REPORT

Evaluation Design for the Georgia II Industry-Led Skills and Workforce Development Project

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1. Introduction

Recognizing that workforce education gaps and skills shortages significantly hinder Georgian economic growth, the Government of Georgia and the Millennium Challenge Corporation (MCC) developed a $140 million compact to improve the quality of education in science, technology, engineering, and math, and in turn foster a more skilled Georgian labor force. This work builds on other Government of Georgia efforts, including a 2013 Vocational Education and Training Development Strategy, with the goal of making vocational programs that meet the economy's labor skills needs more available and flexible (Ministry of Education and Science [MES] 2013). The five-year compact, which entered into force in July 2014, includes three projects that focus on general education, workforce development, and higher education. The Industry-led Skills and Workforce Development (ISWD) project, with a total investment of $16 million, aims to increase the supply of Georgians with technical skills relevant to the local economy through investments in Technical and Vocational Education and Training (TVET). MCC recently contracted with Mathematica Policy Research to evaluate the implementation and potential effects of the ISWD project.

This report describes Mathematica's design for the evaluation of the ISWD project. We begin by presenting an overview of the ISWD program logic, and briefly reviewing the existing literature on the impacts of vocational training programs in other countries. Next, we discuss the key evaluation questions and our methodological approach to address them, data sources and outcomes, and our analysis approach. We then discuss some of the key limitations and challenges that we expect the evaluation to face. Finally, we describe the administrative details related to implementing the evaluation.

2. Overview of the Industry-led Skills and Workforce Development project

The ISWD project aims to improve the alignment between the skills of Georgian TVET graduates and the skills demanded by the labor market. The Millennium Challenge Account-Georgia (MCA-Georgia) is managing the implementation of the project and has subcontracted the implementation to a consortium led by PEM GmbH. The project comprises the following four activities:

- **Activity 1, Program Improvement Competitive Grants (PICG),** is funding Georgian TVET providers on a competitive basis to establish new or improved training courses that reflect industry demand for skills. The 10 institutions selected to receive grants are establishing 26 new courses and seeking to improve 15 existing courses. These include courses in areas such as information technology, agriculture, pisciculture, maritime operations, mountain guiding, railways, and aviation. Most of these courses are at TVET levels 4 and 5, which are training courses for upper secondary school graduates (Appendix Table A.1 provides a complete list of the funded courses). This activity accounts for the bulk of the project funding—$12 million of the total $16 million—with private industry making an additional contribution of about $7 million to the new and improved courses.

- **Activity 2, Strengthening TVET Provider Practice (STPP),** is providing small grants on a competitive basis to develop innovative tools for formal and informal TVET providers, and will identify and promote the uptake of best practices across the TVET sector. The grants are available to TVET providers and other institutions, including educational establishments,

public or private companies, and professional and nongovernmental organizations. Seven grants totaling about $69,000 were awarded in the first round in April 2016, an additional 10 grants totaling about $172,000 were awarded in the second round in April 2017, and a final 10 grants totaling about $177,000 were awarded in the third and final round in June 2018 (Appendix Table A.2 provides a complete list of the STPP grants).

- **Activity 3, Strengthening TVET Sector Policy,** is providing technical assistance to the MES related to TVET sector policy. To reflect the latest priorities of the MES, the efforts under this activity have been consolidated into three main areas: (1) promoting increased business engagement in TVET; (2) improving and promoting the quality and attractiveness of TVET; and (3) supporting the enhancement of learning and qualifications opportunities for adults. The first area includes support for public-private partnerships for TVET provision, the establishment of sector skills councils that identify sector-level skills gaps and develop plans to address them, and increased engagement between TVET providers and employers at the local level through education-business partnerships. The second area includes support for improving the public perception of TVET, improvement of career education and guidance at schools and TVET providers, capacity development for TVET institutions to implement competence-based training and assessments, and development of a quality assurance framework for TVET courses, which is expected to be integrated into a unified national qualifications framework. Finally, the third area focuses on supporting lifelong learning and adult education through the validation of non-formal and informal learning, which enables adults with work experience but no formal qualifications to obtain formal recognition of their expertise, as well as providing advice on adult education policy.

