SUMMARY OF IMPACT EVALUATION
of the USE OF PTS in MEXICAN HIGH SCHOOLS

Background & Summary of PTS Intervention

Two IYF projects in Mexico seek to improve,

1) The alignment between the human resource needs of leading sectors in Mexico and public high school curricula, and;
2) The workforce readiness of high school graduates.

Working with one of the Ministry of Education's systems of technical high school education, the Colegio Nacional de Educacion Profesional or CONALEP, IYF helped to create and/or upgrade 5 technical specialties, introduced career guidance services, and integrated 30 of IYF's *Passport to Success* (PTS) life skills lessons into the curricula. At the time the evaluation was conducted, IYF was working in 3 high schools in the state of Chihuahua and 39 in the state of Mexico.

PTS is a curriculum (content and training methodology) which equips young people with essential socio-emotional skills such as responsibility, teamwork, self-confidence, and time management which are needed to be successful in the workplace and life. IYF trains teachers on how to deliver the curriculum using a learner-centered and highly interactive methodology. To integrate PTS into the CONALEP curricula, IYF reviewed CONALEP's learning objectives and matched them with 30 PTS lessons. In Chihuahua and Mexico state, the way PTS was taught was slightly different, although the same lessons were used for all first semester students (to graduate students must complete 6 semesters).

In Chihuahua, PTS lessons were integrated into three different first semester classes, and thus required IYF to train 3 different teachers for each group of 30-35 student (typical class size). In Mexico state, on the other hand, the same PTS lessons were integrated into one class which meant that every group of 30-35 students received the 30 PTS lessons from the same teacher. The primary reason PTS was offered in a more "condensed" way in the state of Mexico were due to resource constraints as it would have required potentially tripling the number of teachers trained in PTS to cover so many schools and classes of first semester students.

IYF trained CONALEP teachers in PTS in July-August 2015 and from September to December 2015, these teachers delivered PTS lessons to a total of 16,319 first semester students in the states of Chihuahua and Mexico.

Table 1: PTS Reach from September – December 2015 in CONALEP schools

State	Number of Schools Implementing PTS	Teachers Trained	Students Reached
Chihuahua PTS lessons distributed across 3 classes	3	41	1,024
Mexico PTS lessons offered in 1 class	39	96	15,295
Total	42	137	16,319

Evaluation Purpose & Questions

The purpose of the impact evaluation was to analyze whether the inclusion of PTS lessons had an attributable effect on two education outcomes, which are important metrics for the Mexican educational policy makers, parents, and students:

1) Does participation in PTS have a positive impact on **academic performance among first year students and if so, to what extent**?
2) Does participation in PTS have an **impact on the dropout rate from first to second semester**?

IYF contracted the Centro Latinoamericano de Estudios de Evaluacion de Impacto (CLEEI) to design and conduct the evaluation.

Impact Evaluation Design & Methodology

The impact evaluation employed a quasi-experimental design using propensity score matching (PSM), which is a statistical matching technique that attempts to estimate the difference in outcomes between beneficiaries and non-beneficiaries with similar characteristics that are attributable to a particular program. PSM can be used when randomization is not possible and an evaluator has access to large samples and good data.

The impact evaluation utilized administrative datasets from various sources to construct the robust dataset required for the PSM evaluation design, including:

- Student-level administrative (enrollment, grades, courses) data from CONALEP;
- Student-level data from the National Upper Secondary Education Entrance Exam (EXANI-II) administered by the National Evaluation Center for Higher Education (CENEVAL), which included socio-demographic and contextual data on each youth;
- Teacher-level administrative (years teaching, degrees, courses) data from CONALEP;
- Municipal and state-level data from the Economic Census managed by the Mexican statistics institute INEGI, and about marginalization by the policy evaluation institute CONAPO; and
- Regional results from the PLANEA upper secondary exam, managed by the Secretary for Public Education (SEP).

The student and teacher-level administrative data were available for all 308 CONALEP schools across 32 Mexican states. The PSM method requires that the control group be constructed from beneficiary data that are exposed to contextually similar environments. Due to the differences in the PTS intervention model and the socio-economic conditions of the two states where the intervention took place, two different control groups had to be constructed (one for each state) from CONALEP schools and students in other states which were similar to Chihuahua and Mexico states.

To match the treatment and control beneficiaries and estimate the effects, PSM requires constructing a *propensity score* from pre-exposure covariates to estimate the probability of participation in the program. The propensity score was used to match beneficiaries to non-beneficiaries. Based on a review of the literature, the PTS evaluation selected 39 covariates for its construction of the beneficiaries' propensity scores. Once the beneficiaries were matched and entries with missing values were eliminated from the study, the final distribution of units evaluated was as follows:

Table 3: Treatment vs. Control Distribution per State

State	Non-PTS (control)	PTS (treatment)	Total
Chihuahua	6,110	907	7,017
Estado de Mexico	16,743	12,125	28,868

The preferred matching algorithm chosen by the evaluators was that of *Kernel Matching,* as it yielded strong, well balanced, and statistically comparable treatment and control groups for both states. However, to test for robustness, alternative matching algorithms were also used including *Nearest-Neighbor Matching*, *Stratification Matching*, and *Radius Matching*.

Impact Evaluation Findings

The impact evaluation demonstrated that participation in PTS is **attributable to positive results in first semester students' academic achievement and school dropout rates**. The results were more robust in Chihuahua than in Mexico state, however, with the results of each detailed below.

