A total of 23 people attended at least one unit of this workshop, including FOMILENIO and MCC representatives. Next, CIDE conducted the first MEGATEC teacher training session in December 2009. The objective of this training was to help teachers develop competency-based course materials in anticipation of the school year, which began in January 2010.

A second training session in Chalatenango occurred from January 4 to 9, 2010. The purpose of this session was to review and formalize course plans and materials, and develop evaluation tools to assess students' achievement. The third session was held in San Salvador in August 2010 (more than midway through the 2010 school year), which focused on planning students' internships and applying additional teaching and evaluation techniques. In addition, CIDE staff provided educational support for teachers from January to September of 2010, in which they conducted classroom observations and gave teachers feedback on their performance. In total, training included seven workshops and 136 hours of instruction, and 9 months of follow up and support. Thirteen teachers were trained, and 11 teachers participated in nearly all workshops and sessions (four ITCHA teachers and seven middle school teachers).

With the exception of one middle school that sent two teachers to train in the same degree program, all linked middle schools sent only one teacher to 2009-2010 training sessions. To ensure that sufficient staff was trained in the competency-based model, CIDE would have preferred to train two teachers per institute. However, the number of teachers who could be hired and trained was approved by MINED, largely based on the number of students enrolled. For the 2010 academic year, most institutes could justify devoting only one teacher to MEGATEC programs.

The profile of teachers who participated in the training was relatively young—between 20 and 30—with a good technical knowledge base but no formal knowledge of pedagogy. As such, these new teachers did not have a sound understanding of how to develop teaching materials and assess students' performance. CIDE staff mentioned this need in a training summary report that stated, "The primary deficiency is the majority of teachers' difficulty in knowing how and when to evaluate and assess the students' knowledge."[27] To correct this deficiency, CIDE staff focused on pedagogy and student evaluation in follow-up trainings.

Throughout the school year, ITCHA teachers could request additional training on technical aspects of the MEGATEC curricula that they had not yet mastered. For example, civil engineering teachers requested training in topography, and alternative tourism teachers requested training in basic first aid. As of October 2011, two additional training sessions for ITCHA staff were scheduled:

[27] CIDE, 2010. "Final Report: Training of Teachers in Linked Degree Programs"

one session on teaching-learning methodologies and another on specific technical aspects of the civil engineering program. At the time of interviews, several teachers were also completing coursework at the university in order to meet MINED's certification requirements.

In addition, teachers and administrators of MEGATEC programs as well as FOMILENIO, MINED, CIDE, and INSAFORP staff (totaling 22 people) participated in a one-week study trip to Canada in September 2010 to learn about competency-based approaches. According to participants, the trip was very educational, as it provided an opportunity to observe competency-based instruction firsthand. One ITCHA administrator who participated in the trip said, "The trip was very helpful. We had heard of the competency-based approach from different countries (Colombia, Germany, and Mexico), and now we have seen exactly how it works." The trip also provided participants with a chance to socialize and get acquainted. An MCC representative said that this informal socialization was helpful in establishing a rapport between stakeholders from different institutions.

ITCHA teachers of non-MEGATEC programs also received some basic training from CIDE specialists on competency-based teaching methods. As part of middle school strengthening efforts, CIDE staff also administered training to 540 middle school teachers, administrators, parents, MINED staff, and other stakeholders as of September 2011. These less intensive training sessions were designed to introduce stakeholders to the competency-based approach and help them develop lesson plans, educational charts, and assessment materials needed to teach courses. (See Table III.3 for a summary of all training sessions.)

Table III.3. Teacher Training Outputs

Training Output	Description
Number of MEGATEC workshops conducted	7 workshops totaling 136 hours, and 9 months of follow-up training and support.
Number of teachers trained in MEGATEC workshops	11 teachers participated in nearly all workshops and sessions (4 ITCHA teachers and 7 middle school teachers).
Number of stakeholders trained in additional middle school workshops	540 teachers, administrators, parents, MINED staff, and other stakeholders as of September 2011.
Study trip	22 individuals representing MINED, FOMILENIO, CIDE, and INSAFORP took a one-week trip to Canada in September 2010 to learn more about competency-based training.

Source: In-person interviews conducted in August 2011 and 2010 CIDE report, "Final Report: Training of Teachers in Linked Degree Programs"

According to MINED, FOMILENIO, trained teachers, and school administrators, all MEGATEC training sessions were well implemented and useful. Stakeholders credited CIDE's professional and capable instructors, as well as teachers' enthusiasm and strong communication skills as the major facilitators of the productive experience. One middle school principal said, "The training by CIDE was excellent. Improvement is clear; we used to see uncertainty [among teachers] at the beginning, now it's not there. What a radical change!" In particular, teachers found units on student evaluation tools to be particularly useful.

However, training sessions did have some limitations. First, because pedagogy was the primary focus of the trainings, technical deficiencies were not fully addressed in the sessions. One ITCHA administrator remarked that one engineering module related to soil analysis needed follow-up instruction. The administrator said, "Some teachers have experience, but soil analysis is a very specific area of studies and the teachers…need to learn more [on the subject] to speak with authority

and impart it to students." ITCHA teachers of non-MEGATEC programs also mentioned that they would have liked to participate in intensive training, as they saw that their colleagues greatly benefited from the sessions.

Interviews with MEGATEC students suggest that training workshops sufficiently trained teachers to administer the new degree programs. ITCHA civil engineering students reported that teachers had improved the quality of their instruction, were flexible in their teaching approach, and could explain key concepts until students understood them. In focus groups, ITCHA students also noted that teachers had improved their teaching techniques over the course of each academic year, and from one year to the next. Middle school tourism students remarked that alternative tourism classes were well taught. In contrast, the students noted that instruction in other related areas, especially English, were in need of improvement. (See Table III.4 for a summary of student and teacher perceptions regarding teacher training and preparedness.)

Table III.4. Perceptions on Teacher Training and Preparedness

Student Perceptions	
ITCHA Students	Civil engineering students reported that teachers had improved their quality of instruction, were flexible, and explained concepts until students understood them.
Middle School Students	Tourism students reported that tourism classes were well taught. However, instruction in other related areas, especially English, was in need of improvement.
Teacher and Administrator Perceptions	
ITCHA Teachers and Administrators	ITCHA teachers reported that training provided by CIDE had helped to develop tools to evaluate and improve teaching.
Middle School Principals	One principal noted that the training by CIDE was excellent. The principals praised teachers' improvement from one year to the next.

Source: In-person interviews conducted in August 2011.

Although there appeared to be agreement among stakeholders that past teacher contracting and training was successful, stakeholders expressed uncertainty about several issues related to future contracting and training efforts. Because of enrollment increases, one middle school director was making preparations to hire an additional alternative tourism teacher. The current alternative tourism teacher expressed concern that the school would not find an applicant with the appropriate tourism credentials in time for the 2012 academic year. Another concern mentioned during interviews was that teachers with advanced technical degrees could earn higher salaries in San Salvador than in Chalatenango. In response to higher wages in the capital, some technical teachers from Chalatenango might eventually relocate to San Salvador, and few technical teachers living in San Salvador would be willing to commute to Chalatenango.

Future teacher contracting and payment—all of which will be handled by MINED—were also a concern among middle school principals and teachers. At the time of the interviews, institutes presented their staffing needs and projected enrollment to MINED's regional office, and MINED staff assigned resources to contract teachers, as necessary. As of the 2011 school year, MINED had attempted to provide schools with the number of teachers they requested. However, middle school administrators were unsure if their future requests would be accepted by MINED. In addition, there was some uncertainty that MINED's decree—which allows middle schools to hire teachers who are not certified—would remain in place in future years. MINED's salary payments to teachers was also somewhat irregular during 2010 and 2011. One teacher in La Palma mentioned that she had been

paid by MINED only recently for several months of work. An MCC representative confirmed that MINED's payment of teacher salaries and student scholarships had experienced delays. The interviewee said, "We have had to periodically pressure MINED to get payment moving to students and teachers. Those uncertainties are not good for teaching or learning."