- **Activity 4, Annual TVET Conference,** serves as a forum for dialogue and information sharing among TVET stakeholders, and the dissemination of best practices. The first conference took place in July 2016, the second took place in October 2017, and the third took place in November 2018. The conferences are being complemented by other public relations and outreach events to promote the projects' objectives and Georgian TVET more generally, such as awards ceremonies for project grants and a multimedia communications strategy to publicize the project.

In Figure 2.1, we provide a logic model of the ISWD project, which is a modified version of one originally developed by MCA-Georgia and MCC. (We modified the original logic model for the evaluation to more clearly highlight the key pathways through which the project activities are expected to influence the ultimate outcomes of interest and that the evaluation will examine.) The logic model indicates that, in the short term, Activity 1 is expected to lead to an increase in the availability of industry demand-driven TVET courses (the PICG-funded courses). These courses—as well as Georgian TVET courses more generally—are expected to benefit further from improved quality and closer alignment with industry needs through the adoption of best practices disseminated by Activity 2, as well as the implementation of policy changes supported by Activity 3.[1] By encouraging interaction among stakeholders, Activity 4 is expected to support

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[1] The logic model does not explicitly include the enhancement of learning and qualifications opportunities for adults, one of the components of Activity 3, because it is not closely related to the other project activities. Therefore, we do not expect to focus on it as part of the evaluation.

the other activities—for example, by facilitating dissemination of best practices (Activity 2) and greater industry engagement in TVET (Activity 3).

In the medium term, the combination of project activities is expected to increase the availability of graduates with higher-level skills in areas of industry demand. This is expected to result in greater industry satisfaction with local TVET programs, which will lead to greater industry co-investment in the sector. In turn, this increase in investment should feed back into an even larger increase in the availability of graduates with industry-demanded skills.

Finally, in the long term, the logic model suggests that industry will engage fully in the TVET sector. The close alignment of graduates' skills with market needs will lead to increased incomes through higher employment rates, which reflects higher demand for their skills, and higher wages for those who are employed, which reflects their higher productivity. Ultimately, these outcomes are expected to contribute to increased economic growth and reduced poverty in Georgia (the Georgia Compact's overarching goal, not shown in the logic model).

Figure 2.1. The ISWD logic model
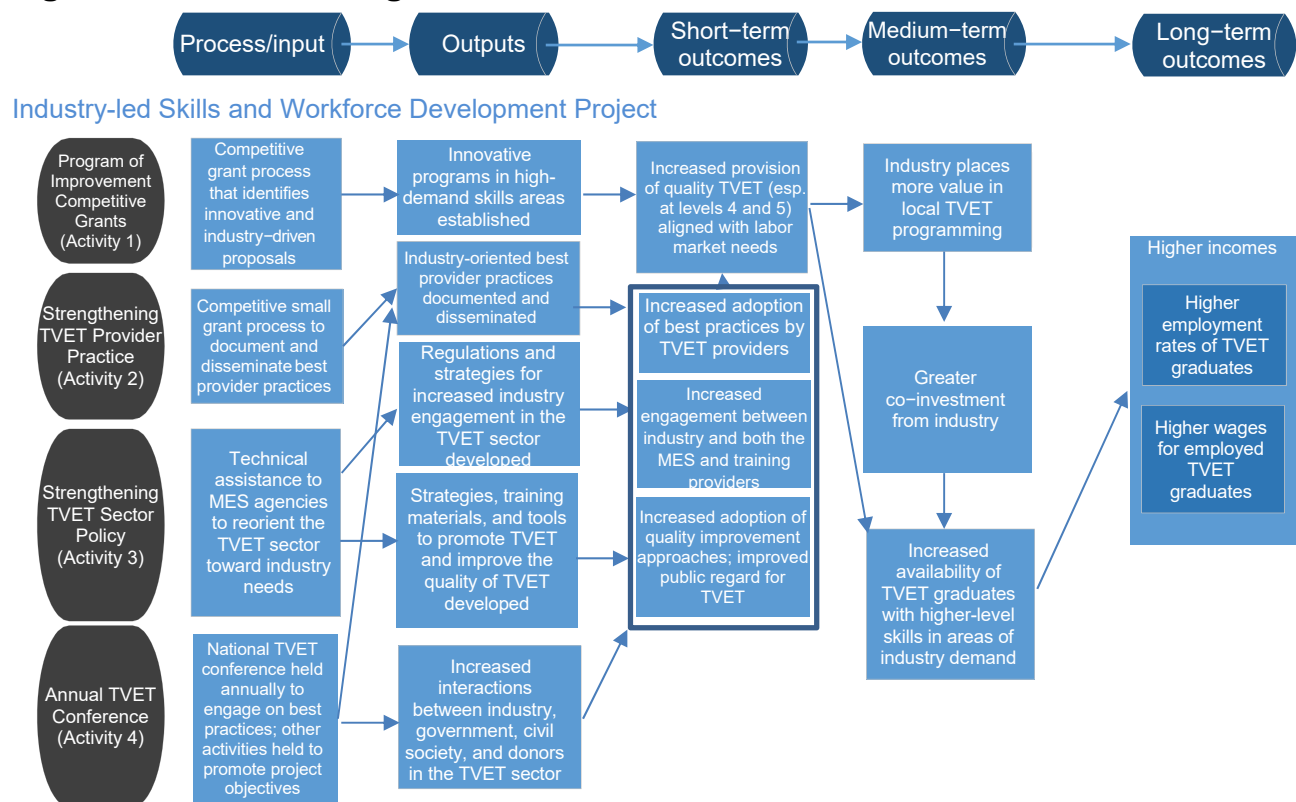
Note: MES = Ministry of Education and Science; TVET = Technical and Vocational Education and Training.