Chihuahua state

At the start of the second semester, the following outcomes were observed among the matched PTS and non-PTS beneficiaries in Chihuahua.

Variable	PTS Treated *Mean average*	Control *Mean average*	Mean difference
Outcome variables			
First semester grade point average (10 is maximum)	8.17	7.85	0.32
Dropout rate between first and second semesters	12%	18%	-6%

This table shows that average grades among the PTS participants is higher than the non-PTS participants, while the dropout rate among PTS participants is lower than the control. However, in order to determine whether or not the higher grades and lower dropout rates are due to students' participation in PTS, the evaluators had to determine the Average Treatment Effect on the Treated (ATT), which is the *estimator of the average benefit of the intervention specifically among those who participated (the impact).*

With regard to students' grades, the ATT is positive with an impact of 0.298 points among PTS beneficiaries with a .01 significance level. What this means is that given the control group's average grade point average of 7.8, we can conclude that **participation in PTS is attributable to a 3.8% increase in grade point averages among first year students.** To understand how the ATT is calculated, please consult the full evaluation report.

In terms of dropout rates, the ATT is negative, showing a reduction of 0.057 percentage points among PTS beneficiaries with a .05 significance level. When the ATT is taken in consideration, we can conclude **that participation in PTS is associated with a 32% reduction in the average rate of dropouts between semesters.** This refers to the size of the effect of PTS participation relative to the control group's mean average.

To test for robustness, the evaluators used the 3 additional matching methods each of which yielded similar impacts for both academic achievement and dropouts, signaling a very robust association between PTS and these outcomes.[1]

[1] The ATT for academic achievement ranged between .2 and .25; while for dropouts it ranged from -.041 and -.051, closely approximating the impact results from the kernel matching and signaling a very robust correlation between participation in PTS and the results observed.

Mexico state

At the start of the second semester, when impact data were collected, the following outcomes were observed among the matched PTS and non-PTS beneficiaries in Mexico state:

Variable	PTS Treated *Mean average*	Control *Mean average*	Mean difference
Outcome variables			
First semester grade point average (10 is maximum)	7.8	7.6	0.291
Dropout rate between first and second semesters	19%	23%	-4%

As with Chihuahua, there were more favorable academic achievement and dropout rate outcomes among PTS beneficiaries in comparison to non-participants.

The ATT is positive in terms of grade point averages with an impact of 0.169 points among PTS beneficiaries; however, the significance is at the .1 level indicating less precise results than those in Chihuahua. Taking into consideration the ATT and the control group's grade point average of 7.6, **participation in PTS is attributable to a 2.2% increase in grade point averages among first year students.**

With regard to school dropouts, the ATT shows a reduction in the rate by 0.034 percentage points among PTS participants; with a significance level of .1 which is less confident than in Chihuahua. When the ATT is taken in consideration of the control's mean average, **the evaluation shows that participation in PTS is associated to a 14.7% reduction in average dropout rate from first to second semester.** It is again important to point out that this refers to the size of the effect of PTS participation relative to the control's average.

To test for robustness, the same 3 matching algorithms were applied and revealed less consistent results across each one. While we can conclude that PTS has a positive effect on the outcome indicators, we are less confident that the results obtained in Estado de Mexico are due to PTS alone. [2]

Strengths & Weaknesses of Design

Propensity Score Matching as the main method for constructing the impact evaluation design has some strengths and weaknesses. First, randomly distributing beneficiaries into treatment and control groups prior to the intervention controls for selection bias and for this reason, randomized control studies are considered the gold standard. When randomization is not possible, as was the case in this study, quasi-experimental designs like PSM can be employed to reduce the selection bias. As a viable method to match beneficiaries and non-beneficiaries, however, PSM can only do this based on observed characteristics. The method runs the risk of bias from unobserved differences between the two groups. In order to reduce the bias, a study that employs PSM requires large datasets with many variables that describe the beneficiaries and their environment. This evaluation had both:

- A baseline dataset with many variables describing the students, ranging from homework timeliness during middle school to the students' mother's schooling levels;

[2] To test for robustness, the evaluators used the 3 additional matching methods as was done in the Chihuahua experiment. However, the results were less consistent than those of Chihuahua across each method. Under *Nearest-Neighbor* and *Stratification matching*, the ATT is still positive but with a larger magnitude than the results of the Kernel matching. Meanwhile, the *Radius Matching* check did not yield statistically significant results.

- Environmental data including teacher qualifications, years of experience, etc. and regional and municipal data; and
- A significantly larger sample of students from which to construct the control groups.

The fact that the data sources were the same for all the participants also helps reduce bias significantly. To add an additional factor of robustness, the evaluation utilized several matching algorithms to check for consistency and further validate the findings.

It should be noted that the addition of a baseline outcome variable and the inclusion of a differences-in-differences analysis would have increased the overall robustness and further reduced the possibility of bias in the study; however this was not possible due to limited access to a large amount of students' middle school information.

Conclusions

In conclusion, the quasi-experimental evaluation provides strong evidence to indicate that participation in PTS has a positive impact on first- year Mexican high school students' academic achievement and dropout rates in both states. However, the results were stronger and more reliable in Chihuahua than in the state of Mexico. While not analyzed in the study due to design and data limitations, it is theorized that the different PTS implementation models may have contributed to the difference in impact.