An even greater concern than recruiting, contracting, and paying new teachers is the lack of a formal procedure to train newly hired teachers in competency-based degree programs. Before the 2011 school year, two CIDE-trained alternative tourism teachers resigned from their positions at ITCHA. Because formal training from CIDE was no longer available, ITCHA's civil engineering teachers informally trained newly contracted tourism teachers on the competency-based approach. As of late 2011, no official training procedure had been established for new teachers of MEGATEC programs, and no financial or human resources had been devoted to additional training. Reflecting on this situation, one CIDE representative said that this issue could have been avoided if MINED had committed some staff to become trainers in 2009 and 2010. The representative said, "Before training the teachers, there should have been training of a small MINED group to lead the transformation and give sustainability to the model…this would have led to better follow-up and a shared vision with MINED."

The absence of a formal MEGATEC training procedure—as well as the necessary financial and human resources for training—could have negative implications for the quality of MEGATEC education in future years. If more CIDE-trained teachers resign in upcoming academic years, there may not be enough experienced and trained teachers to informally train newly hired teachers on the competency-based approach. In addition, informal training from other teachers (who teach different degree programs) is probably not sufficient to fully impart the range of skills needed for each program's technical aspects. According the interviewed stakeholders, the most appropriate solution to this issue is for MINED to establish a training procedure and designate funding for future technical training efforts. One MCC representative said, "[Technical schools] need enough money to contract people like CIDE. There are some local people who can do this kind of training. MINED should make resources available to hire them."

C. Implementing Two New MEGATEC Degree Programs

Next, we discuss the implementation of the two new MEGATEC degree programs at ITCHA and its linked middle schools. Key aspects of implementing the two new MEGATEC degree programs were conducting outreach to upcoming middle school students, implementing a coherent MEGATEC curriculum in technical middle schools and the ITCHA, and providing hands-on experience to students related to the programs' modules. We discuss each of these aspects below.

Outreach related to the new MEGATEC middle school programs was targeted to 9th grade students in elementary schools near ITCHA's four linked technical middle schools. In 2009, FEPADE staff visited elementary schools to promote the scholarship program and the new MEGATEC degree options. ITCHA personnel also promoted the new programs through existing parent and student networks, and FOMILENIO staff traveled to several municipalities to promote the programs. FOMILENIO also financed radio ads and promotional materials to increase student interest in the two new technical programs available at ITCHA and its linked middle schools. In November 2009 and 2010, there was an introductory two-week course at ITCHA in which all degree programs were presented and explained to prospective students. Partly related to these outreach efforts, 2010 MEGATEC enrollment exceeded 150 students in middle schools and reached nearly 100 students at ITCHA.

According to teachers and administrators, introducing a coherent MEGATEC curriculum in ITCHA and the middle schools in 2010 and 2011 was challenging. Some middle school classes had 40 and even over 50 students, and this large class size precluded a large amount of one-on-one instruction. With four trained MEGATEC teachers, ITCHA had sufficient human resources to place around 20 students in each class. However, this seemingly manageable number of students per class posed a challenge in teaching some modules that required hands-on practice and instruction.

Another challenge to implementing a coherent curriculum was the need to establish uniform achievement standards for middle school students who would eventually enroll in ITCHA as second-year students. To ensure this uniformity, CIDE provided middle school teachers with standards for first-year students' achievement on each competency, as well as definitions regarding how each competency would be evaluated. These guidelines were instrumental in ensuring that a common MEGATEC curriculum was provided across middle schools in both new programs.

A factor that facilitated the introduction of the new degree programs was that all trained ITCHA and middle school teachers were young, very motivated and had completed training together. This shared training experience allowed for better communication among teachers and created an informal link between middle schools and the ITCHA. Often, ITCHA and middle school teachers communicated via Internet, requested help from each other when needed, and shared relevant information about lesson plans and curricula. This communication was particularly useful in ensuring that middle schools with the same MEGATEC programs were using similar methods to teach each competency. Another facilitator of the successful introduction of the two new degrees was AGAPE staff, which coordinated class schedules and resource allocation among teachers and programs in an efficient manner, particularly when classrooms were overcrowded during construction in 2010**.** Said one MCC interviewee, "[AGAPE staff] does a lot with very little. They are very innovative."

Hands-on practical experience—through school activities as well as internships—is integral to learning under the MEGATEC competency-based approach. Of the two new degree programs, civil engineering students had more access to work experience and internships, largely related to the construction of the new ITCHA institute and nearby road construction work. Alternative tourism students did not have similar access to internships related to the tourism industry. During interviews, ITCHA staff mentioned the need to form more alliances with potential employers in the future, as these alliances could lead to more internship opportunities for students in both programs.

Regarding stakeholders' perceptions on the new MEGATEC programs, the competency-based approach was very positively received from students and teachers alike. During the 2011 school year, middle school students (who took a mix of MEGATEC classes and non-MEGATEC classes) stated that they favored the MEGATEC approach to the more traditional unit-focused teaching method. In interviews, middle school teachers and students expressed that students had learned core competencies well, and these competencies were directly related to labor market needs in the region.

According to some ITCHA teachers, the school's conversion to a MEGATEC had actually improved education in the traditional programs, as non-MEGATEC teachers found more opportunities to provide their students with practical, hands-on application of key concepts. The MEGATEC approach also generated interest among students of the traditional programs—particularly marketing students—for more hands-on practice. One ITCHA administrator said, "Now even our non-MEGATEC teachers say that all teaching needs to be practical."

Although there is an overall positive reception of the competency-based model, some MEGATEC teachers reported they would have liked additional guidance in making a transition to the MEGATEC model. One middle school teacher said, "We learned by trial and error…sometimes we feel we were thrown in the water to learn." In addition, some teachers reported that they would have liked to participated in the design of the competency-based modules, as they viewed some of the modules as repetitive, felt some modules were missing, and thought some of the subjects could have been improved with teacher input. CIDE personnel also thought that teacher input would have been helpful, but due to the timing of implementation, the modules were designed before teachers were hired.

Regarding their experience with the MEGATEC curriculum, middle school students studying tourism expressed that computer training and computer use should be available during all years of MEGATEC study, and more math classes and instruction on starting and managing a company would better serve their needs. Facing a lack of computer instruction in school, two interviewed students attended an outside computer class every Friday, which they paid for out-of-pocket. (See Table III.5 for a summary of student and teacher perceptions of the new MEGATEC programs.)

Table III.5. Perceptions on New MEGATEC Programs

Student Perceptions	
ITCHA Students	ITCHA students reported high satisfaction with the two new programs, and affirmed that the new programs serve their educational needs as well as the labor market needs in their area.
Middle School Students	Several students in the tourism program expressed a desire for more training on starting and managing a company, more math instruction, and more computer classes.
Teacher and Administrator Perceptions	
ITCHA Teachers and Administrators	Teachers and administrators reported high satisfaction with the competency-based approach. However, some teachers stated that they would have liked to be part of the design of the competency-based modules.
Middle School Principals	Principals reported that the new programs are successful and students in MEGATEC programs are very motivated.

Source: In-person interviews conducted in August 2011.

D. Scholarships and PILAS

From 2009 to 2011, FOMILENIO financed 586 ITCHA scholarships of $1,500 to students in MEGATEC and non-MEGATEC programs (61 in 2009, 200 in 2010, and 325 in 2011). Administered by AGAPE, the ITCHA scholarship covered enrollment, learning materials and books, food, and transportation. As shown in Table IV.6, around 80 percent of first-year students enrolled at ITCHA in 2011 received a FOMILENIO scholarship, and similar proportions of students in MEGATEC and non-MEGATEC programs received this scholarship.[28] As of March 2012, FOMILENIO was projected to spend approximately $1.7 million on ITCHA scholarship payments during the compact period.

[28] Unfortunately, there is no credible estimate of the proportion of ITCHA students who receive a non-FOMILENIO scholarship. However, ITCHA administrators explained in interviews that non-FOMILENIO scholarships are also available to students, to the extent that during some school years, there is an oversupply of available scholarships.