3. Literature review

In this section, we review the literature on the labor market impacts of vocational training programs in low- and middle-income countries. The program logic for the ISWD project anticipates that the project will eventually result in improved labor market outcomes for Georgian TVET graduates—specifically, increased employment and higher wages. Outside of

Georgia, a number of high-quality impact studies have examined the relationship between vocational training programs and these outcomes. These prior studies provide useful context and could help to indicate whether the ISWD program logic represents a plausible hypothesis about how the project activities could affect the ultimate outcomes of interest.

McKenzie (2017) recently reviewed 12 such impact studies that used an experimental design, which provides the highest standard of evidence (Table 3.1).[2] Only three of the nine studies that measured employment as an outcome found a statistically significant impact, and the mean impact was only 2.3 percentage points.[3] However, there is some evidence of larger impacts on formal employment, with a mean impact across studies of 3.6 percentage points—suggesting that training might shift workers from the informal to the formal sector.[4] Only two of nine studies that examined earnings as an outcome found a statistically significant impact, although most estimates were positive, with a mean of a 17 percent increase and median of an 11 percent increase. McKenzie concluded that the impacts of vocational training on employment and earnings are modest in most studies, although they are positive in some cases. He also suggested that few of these programs are likely to pass a simple cost-benefit test given the high costs of training and uncertainty about the sustainability of labor market impacts over time.

The findings from Mathematica's recent impact evaluation of MCC-funded scholarships for vocational training in Namibia (Borkum et al. 2017),[5] which also used an experimental design, are consistent with the modest impacts described above. The trainee scholarships were provided by issuing competitive grants to training providers and aimed to fund training in high-priority skill areas. Although the evaluation found that receiving a scholarship offer had large impacts on the probability of enrolling in and completing vocational training, especially among women, there was no evidence of positive impacts on employment and wages. A complementary qualitative study suggested that the process TVET providers used to assess market demand was not fully developed when the grants were made, which could partially explain the project's limited labor market impacts.

Additional evidence on the implementation and effects of vocational training programs in developing countries can be drawn from performance evaluations of specific programs. These evaluations often use mixed qualitative and quantitative methods and—in contrast to impact evaluations—are characterized by the lack of a rigorously defined comparison group. A review

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[2] The literature also includes several relevant quasi-experimental impact evaluations. However, a review by Tripney et al. (2013) found that the quality of these studies is highly variable, making it difficult to interpret the similarly variable findings on labor market impacts. In addition, other studies have found that evaluations of the same training program using different quasi-experimental methodologies can yield very different results (Ibarrarán and Rosas Shady, 2009; Delajara et al., 2006). Therefore, we focus our review on the higher-quality experimental studies summarized in Table 3.1, which have largely superseded these older quasi-experimental studies.

[3] McKenzie's review focused on the impacts of the offer of training; the impacts on those who actually received training was 20 to 40 percent larger, depending on the take-up rate of the offer of training in a particular study.

[4] The definition of formal sector employment varies across studies. It is typically based on employment in a job that includes legally mandated benefits in a given country context, such as health insurance, injury compensation, or social security contributions.

[5] The final evaluation report is currently under review at MCC; we expect it to be publicly available in fall 2017.

of the literature on youth workforce development over the past decade (U.S. Agency for International Development 2013) identified approximately 15 performance evaluations of vocational training programs in developing countries. The findings on the success of these programs in terms of employment and earnings, workforce readiness, and skills development were generally mixed, and depended on the features and context of the particular program. (For examples of specific performance evaluations, see Asian Development Bank [2013] and Kelly et al. [1998]).

Overall, the literature suggests that, although the effects of many vocational training programs in developing countries are modest, these programs can be successful in specific contexts. The success of any given program likely depends on factors such as social, economic, and labor market conditions; existing skill levels of targeted groups; and training program characteristics. To the best of our knowledge, no large-scale, rigorous evaluations of vocational training programs in Georgia or other countries in the Caucasus region have taken place, so the likely range of effects in the Georgian context are unclear.

In addition, there are some important differences between many of the training programs studied in the literature and the PICG-supported courses. First, the PICG-supported courses are substantially longer in duration and involve training at higher technical levels than many of these programs. The PICG-supported courses are expected typically to be between 9 and 24 months in duration (a median of about 18 months) and are offered at levels 4 and 5, which are only available to secondary school graduates. In contrast, many of the other training programs in the literature are only a few months in duration and target a less educated group of trainees. Second, PICG-supported courses have a much stronger market-related focus and a higher degree of industry involvement than most of the other training programs in the literature. Employers have been closely involved in developing the PICG-supported courses—for example, through co-funding arrangements (including monetary and in-kind contributions) and by advising providers on curriculum development—which could lead to stronger market alignment of these courses relative to other programs. Third, the ISWD project was explicitly designed to integrate market-relevant training with complementary activities and broader sector reforms aimed at improving the quality and market relevance of vocational training, which was not the case for most other training programs. The expected changes in the TVET sector resulting from these complementary activities—for example, adoption of best practices by TVET providers, increased employer and engagement, and improved public perceptions of TVET—could support broader improvements in outcomes for graduates of Georgian TVET programs. It is possible that these features of the ISWD project could make it more successful than typical vocational training programs.

Table 3.1. Experimental evaluations of vocational training programs in low- and middle-income countries

Country	Study	Population	Follow-up period relative to end of training	Impact of the offer of training				Cost per trainee (USD)
				Employment (percentage points)	Formal employment (percentage points)	Earnings (percent)	Formal earnings (percent)	
Argentina	Alzúa et al. (2016)	Low-income youth	18 months	n.r.	**8.0**	n.r.	**64.9**	$1,722
		Low-income youth	33 months	n.r.	4.3	n.r.	23.1	
Colombia	Attanasio et al. (2011)	Low-income youth	14 months	**4.5**	**6.4**	**11.6**	**27.1**	$750
	Attanasio et al. (2015)	Low-income youth	up to 10 years	n.r.	**4.2**	n.r.	**13.6**	
Dominican Republic	Card et al. (2011)	Low-income youth	12 months	0.7	2.2	10.8	n.r.	$330
	Ibarrarán et al. (2014)	Low-income youth	18 to 24 months	-1.3	1.8	6.5	n.r.	$700
	Ibarrarán et al. (2015)	Low-income youth	6 years	-1.4	2.6	-1.9	n.r.	$700
	Acevedo et al. (2017)	Low-income youth	3 years	0.7	n.r.	n.r.	n.r.	n.r.
India	Maitra and Mani (2017)	Low-income women	18 months	**8.1**	n.r.	**95.7**	n.r.	$13
Kenya	Honorati (2015)	Low-income youth	14 months	**5.6**	n.r	29.7	n.r.	$1,150
Malawi	Cho et al. (2013)	Low-income youth	4 months	n.r.	n.r.	-19.6	n.r.	n.r.
Peru	Diaz and Rosas (2016)	Low-income youth	36 months	1.6	**3.8**	13.4	n.r.	$420
		Low-income youth	36 months	n.r.	4.5	n.r.	n.r.	
Turkey	Hirshleifer et al. (2016)	Unemployed	1 year	2.0	2.0	5.8	8.6	$1,700
		Unemployed	2.5 years	n.r.	-0.1	n.r.	-0.8	

Source: McKenzie (2017).

Notes: Impacts that are statistically significant at the 5 percent level are in bold.

n.r. = not reported.