From 2009 to 2012, FOMILENIO awarded 3,409 middle school scholarships (150 in 2009, 921 in 2010, 1,197 in 2011, and 1,141 in 2012). In Table III.6, we provide additional information on scholarships awarded in 2010 and 2011. As illustrated, 8 percent of scholarships awarded in 2010 and 2011 were not fully disbursed, primarily due to students' decisions to discontinue their studies. Also notable is the higher concentration of scholarships among students in linked MEGATEC programs versus non-MEGATEC programs. About 80 percent of first-year middle school students enrolled in linked alternative tourism and civil engineering MEGATEC programs in 2011 received a scholarship, whereas only 36 percent of first-year middle school students enrolled in other programs in 2011 received a FOMILENIO scholarship.[29,30]

Table III.6. Technical Middle School and ITCHA Scholarships

	2010	2011
ITCHA Scholarships		
First-Year students with active scholarships (MEGATEC programs)	70 of 97 enrolled (72%)	107 of 133 enrolled (80%)[b]
First-Year students with active scholarships (Non-MEGATEC programs)	108 of 173 enrolled (62%)	213 of 271 enrolled (79%)[c]
Inactive scholarships[a]	22 of 200 awarded (11%)	5 of 325 awarded (2%)
Middle School Scholarships		
First-Year students with active scholarships (linked MEGATEC programs)	126 of 172 enrolled (73%)	132 of 169 enrolled (78%)
First-Year students with active scholarships (other programs)	674 of 2,741 enrolled (25%)	1,019 of 2,814 enrolled (36%)
Inactive scholarships	121 of 921 awarded[d] (13%)	46 of 1,197 awarded[d] (4%)

Source: CIDE administrative records, 2011.

[a]Inactive scholarships are scholarships that were accepted but not fully disbursed, usually due to students' decision to drop out or transfer schools.

[b]In addition, 73 of 89 (82 percent) second-year students in MEGATEC program received scholarships in 2011.

[c]In addition, 113 of 170 (66 percent) second-year students in non-MEGATEC programs received scholarships in 2011.

[d]The total number of scholarships awarded, 921 and 1,197 in 2010 and 2011, respectively, do not match the total number of scholarships available in 2010 and 2011 (1,000 and 1,200, respectively). This discrepancy is related to a portion of scholarships—particularly in 2010—that were offered to students but not accepted.

[29] The original objective was that all middle school students enrolled in linked MEGATEC programs would receive scholarships. However, some students who applied lived outside of the target area and/or did not fill out the documents correctly or promptly. As a result, scholarships cover around 80 percent of incoming middle school students enrolled in linked MEGATEC programs in 2011.

[30] Unfortunately, there is no credible estimate of the proportion of middle school students who receive a non-FOMILENIO scholarship.

From 2009 to 2012, FOMILENIO financed a total of 4,330 middle school and post-secondary scholarships.[31] This was 730 more scholarships than the compact's goal of 3,600 scholarships. As of March 2012, FOMILENIO was projected to spend approximately $3.2 million on scholarship payments and administrative fees associated with the middle school scholarship program during the compact period, and a combined $4.8 million on the MEGATEC and middle school scholarship programs. This is over $1 million more in expenses than the $3.8 million originally budgeted for MEGATEC and middle school scholarships.

The consensus among students and teachers is that ITCHA scholarships were generous and served as a primary motivation for students' enrollment. One ITCHA student said, "The scholarship is very important; it covers the cost of books, registration, transportation and more. It is a determining factor for students. Some had quit [studying] and came back due to the scholarship." Middle school scholarships were also viewed as helpful by school principals and teachers, particularly for students with very limited resources. Middle school students also expressed appreciation for the scholarships, but reported that at $40 a month, these scholarships do not cover their educational costs. One middle school student said, "We eat lunch here and it costs $1.50 to $2.00 a day. The scholarship covers less than 50 percent of expenses for those who live far away."

Despite their modest amount, middle school scholarships appeared to play a large a role in motivating students to enroll in MEGATEC programs. Some students reported that they selected their educational program based solely on the availability of scholarships. One tourism student said, "We were hoping to study something else, but due to the scholarship we signed up." One middle school principal was somewhat concerned about the large role that scholarships played in students' decisions to enroll in new MEGATEC programs. The principal said, "We make students aware they should not study for the scholarship money only. They need to actually like the program."

Regarding barriers to successful administration of the scholarship, some middle school students reported that scholarship disbursements had not been paid in a timely manner. Through its contract with FEPADE, FOMILENIO was responsible for administering all first-year (and half of all second-year) middle school scholarships for the 2011 academic year, and these scholarships appear to have been distributed in a timely manner. However, half of all second-year middle school scholarships (and all third-year scholarships) granted in 2011 were financed and administered by MINED. These scholarships were subject to MINED's annual budget approval, and this process delayed payments. When received by students, the payments were retroactive and covered several months in one lump sum. Some students reported receiving their first scholarship disbursement in July and as late as August 2011 to cover expenses dating back to January 2011. (See Table III.7 for a summary of student and teacher perceptions of FOMILENIO scholarships.)

[31] This includes 3,409 middle school scholarships, 586 post-secondary scholarships for ITCHA students, and 335 post-secondary scholarships for non-ITCHA students.

Table III.7. Perceptions on FOMILENIO Scholarships

Student Perceptions	
ITCHA Students	Students expressed great satisfaction with the scholarship amount and its regular administration.
Middle School Students	Students expressed high satisfaction with the scholarships, but mentioned that the amount was not enough to cover all expenses. In some schools, scholarship payments were delayed six months due to MINED's budget approval process.
Teacher and Administrator Perceptions	
ITCHA Teachers and Administrators	Scholarships were a determining factor in students' enrollment decision, along with ITCHA's new facilities and technological improvements.
Middle School Principals	Principals said that continuing the scholarship program would be very helpful, as most students had very limited financial resources.

Source: In-person interviews conducted in August 2011.

According to projections and MINED commitments in 2011, all qualified students from linked middle schools who enrolled in ITCHA in 2012 would get scholarships, financed and administered by MINED. MINED would also finance and administer scholarship renewals for second-year ITCHA students. However, the scholarship amount had not been confirmed by late 2011 and MINED had not yet defined how payments would be disbursed. FOMILENIO financed these scholarships during 2010 and 2011, and students were paid in cash. Students used this cash to pay housing and transportation expenses on a monthly basis. In late 2011, it was not yet clear if payments would be made in cash or in kind once administration of the scholarships transferred to MINED.[32]

Starting in 2010, MINED began financing and administering half of all second-year middle school scholarships, while FOMILENIO financed all first-year scholarships and the remaining half of second-year scholarships. In 2011 and 2012, a similar arrangement was scheduled to continue, except MINED would also fund all third-year scholarships (as mentioned above). However, in December 2011, MINED reported that due to emergency repairs following the rainstorms earlier in the year, it could not fulfill its full 2012 commitment to financing second- and third-year FOMILENIO scholarships. As such, MINED requested that FOMILENIO cover $182,600 in scholarship payments to complement MINED's 2012 contribution of $260,000. With MCC's no-objection, FOMILENIO agreed to this request.

After FOMILENIO assistance ends, MINED will presumably assume responsibility for funding second- and third-year middle school scholarships until the last cohort of FOMILENIO scholarship recipients finishes middle school in 2014. The annual middle school scholarship amount will likely remain $400 per year. In addition to financing these scholarship renewals, in 2013 MINED plans to begin granting scholarships to incoming middle school students in the Northern Zone under its existing PROEDUCA scholarship program. However, it is unclear whether these scholarships will be offered to students enrolled in all 20 middle schools currently benefited by FOMILENIO and MCC.

[32] Currently MINED offers scholarships in MEGATEC La Unión and those scholarships are in kind: they cover tuition and food in the school's cafeteria.

As of early 2012, the PILAS program had completed several months of full implementation. By March 2012, all three PILAS grantees—Agape, Empresarios Juveniles, and Adel-Morazán—had reported results regarding their success in selecting candidates for the program, placing them in formal jobs, and helping them start their own businesses. Combining results from all three grantees, the program had placed 107 individuals in jobs and helped 65 individuals start their own businesses. These preliminary results showed that initial placement and self-employment targets were far too ambitious, and placement goals were revised downward to between 20 and 75 percent of original goals. In addition, self-employment goals were lowered for two of the program's three grantees. According to a presentation submitted by CIDE staff, one key lesson learned during the first year of PILAS implementation was that additional criteria should be applied to candidates following initial selection to guarantee that these candidates had a strong desire to work, and to ensure that self-employment candidates had sufficient motivation and a minimum level of resources.