4. Evaluation design

In this section, we describe our design for the evaluation of the ISWD project, including the evaluation's key research questions, analytical methods, study sample, and the time frame for the data that we plan to collect.

4.1. Evaluation type

Evaluation studies generally fall into one of two categories: performance evaluations, which measure key outcomes and assess the contribution of a program to these outcomes without using a counterfactual, and impact evaluations, which use a counterfactual to rigorously estimate a program's causal effects on key outcomes. To evaluate the ISWD project, we propose a mixed-methods performance evaluation, which will include two studies: (1) a quantitative outcomes study of Activity 1; and (2) a qualitative study assessing all project activities (Activities 1–4). To evaluate the possible effects of Activity 1, the outcomes study will measure the training and labor market outcomes of trainees in PICG-supported courses and, to the extent possible, compare those outcomes with those of a relevant sample of trainees who attended non-supported courses. The qualitative study will explore implementation of all the project activities, the potential mechanisms driving the results observed in the Activity 1 outcomes study, and the likelihood of sustainability across all ISWD initiatives after the compact ends.

4.2. Evaluation questions

Table 4.1 presents the key evaluation questions and the approaches we will use to answer them.

Table 4.1. Evaluation questions and approaches to answering them

Evaluation questions	Approaches to answering them
Activity 1 – Program Improvement Competitive Grants	
1. How did the implemented PICG courses compare with the original grant proposals, and what were the reasons for any deviations?	*Outcomes study* • Analyze trainee survey data to document course content, perceived quality, and training approaches (teaching materials, practices, and delivery methods; use of laboratories; availability of internships; receipt of career guidance; etc.) *Qualitative study* • Analyze documents from grantees to describe course offerings and practices, and compare with original grant proposals • Interview teachers of PICG-supported courses to understand changes in curriculum, training, and teaching methods associated with PICG-supported courses • Conduct trainee focus groups to explore perceived strengths and weaknesses of course content, training quality, and training approaches • Interview grantees, PEM, MCA-Georgia, the National Centre for Education Quality Enhancement (NCEQE), and employers and other partners who co-invested or supported course development to understand the course development and authorization process, and reasons for deviations from original plans

Evaluation questions	Approaches to answering them
2. Did trainees enroll in PICG-supported courses and graduate from them at targeted levels? a. To what extent did women or members of socially disadvantaged groups (defined by language, region of origin, or other socio-demographic characteristics) enroll and graduate? b. Did these patterns differ across training sectors and grantees?	*Outcomes study* • Analyze trainee survey data to measure enrollment and graduation rates, overall and by subgroup *Qualitative study* • Interview grantees and trainee focus groups to better understand enrollment and graduation patterns
3. What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses? a. How did the outcomes of these graduates compare to those of graduates from other, non-supported courses? b. Did these results differ by gender or other socio-demographic measures? c. Did the results differ across training sectors and grantees?	*Outcomes study* • Analyze trainee survey data to measure labor market outcomes among trainees in PICG-supported courses, overall and by subgroup • Compare labor market outcomes for trainees in PICG-supported courses to those of trainees in a broad set of public TVET courses in Georgia (benchmarking approach) • Compare labor market outcomes for trainees in improved PICG-supported courses to those of trainees in the same courses before they were improved (pre-post design) *Qualitative study* • Interview employers to understand the job-search, hiring, and wage-setting processes • Interview graduates of PICG-supported certificate courses to understand effects on their labor market experiences
4. What were employer perceptions of the graduates from the PICG-supported courses, and how did the availability of these graduates affect their hiring and training plans? a. Do employer perceptions of graduates from PICG-supported courses differ according to gender or socio-demographic categories?	*Qualitative study* • Interview employers to understand the reasons underlying the perceptions of graduates from PICG-supported courses, as well as changes in hiring and training processes
5. Will PICG-supported courses be sustained after the compact? a. What are the main challenges to sustaining these courses, and how can they be overcome? b. How has the level of engagement between employers and grantees changed after the compact?	*Qualitative study* • Interview grantees to document plans to sustain new courses and assess the main barriers to doing so • Complement with an analysis of administrative data from grantees to assess enrollment levels for cohorts who enrolled in PICG-supported courses after the compact • Analyze grantee financial data on the revenues and costs of PICG courses to assess financial viability • Interview grantees, employers, and industry groups to investigate engagement between employers and providers and how this has changed over time
Activities 2–4 (Strengthening TVET Provider Practice; Strengthening TVET Sector Policy; Annual Conference)	
6. What are TVET providers' perceptions of the best practices identified and disseminated by the project, to what extent have they adopted them, and what are the main barriers to doing so? a. How were best practices identified and disseminated in practice? b. How has the adoption of best practices affected TVET providers, including the grantees and other providers? c. Is the adoption of best practices sustainable, and is the extent of adoption likely to increase in the future?	*Qualitative study* • Analyze documents from STPP grantees to describe the best practices identified and the dissemination process • Interview STPP grantees, PEM, and MCA-Georgia to understand the identification and dissemination process for best practices • Interview STPP grantees and other providers to explore perceptions and adoption of practices, their effects, and their perceived sustainability