As of March 2012, FOMILENIO was projected to spend approximately $1.1 million on programmatic costs and administrative fees associated with PILAS during the compact period. This is approximately $1.6 million less in expenses than the $2.7 million originally budgeted for PILAS in 2010. However, this amount did not include consulting fees paid to CIDE for PILAS implementation.[33]

In late 2011, one MCC interviewee stated that in hindsight, FOMILENIO and MCC should have initiated the PILAS program earlier, perhaps in 2008 or 2009. This would have allowed for a longer implementation period and midcourse corrections to improve the program's processes and approach. However, the interviewee said that MINED stakeholders had expressed a high degree of support for PILAS and were interested in using it as a model for future MINED job placement efforts after the compact period had elapsed. As such, it was feasible that lessons learned with PILAS during the compact period could be applied to future job placement efforts.

E. Integration of ITCHA Strengthening Components

Reflecting on the ITCHA strengthening intervention in its totality—including the ITCHA construction, the new degree programs and teacher training sessions—stakeholders observed that in general, the components were well coordinated by FOMILENIO, MINED, and CIDE staff. One MCC interviewee mentioned the key role played by an informal advisory committee comprised of FOMILENIO, MINED, CIDE and INSAFORP staff as a major facilitator of the implementation of each component, as well as the successful coordination of all strengthening activities. This committee met periodically to review and revise budgets and contracts, as well as solve problems related to construction, training, and scholarships that emerged throughout implementation.

Several stakeholders also mentioned AGAPE staff's strong organizational and leadership skills in facilitating communication between MINED staff and ITCHA teachers in 2010 and 2011, the first two years that MEGATEC programs were offered at ITCHA. Throughout implementation, CIDE staff also played a key role of coordinating activities and facilitating relationships between FOMILENIO and MINED, as well as other stakeholders. These relationships not only facilitated

[33] Unfortunately, the $4.7 million in consulting fees provided to CIDE staff could not be categorized by investment type: e.g., consulting services related to ITCHA, middle schools, PILAS, or scholarships. For this reason, there is no accurate estimation of the actual cost of each investment of the Formal Technical Education Sub-Activity.

implementation tasks, but also helped build a level of trust between institutions that could foster future inter-institutional collaboration in educational initiatives.

IV. OUTCOMES

In this section, we examine the following key outcomes of the ITCHA strengthening intervention: (a) ITCHA and middle school enrollment, (b) student achievement and graduation, (c) linkages with middle schools and universities, and (d) employment and university enrollment. Because employment and university enrollment outcomes were not yet available for MEGATEC graduates during data collection in 2011 and early 2012, we present stakeholders' expectations regarding these outcomes.

A. ITCHA and Middle School Enrollment

In this section, we analyze overall ITCHA enrollment from 2008 to 2011, as well as enrollment in each ITCHA degree program. Because of their linkages with ITCHA's MEGATEC programs, we also analyze middle school enrollment in the two new MEGATEC programs during 2010 and 2011.

On the face of it, enrollment in MEGATEC degree programs was caused by the intervention because these programs were introduced as part of middle school and ITCHA strengthening efforts. However, in the absence of a valid counterfactual, we cannot determine whether MEGATEC students would have simply enrolled in other degree programs (and/or other schools) in the absence of the intervention. As such, we cannot determine with certainty if the intervention increased middle school or post-secondary enrollment in the region. Similarly, enrollment changes in ITCHA's non-MEGATEC programs cannot be attributed directly to the interventions. However, these changes offer insight into students' enrollment decisions in response to the offer of scholarships and the new availability of enhanced facilities and newly trained teachers.

According to official school records, ITCHA enrollment more than doubled from 309 students (across three programs) in 2008 to 663 students (across six programs) in 2011 (Table IV.1). This enrollment during the 2011 school year already exceeded the 2012 enrollment target of 540 students set by MCC and FOMILENIO in their monitoring and evaluation plan. However, ITCHA enrollment in 2012 is not likely to meet the compact's original goal of 1,100 students, due to space constraints and a limited number of instructors.[34] Since 2009, the ITCHA program that experienced the highest enrollment increase was the marketing program, with 13 first-year students in 2009 and 84 first-year students in 2011 (Figure IV.1). Introduced in 2010, the two MEGATEC programs also experienced an increase in first-year enrollment in 2011. Civil engineering enrollment increased from 38 first-year students in 2010 to 59 first-year students in 2011 (a 55 percent increase), and alternative tourism enrollment increased from 59 first-year students in 2010 to 74 first-year students in 2011 (a 25 percent increase).[35]

[34] The compact's original goal of 1,100 students enrolled by the 2012 school year was revised downward to 540 in 2010 when it became clear that the new facility's maximum capacity would likely be around 600 students.

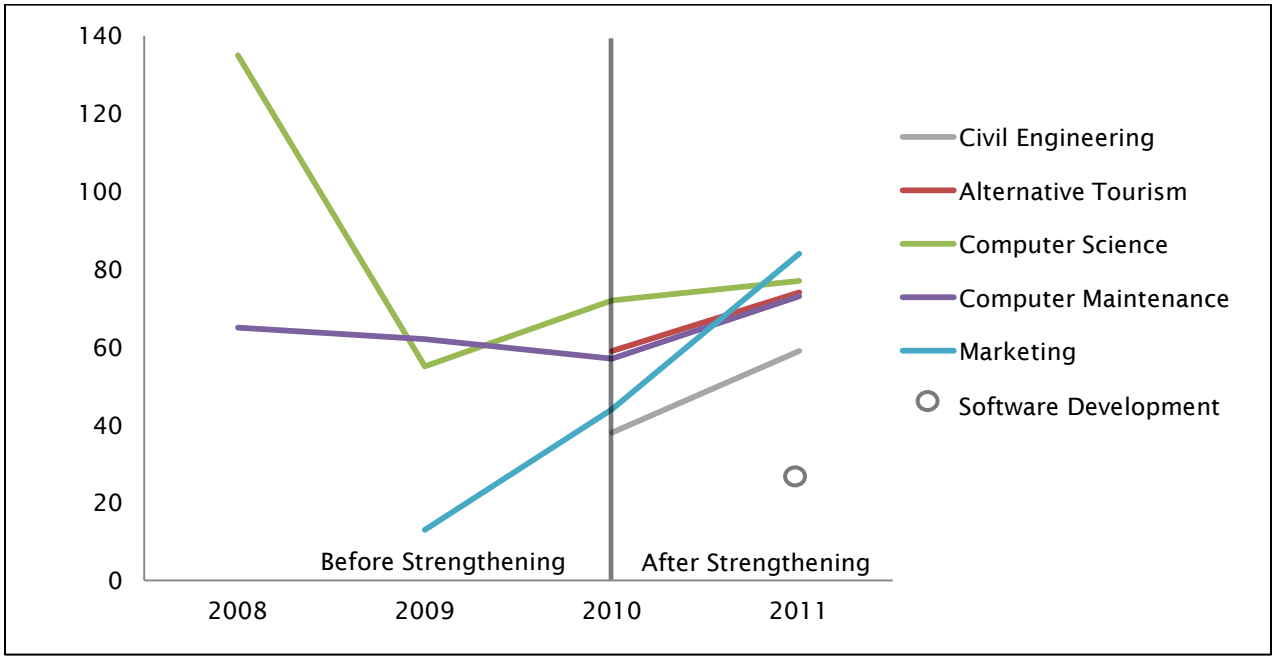
[35] The proportion of males to females varies across ITCHA's degree programs. In 2010, the first-year civil engineering program was only 8 percent female, whereas the alternative tourism program was 66 percent female and the marketing program was 80 percent female. Other degree programs, including computer maintenance and software development, had a stronger gender balance.

Table IV.1. ITCHA Enrollment and Graduation (2008-2011)

Year	MEGATEC Programs		Non-MEGATEC Programs				Total
	Civil Engineering	Alternative Tourism	Computer Science	Software Development	Computer Maintenance	Marketing	
Number of Students Enrolled in First Year							
2008	NA	NA	135	NA	65	NA	200
2009	NA	NA	55	NA	62	13	130
2010	38	59	72	NA	57	44	270
2011	59	74	77	37	73	84	404
Number of Students Enrolled in Second Year							
2008	NA	NA	45	NA	53	11	109
2009	NA	NA	82	NA	52	NA	134
2010	NA	NA	47	NA	50	10	107
2011	36	53	64	NA	67	39	259
Total Enrollment							
2008	NA	NA	180	NA	118	11	309
2009	NA	NA	137	NA	114	13	264
2010	38	59	119	NA	107	54	377
2011	95	127	141	37	140	123	663

Source: ITCHA administrative records, 2011.

Figure IV.1. ITCHA First-Year Enrollment, by Academic Program (Number of Students)



Source: ITCHA administrative records, 2011.

Dividing total second-year ITCHA enrollment in 2011 (259 students in both MEGATEC and non-MEGATEC programs) by total first-year enrollment in the same programs in 2010 (270 students), ITCHA's 2011 second-year retention rate was around 96 percent.[36] This rate exceeded MINED's expectation of an 80 percent continuation into the second year of post-secondary studies. Dividing second-year enrollment in MEGATEC programs in 2011 (89 students) by first-year enrollment in the same programs in 2010 (97 students), it appears that the approximate student retention rate for ITCHA's MEGATEC programs was around 92 percent in 2011. This is comparable to the 2011 retention rate for the school's non-MEGATEC superior technical programs,[37] and both rates are much higher than the 2009 retention rate of less than 70 percent preceding ITCHA's conversion (and the non-MEGATEC retention rate of slightly over 80 percent in 2010, the first year of the intervention).[38]

As shown in Table IV.2, first-year enrollment in the two new MEGATEC programs at the four linked middle schools in 2010 was between 30 and 50 students per school. In 2011, total first-year enrollment increased for the two civil engineering programs by 16 percent, but decreased by 18 percent for the two alternative tourism programs. Based on 2010 and 2011 enrollment figures, retention rates in 2011 appeared to be around 90 percent among the two civil engineering programs, and around 80 percent among the two alternative tourism programs.

Table IV.2. Enrollment in Middle School Programs linked to MEGATEC (2010-2011)

	Civil Engineering Programs		Alternative Tourism Programs		
Year	Benjamin Estrada Valiente	Aguilares	La Palma	San Ignacio	Total
Number of Students Enrolled in First Year					
2010	49	33	44	46	172
2011	56	39	36	38	169
Number of Students Enrolled in Second Year					
2010	NA	NA	NA	NA	NA
2011	43	31	34	40	148
Total Enrollment in Engineering and Alternative Tourism					
2010	49	33	44	46	172
2011	99	70	70	78	317

Source: MINED Office of Accreditation, 2011.

[36] This approach is only a rough estimate of school retention because only a calculation method that accounts for transfers in and out of degree programs will yield an accurate retention rate. A valid retention estimate would have to be based on student-level data.

[37] On average, the average 2011 retention rate across non-MEGATEC programs was 98 percent. However, this figure should be interpreted with some caution, as it reflects the apparent transfer of at least 10 second-year students into the computer maintenance program in 2011. A large portion of these students likely transferred from another institution.

[38] However, it should be noted that 2009 and 2011 non-MEGATEC retention rates are not directly comparable, as the marketing program did not have a 2008-2009 cohort, and was thus not included in the overall 2009 retention rate.

FOMILENIO and MCC staff reported being satisfied with strong ITCHA and middle school enrollment levels. One MCC representative said, "Almost all the ITCHA classrooms are filled. They are almost at capacity. The middle schools are all full, too." MCC staff interpreted large increases in enrollment following improvements as a clear sign of previously unmet demand; when educational programs and the proper infrastructure were finally made available to youths in the Northern Zone in 2010 and 2011, these youths enrolled in middle schools and post-secondary school in greater numbers than anticipated.

B. Achievement and Graduation

With the new MEGATEC programs, student achievement is measured with grades and formative evaluations. CIDE provides teachers with evaluation models, which they use to determine students' progress toward learning all competencies. Based on feedback provided by teachers and students, CIDE has found that the competency-based approach has generated high levels of student learning and achievement. One CIDE representative said, "Teachers are close to their students in age and there is a bond that results in confident students who express themselves well. [Students] show a marked improvement in basic and technological education." If possible, Mathematica staff will attempt to document MEGATEC students' academic achievement in future rounds of data collection.

In the MCC-El Salvador monitoring and evaluation plan (updated in December 2011), stakeholders defined the goal of a 73 percent graduation rate for ITCHA students in 2012. At 88 percent, the overall graduation rate for the 2010-2011 ITCHA cohort (including MEGATEC and non-MEGATEC programs) had already surpassed this goal (Table IV.3).[39] Graduation rates for MEGATEC programs (89 and 83 percent for civil engineering and alternative tourism, respectively) were similar to graduation rates for the school's non-MEGATEC programs, which averaged around 90 percent among all three programs. Interestingly, non-MEGATEC graduation rates for the 2010-2011 cohort (after ITCHA strengthening) were substantially higher than graduation rates for the 2008-2009 cohort (before ITCHA strengthening) enrolled in the same academic programs (an average of 91 percent versus 56 percent).[40]

The MEGATEC graduation rate for students who spent nearly two years at the new facility could not be measured in late 2011, as this MEGATEC cohort will not graduate until late 2012. Given high continuation rates and strong student motivation following improvements, all interviewed students and teachers expressed the expectation that graduation rates in all ITCHA programs would be high during future years. Future data collection efforts by Mathematica staff will focus on student achievement and graduation rates, as well as graduates' employment outcomes.

[39] 2011 graduation rate estimates are calculated by dividing the number of graduates in 2011 by the number of first-year enrollees in 2010. However, this approach is only a rough estimate because only a calculation method that accounts for transfers in and out of degree programs will yield an accurate graduation rate.

[40] This comparison excludes graduation rates for the marketing program, which did not have a 2008-2009 cohort. The estimated graduation rate for the 2010-2011 cohort should be viewed with some caution, considering that it reflects several second-year transfers into the computer maintenance program in 2011.

Table IV.3. ITCHA Graduation (2008-2011)

Cohort	MEGATEC Programs		Non-MEGATEC Programs				All Programs
	Civil Engineering	Alternative Tourism	Computer Science	Software Development	Computer Maintenance	Marketing	
Number of Graduates							
2006-2007	NA	NA	37	NA	43	14	94
2007-2008	NA	NA	35	NA	44	8	87
2008-2009	NA	NA	72	NA	40	NA	112
2009-2010	NA	NA	41	NA	31	9	81
2010-2011	34	49	56	NA	62	37	238
Graduation Rates[a]							
2008-2009	NA	NA	53	NA	62	NA	56
2009-2010	NA	NA	75	NA	50	69	62
2010-2011	89	83	78	NA	109[b]	84	88

Source: ITCHA administrative records, 2010-2012.

[a]Graduation rate estimates are calculated by dividing the number of graduates in each cohort by the number of first-year enrollees in the cohort's first year of enrollment.

[b]The computer maintenance program experienced an increase in second-year enrollment in 2011, presumably from student transfers from other programs and schools. For this reason, the approximate graduation rate is above 100 percent.

C. Linkages with Middle Schools and Universities

About three months before the end of the 2011 school year, the linkage between middle schools and ITCHA appeared strong. ITCHA and middle school teachers regularly communicated with each other regarding lesson plans and curricula. In addition, middle school students took field trips to ITCHA, during which they had the opportunity to talk to post-secondary students and teachers about ITCHA degree programs. In addition, ITCHA and MINED interviewees fully expected that a substantial portion of technical middle school graduates who complete tourism and engineering programs in 2013 will enroll in ITCHA as second-year students.

However, the link between ITCHA and universities was still not well defined by late 2011. Due to the absence of a formal agreement among educational institutions regarding the transfer of credits, students completing a MEGATEC degree at ITCHA would not be able to transfer credits to university degrees, as originally envisioned under the MEGATEC model. One ITCHA administrator commented, "Once students finish their second year [at ITCHA], they can go to the university but they must start all over. They cannot transfer credits due to the competency-based approach used here." In contrast, graduates of traditional ITCHA programs, including computer science, can apply credits earned at ITCHA to university degrees.

Another key aspect of the MEGATEC model—the ability of students to receive a general degree after two years of middle school—had not yet been defined by MINED leadership by late 2011. In interviews, some technical middle school students expressed a desire to obtain a general degree and enroll in a university. Although they had completed the two years of study, these students could not fulfill the final graduation requirement of community service hours, which is not introduced until the program's third year. The students' principal contacted MINED staff to discuss this issue, but did not receive a definitive answer regarding the possibility of waiving the community

service requirement or completing it during the students' second year. In the absence of guidance from MINED regarding this issue—as well as ITCHA students' ability to apply MEGATEC credits to university degrees—students didn't appear to have enough information to make fully informed decisions regarding middle school, post-secondary, and university studies.

D. Employment and University Enrollment

In the MCC-El Salvador compact, stakeholders defined the goal of a 70 percent employment rate of ITCHA graduates one year after graduation, as well as a yearly income among graduates that was 42 percent more than the income of graduates of the 12th grade. It is too early to report employment outcomes of ITCHA graduates, as the first cohort of students who completed two years in the strengthened ITCHA will graduate in late 2012. However, students were very positive during interviews about prospects for gainful employment. They believed their MEGATEC degree was a strong credential, and one ITCHA administrator said that potential employers had already approached students with job offers. Despite these offers, nearly all students planned to finish the programs, according to the administrator, particularly because they saw the scholarships as a rare opportunity and a strong incentive to continue studying.

However, there are some potential barriers to employment for ITCHA graduates. According to several stakeholders, there may be some negative repercussions of saturating the local market with tourism and engineering specialists. One middle school teacher who taught alternative tourism said, "I have 34 students, and there are 38 in San Ignacio, so there is too much competition for the area." Given the large number of middle school and ITCHA graduates in these regions, students may need to relocate to find tourism-related jobs following graduation. Faced with a lack of formal employment opportunities in the area, some recent graduates may also attempt to start their own businesses. Such entrepreneurialism would be viewed as a positive outcome by FOMILENIO staff, but young entrepreneurs would likely require additional skills to start and sustain their own business. Designed to foster formal employment as well as entrepreneurship, the PILAS program may offer recent graduates assistance in both areas.

In theory, middle school students in MEGATEC programs could complete a two-year general secondary (middle school) degree and proceed to university-level studies. Although several interviewed middle school students expressed interest in attending a university after graduation, MINED staff had not yet established a procedure by which a technical middle school student can obtain a general degree and transfer to a university (discussed above). In recent years, a small portion of ITCHA graduates has also pursued university studies. However, ITCHA administrators estimated that few MEGATEC graduates will enroll in universities, due in part to the non-transferability of MEGATEC credits discussed above. Besides these obstacles, it appears that students' lack of economic resources often preclude university studies. One ITCHA teacher said, "The majority [of these students] will not go to the university. They want to work because they come from low economic strata. Less than 50 percent will go on [to university studies]."

V. PROGRAM SUSTAINABILITY

According to the MCC-El Salvador compact, all education improvements funded by the compact were designed in the interest of promoting program sustainability. The compact states, "All aspects of the Education and Training Activity are being designed to install permanent capacities in key Salvadoran ministries and institutions. Investments in school strengthening and education infrastructure development will continue well after the Compact Term."

In this report, we define the sustainability of ITCHA's operations as the continued successful implementation of ITCHA's MEGATEC and non-MEGATEC degree programs in the next 5 to 10 years, in addition to the continued successful implementation of MEGATEC programs at linked technical middle schools. To assess the sustainability of ITCHA operations, we have defined four key elements that must be in place for ITCHA to continue to function as a high-quality, post-secondary institute during this timeframe. These four elements are: (a) the availability of technically trained teachers, (b) continued enrollment in MEGATEC and non-MEGATEC programs, (c) the continued maintenance of the new ITCHA facility and equipment, and (d) leadership and financial support from MINED. Below we assess whether these elements are likely to be present in future years, particularly in the first few academic years following the end of the compact period in late 2012. (See Table V.1 for a summary of this analysis.)

Table V.1. Assessment of ITCHA Sustainability

Key Element	Discussion
Availability of Trained Teachers	As of 2011, there appeared to be no formal arrangement by which technical teachers could be trained after FOMILENIO financial support ends. This may be the largest threat to sustaining the quality of MEGATEC programs, and the program themselves, in the next several years.
Continued Enrollment	Due to recent construction and improvements, enrollment in middle school and post-secondary technical programs will likely be strong in the next several years. However, future enrollment rates may be affected by the availability of scholarships and the type of expenses they cover.
Facility Maintenance	Annual allocations from MINED will cover any maintenance and repair expenses in the next several years. There is currently a designated budget for short- or long-term maintenance and repair.
MINED Leadership and Support	MINED commitment to technical education and ITCHA appeared strong in 2011. However, the Ministry has not yet explicitly committed the necessary funds for additional teacher training.

A. Availability of Technically Trained Teachers

Training teachers is a challenge for all Salvadoran schools, including ITCHA and its linked middle schools. As of late 2011, the process for training new technical middle school and post-secondary MEGATEC teachers was still undefined. The absence of a formal MEGATEC training program—as well as designated financial and human resources to conduct such training—could have negative implications for MEGATEC education in future years. If additional CIDE-trained teachers resign during in upcoming academic years, there may not be enough experienced teachers to informally train newly hired teachers on the competency-based approach. In addition, informal training from experienced teachers is probably not sufficient to fully develop the range of skills needed to teach each program's technical aspects. According to the interviewed stakeholders, the most appropriate solution to this issue is for MINED to establish a training program and designate

funding for future technical training efforts. As of late 2011, however, the absence of a training plan (and the resources to implement it) posed a threat to the long-term availability of experienced and competent technical teachers at ITCHA and its linked middle schools

In addition, stakeholders expressed some concern regarding schools' ability to find qualified candidates for middle school and ITCHA MEGATEC positions, either because of a lack of professionals with engineering or tourism backgrounds, or because qualified individuals would be more likely to take teaching positions in San Salvador. MINED's ability to contract and pay teachers in a timely manner was also a concern among middle school principals and teachers.

Report update: In 2013, MINED representatives informed Mathematica staff that the Ministry had begun a quality control program at ITCHA in 2011. Under this Ministry-financed program, all teachers are trained and provided with support services. The Ministry reported that ITCHA staff determines the program's budget on an annual basis, and the Ministry approves this budget. As such, a formal teacher training program is in place for ITCHA teachers. However, it is unclear if this program provides MEGATEC teachers with specialized technical training and supports, or whether teacher training is uniform across all ITCHA degree programs. In addition, it is unclear if secondary school MEGATEC teachers currently receive specialized training related to the program's competency-based technical education model.

B. Continued Enrollment in MEGATEC and Non-MEGATEC Programs

High levels of enrollment in ITCHA's MEGATEC and non-MEGATEC programs—as well as enrollment at ITCHA's linked middle schools—seem likely to continue during the next several years. ITCHA and middle school improvements, including new classrooms, laboratories, and computer laboratories, will likely motivate students to enroll in technical programs. ITCHA's strong reputation for producing high-quality technical workers will also help to maintain enrollment at present levels.

However, scholarships also play an important role in the decision of the students to enroll at ITCHA and linked middle schools. As of 2011, future ITCHA scholarship amounts and payment methods were still undefined. If future ITCHA scholarship payments are in-kind (as opposed to cash payments), students may not have the same incentives to enroll or continue studying. In addition, delays in scholarship payments could also have a detrimental effect on students' decisions to continue studying. As of late 2011, MINED had made scholarship payments to second- and third-year middle school students with delays of approximately seven months. These delays will likely continue given MINED's annual budget approval process, which takes about five months. In addition, it is unclear whether MINED will grant new scholarships to incoming students at all of the 20 strengthened middle schools after the sub-activity ends in 2012. Because scholarships play a large role in students' enrollment decisions, any substantive changes to the availability of scholarships, the payment amount, the form of payment, or the timeliness of payment could have negative implications for ITCHA and middle school enrollment and continuation rates.

Report update: In 2013, MINED representatives informed Mathematica staff that the Ministry had implemented a scholarship program, "Let's Go To School," which is designed to provide disadvantaged students with financial assistance. Under this program, MINED provides primary, secondary, and post-secondary school students with scholarships to cover educational expenses. From 2011 to 2013, nearly 400 scholarships were awarded to ITCHA students. According to data provided by MINED, these scholarships appear to be approximately $1,350 per student per year. The availability of these scholarships would likely encourage students' enrollment in ITCHA programs.

Future enrollment may also depend on new graduates' ability to find jobs, as well as prospective students' views on whether ITCHA's degree programs will help them find employment. The first cohort of students in the new ITCHA degrees will graduate in early 2012. In general, students and teachers have high expectations for labor insertion. However, given current economic conditions, there is some concern about the job prospects for the civil engineering students. In addition, there is potential for an oversupply of graduates with tourism degrees in the Northern Zone. ITCHA and MINED staff appear to monitor labor market demand and supply related to these specialties—as well as the supply of technical specialists—and cancel, initiate, or modify programs as necessary. For example, ITCHA administrative staff recently decided to discontinue the computer science program based on market saturation. This program will be replaced by agriculture, which appears to be an appropriate fit for the region. ITCHA and MINED's ability to alter its mix of degree programs in response to market supply and demand will likely facilitate continued student interest and ITCHA enrollment in the future. However, this process may entail the cancellation of existing MEGATEC and non-MEGATEC programs and the creation of new degree programs.

C. Maintenance of the New Facility

The new ITCHA buildings seem to be of high quality and a maintenance plan is currently in place through AGAPE. However, equipment maintenance and software updates are already needed. What's more, enrollment is expected to increase in future years, creating additional equipment and software demands in the short-term. In the medium-term, ITCHA's computers will become obsolete and need to be replaced within several years. MINED is responsible for covering a portion of these short- and medium-term maintenance and equipment costs. At this time, MINED has allocated funding to cover these expenses in the short- and medium-term. Accordingly, there is not a high risk in the short- or medium-term that the ITCHA facility will face maintenance challenges that could compromise its ability to function as a post-secondary institute.

D. Leadership and Financial Support from MINED

Continued government support—and particularly MINED support—is necessary for ITCHA's continued operation. As of late 2011, MINED leadership appeared committed to maintaining advances made under the sub-activity. High-level MINED staff actively participated in trips, training workshops, and planning meetings to support technical education in the Northern Zone. One MCC representative said, "At first, we feared that MINED would not buy into it. But they are really getting on board." The interviewee reasoned that creating the critical mass of new infrastructure helped to strengthen government support. Once MINED saw that the FOMILENIO investments were working well, the interviewee stated, their commitment to the region and MEGATEC model has grown.

In recent years, MINED staff also committed to granting and renewing future ITCHA scholarships, as well as financing second- and third-year FOMILENIO middle school scholarships until 2014. However, a natural disaster precluded MINED from honoring its full 2012 scholarship commitment of $442,600. In response, FOMILENIO provided an additional contribution to fully fund the program. Given this development, stakeholders emphasized the importance of guaranteeing that MINED honor its 2013 and 2014 scholarship commitments. However, there appear to be few legal or administrative mechanisms by which stakeholders can guarantee such compliance.

In addition, by late 2011 MINED leadership had not yet defined the link between MEGATECs and universities or the procedure to obtain a general middle school degree after completing two years of technical education. If MINED staff resolves these issues in upcoming school years, students could make more informed enrollment decisions before upcoming school years.

Perhaps most importantly, MINED's continued leadership and financial support is a necessary requirement for all three key elements to sustainability discussed above. MINED leadership must design and finance training for new MEGATEC hires, continue to finance ITCHA and middle school scholarships, and provide resources for the maintenance to the new ITCHA facility. As such, ITCHA's short- and long-term sustainability hinges on leadership and budget support from MINED in these areas. As stated above, MINED's commitment to technical education and the MEGATEC model appears strong. However, the Ministry's actual administration of scholarship and teacher payments, as well as its articulation of key links in the MEGATEC model, have not met expectations. In addition, MINED has not yet explicitly committed the necessary funds for additional teacher training. There may be a need to capitalize on MINED's current commitment to technical education to ensure that these investments are carried out—and that scholarship and teacher payment processes are improved—before the end of the compact period in late 2012. To do so, FOMILENIO could attempt to secure a binding commitment from MINED regarding future scholarship and teacher training programs for the 2013 and 2014 fiscal years. Before the end of the compact period, FOMILENIO and CIDE staff could also take an active role in helping MINED staff design a permanent MEGATEC training program for 2013 and 2014 school years.

VI. CONCLUSIONS AND LESSONS LEARNED

A. Design and Implementation

Reviewing the design and implementation of the ITCHA strengthening component, we can conclude that all major aspects of the intervention, including construction, development of new degree programs and teacher training, were implemented in a participatory and professional manner. In addition, stakeholders demonstrated a high degree of flexibility and leadership during key points in the intervention. Two notable examples of this are FOMILENIO staff's successful efforts to secure commitment from MINED to build ITCHA in a more suitable location, as well as MCC and FOMILENIO staff's creation of the PILAS program in 2010 to maximize beneficiaries' job placement rate.

Another common theme throughout implementation is CIDE's strong performance in developing curricula and training teachers and principals. CIDE staff was also adept at solving problems that arose during implementation. For example, CIDE contracted and paid middle school teachers during training sessions in 2010 while MINED adjusted its teaching certificate requirements. Perhaps more importantly, CIDE staff played a key role of coordinating activities and facilitating relationships between FOMILENIO and MINED, as well as other stakeholders. These relationships not only facilitated implementation tasks, but helped build a level of trust between institutions that will likely foster future inter-institutional collaboration in educational initiatives.

Students and teachers had positive feedback regarding all aspects of the ITCHA intervention. ITCHA administrators, teachers, and students reported high satisfaction with the new facility and laboratories. In addition, the new programs' competency-based modules were very popular with students, teachers, and school administrators. In particular, students expressed appreciation that teachers did not advance to new teaching modules until students had mastered the current module.

B. Student Enrollment, Graduation and Employment

Enrollment at ITCHA and its linked middle schools in 2010 and 2011 was higher than anticipated. ITCHA enrollment more than doubled from 309 students (across three programs) in 2008 to 663 (across six programs) in 2011. This 2011 enrollment level already exceeded the 2012 enrollment target of 540 students set by MCC and FOMILENIO in their monitoring and evaluation plan, but did not appear to be on track to meet the compact's original goal of 1,100 students enrolled in ITCHA by 2012.

Across all programs (including MEGATEC and non-MEGATEC programs), ITCHA's 2011 second-year retention rate was around 96 percent. This rate exceeded MINED's expectation of an 80 percent continuation into the second year of post-secondary studies. In addition, the retention rate in ITCHA's MEGATEC programs was around 92 percent in 2011. This is comparable to the 2011 retention rate of the school's non-MEGATEC programs, and both rates are much higher than the 2009 retention rate of less than 70 percent preceding ITCHA's conversion.

At 88 percent, the overall graduation rate for the 2010-20011 ITCHA cohort had already surpassed the intervention's monitoring and evaluation goal of a 73 percent graduation rate for the 2012 school year. Graduation rates for MEGATEC programs (89 and 83 percent for civil engineering and alternative tourism, respectively) were similar to graduation rates for the school's non-MEGATEC programs, which averaged around 90 percent among all three programs. Interestingly, non-MEGATEC graduation rates for the 2010-2011 cohort (after ITCHA strengthening) were substantially higher than graduation rates for the 2008-2009 cohort (before

ITCHA strengthening) enrolled in the same academic programs (an average of 91 percent versus 56 percent).

Because they are dependent on global economic factors, local labor market needs, immigration trends, and other factors, long-term employment prospects for ITCHA graduates cannot be predicted with certainty. In future years, there may not be enough labor market demand in the area to absorb middle school and ITCHA graduates. In the short term, a FOMILENIO-funded labor insertion program introduced in 2010 could help students find employment or start their own businesses. In the long term, ITCHA principals appear poised to modify degree programs in response to labor market demand.

C. ITCHA Sustainability

By late 2011, MINED commitment to technical education in the Northern Zone appeared strong. As a result of this commitment, MINED will likely provide ITCHA staff with sufficient financial and human resources to maintain the school's degree programs and facilities in upcoming academic years. However, ITCHA's continued successful implementation of MEGATEC and non-MEGATEC degree programs is not guaranteed given two primary considerations. First, as of late 2011, there was no formal MEGATEC training program for newly hired teachers or designated financial and human resources to conduct such training. Second, the amount and method of payment of ITCHA scholarships under MINED's administration was not yet defined, nor was the extent to which MINED would continue to offer new middle school scholarships after 2012. Because scholarships play a large role in students' decisions to enroll in MEGATEC programs, any substantive changes to the availability of scholarships, the payment amount, the form of payment, or the timeliness of payment could have negative implications for ITCHA and middle school enrollment and continuation rates.

Report update: In 2013, MINED representatives informed Mathematica staff that the Ministry had begun a quality control program at ITCHA in 2011. Under this Ministry-financed program, all teachers are trained and provided with support services. As such, a formal teacher training program is in place for ITCHA teachers. In addition, MINED representatives informed Mathematica staff that starting in 2011, ITCHA students began receiving scholarships through the "Let's Go To School" program. Under this program, MINED provides primary, secondary, and post-secondary school students with scholarships to cover educational expenses. From 2011 to 2013, nearly 400 scholarships were awarded to ITCHA students. According to data provided by MINED, these scholarships appear to be approximately $1,350 per student per year. The availability of these scholarships would likely encourage students' enrollment in ITCHA programs.

D. Lessons Learned

One key lesson learned from the ITCHA intervention is that the need for an institutionalized training program for MEGATEC teachers could have been anticipated before CIDE training began in 2010, and stakeholders could have taken measures in (or before) 2010 to ensure that a formal training program would be available for newly hired teachers in 2011. In a best-case scenario, CIDE trainers could have worked more closely with MINED staff in late 2009 and 2010 to develop the Ministry's internal capacity to train technical middle and post-secondary school teachers. In 2011, CIDE staff could have assisted MINED staff as the Ministry assumed leadership in conducting the technical training sessions, thus promoting a seamless transition from CIDE's technical assistance to MINED's internal technical capacity.

A second lesson from the ITCHA intervention is that large investments in school infrastructure, new curricula, and teacher training programs—even when they are designed to

directly address local labor market demand—may not be sufficient to generate positive employment outcomes. Additional programmatic support may be needed to: (1) ensure that trained graduates are prepared to interact with potential employers, (2) facilitate interactions between recent graduates and employers with the objective of formal and informal job placements, and (3) assist some trained graduates in starting their own business. This additional support is likely more necessary in developing countries than developed countries, given information constraints and a general unavailability of job coaching, job placement services, and seed capital in developing countries. Recognizing this need once implementation was underway, MCC and FOMILENIO staff designed and implemented PILAS following the compact's mid-term review. Whereas PILAS was likely a positive development, its relatively late implementation precluded an extended pilot phase and potential gains in efficiency and effectiveness that could have resulted from a multi-year implementation period.

To help formulate new degree programs and assess the need for employment support programs at the outset of large-scale education interventions, future compact development and implementation teams could benefit from a targeted preliminary analysis of: (1) the intervention's target population, (2) labor market demand related to this target population, (3) existing and potential linkages between the target population and employers, and (4) constraints to gainful salaried employment and self-employment. Such a diagnostic could help identify and isolate job-relevant skills constraints, job search constraints, small business start-up constraints, and overarching constraints in labor demand that directly affect the target population.[41] Identified job-relevant skills constraints could inform the development of new degree programs, whereas job search constraints and firm start-up constraints could inform the development of employment support programs, if necessary. Identified constraints in labor demand in specific economic sectors would be particularly informative, as they would signal areas in which investments in new degree programs would not likely generate significant employment.[42]

E. Next Steps

Ideally in December 2013, Mathematica staff will complete a second round of site visits and data collection. In this latter round of analysis, our discussion will focus primarily on the intervention's key outcomes of achievement, graduation, employment, and enrollment in university programs. To document employment and university enrollment outcomes after graduation, we will conduct a survey of graduates from the first class of MEGATEC students who spent two years at

[41] It should be noted that CIDE did conduct a diagnostic of labor market demand in the Northern Zone in 2008. This diagnostic largely documented economic conditions and (actual and potential) labor market demand in the region. The study used data from the 2005 economic census, as well as primary data from interviews with businesses in the Northern Zone. However, this study did not document the relationship between labor market demand in the region and the supply of technical middle-school and post-secondary graduates, which was the primary focus of the Formal Technical Education Sub-Activity. A stronger focus on documenting the types of jobs obtained by youths in the Northern Zone with secondary and post-secondary technical degrees and the constraints they faced in finding employment could have provided strong insight into what new degree programs were needed, and whether additional job search assistance or entrepreneurial assistance would be necessary to complement these new programs. In addition, the study's focus on potential linkages with the Connectivity Project and the Productive Development Project may have been ill-advised, given difficulties in assessing future labor demand related to these investments as well as the limited timeframe of these projects.

[42] See World Bank Employment Policy Primer, November 2010, No. 16 for more detail regarding a constraint-driven framework to formulating employment-focused training and support programs for youths. This document is available at: http://siteresources.worldbank.org/INTLM/214578-1103128720951/22795057/EPPNoteNo16_Eng.pdf.

the new facility. These students will graduate in late 2012, so second-round interviews will take place roughly one year after students' graduation.

In early 2014, Mathematica will submit its final report for the case study. The report will synthesize implementation findings from the interim report with findings from the second round of data collection. The main focus of the final report, however, will be to discuss beneficiaries' reported medium-term changes in educational attainment, income and employment, as well as perceived changes in the supply of trained professionals in the local economy as a result of MEGATEC degree programs.

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APPENDIX A

SCHEDULE 1-3 TO ANNEX I OF THE MCC-EL SALVADOR COMPACT, DESCRIPTION OF THE FORMAL TECHNICAL EDUCATION SUB-ACTIVITY

Project Sub-Activity: Formal Technical Education (the "*Formal Technical Education Sub-Activity*")

The Formal Technical Education Sub-Activity aims to strengthen technical/vocational education institutions in the Northern Zone, so that more youth can gain marketable skills and thereby increase their opportunities for employment and income generation. The Ministry of Education will be the principal Implementing Entity for this Sub-Activity. Specifically, MCC Funding will support the following:

1. Strengthen an existing post-secondary institute in Chalatenango (the "***Chalatenango Center***") to improve teacher skills, facilities, equipment, and curriculum resources to offer improved secondary and post-secondary courses to up to 1,100 students annually by the end of the Compact Term. Strengthening the Chalatenango Center will enable it to serve as a national hub for advanced technology training and a repository for instructional resources in thirty (30) or more career fields.
2. Support the strengthening of the Chalatenango Center to become a resource center for in-service and pre-service vocational teacher training, curriculum experimentation and other forms of resource development in support of the middle technical schools in the Northern Zone and throughout El Salvador. More than 5,000 teachers will benefit from in-service and pre-service training, participate in demonstration vocational training programs, and share resources and learning materials with schools throughout El Salvador.
3. Support the strengthening of approximately twenty (20) middle technical schools in key municipalities (selected based on the MCC-approved criteria established under the Technical Assistance Sub-Activity) with links to the other activities funded under the Program. This support will include: improving the array of degree granting and non-degree granting vocational training and skills courses for youth; training teachers in the use of advanced instructional technologies; linking formal education with private sector needs; capital improvements (laboratories and workshops); and purchasing needed equipment. Where feasible, MCC Funding for capital improvements will leverage funding from local governments, communities, private parties, neighborhood associations and other NGOs. It is expected that over 9,000 students will benefit from this vocational training during the Compact Term and the quality of training delivered will be improved.
4. Establish a competitive scholarships program to reach deserving, yet poverty-stricken youth. The Implementing Entity for this program will be determined on a competitive basis. It is expected that over 3,600 scholarships will be granted with MCC Funding for post-secondary and, primarily, middle technical school attendance under the Formal Technical Education Sub-Activity.

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