Evaluation questions	Approaches to answering them
7. To what extent have the MES and its agencies adopted the policy reforms supported by the project, (for example, those related to industry engagement, marketing of TVET, and quality improvement) and what have been the main challenges in doing so? a. How has the adoption of these reforms affected or expected to affect the TVET sector, and in what time frame? b. Are the policy reforms supported by the project sustainable, and how are these policies expected to evolve? c. Is there any evidence of a broader shift toward higher-level, industry-driven courses in the Georgian TVET sector? If so, what was the role of the project, and if not, why not?	*Qualitative study* • Interview the MES to explore the adoption of reforms and remaining challenges to doing so • Interview employers, industry groups, and providers to understand the effects of the reforms on key stakeholders • Interview the MES and the Georgian Association of Private Colleges, as well as review administrative data on TVET course offerings, to understand broader changes in these offerings and the underlying reasons for these changes
8. How and to what extent has the annual TVET conference influenced providers, employers, the MES, and other TVET sector stakeholders? a. Who attended and financed the conference, and what were its main areas of focus? b. Is the conference likely to be sustained in the future?	*Qualitative study* • Conduct in-depth interviews with providers, employers, the MES, and other stakeholders to explore participation in and the effects of the conference and its perceived sustainability • Analyze administrative data on TVET conference attendance and financing • Directly observe conference activities and record descriptive information about conference implementation and engagement between participants

4.3. Methods

This section describes the two components of the evaluation—the outcomes study and qualitative study—in further detail.

a.   Outcomes study

The Activity 1 outcomes study will describe trainee outcomes that are linked to evaluation questions 1–3. This includes an analysis of trainees' training experiences, graduation rates, and key post-graduation labor market outcomes—in particular, employment rates and wages.[6] We will measure trainees' outcomes using data from a trainee tracer survey that follows TVET enrollees after graduation and into the labor market.

To place these outcomes in context, we also plan to use a combination of study-collected survey data and MES survey data to compare the labor market outcomes of trainees in the PICG-supported courses to those of trainees in a broad set of non-supported courses (related to

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[6] We will also examine whether graduates of PICG-supported courses enroll in further training and whether they are "productively engaged" (defined as being employed or enrolled in training). However, the program logic does not posit substantial enrollment in further training soon after graduating from the PICG-supported courses, which are already at an advanced level. Therefore, we focus on employment and wages as our primary labor market outcomes.

evaluation question 3). Because it was not feasible to use a rigorous approach to identify these non-supported courses,[7] we recognize that these comparisons are unlikely to yield causal estimates of the impacts of Activity 1. Nevertheless, these comparisons will enable us to place the estimated trainee-level outcomes into the existing vocational training context in Georgia. These descriptive results will also help to assess whether the linkages between project activities and trainee outcomes assumed in the project logic and economic rate of return (ERR) model are likely to have occurred in practice.

We will use two complementary approaches to identify the set of non-supported courses for these comparisons:

- **A benchmarking approach**, which will compare the outcomes of trainees in PICG-supported courses to those of trainees enrolled contemporaneously in a broad set of public TVET courses in Georgia, using secondary tracer survey data collected annually by the MES. There are some challenges in using the MES tracer survey data as a benchmark, including differences in the timing of data collection, survey instruments, and response rates relative to our evaluation's tracer surveys of PICG graduates. In addition, the benchmarking results will be purely descriptive and cannot be interpreted as the impacts of the PICG grants because of differences in subject areas, economic sectors, course levels, and the trainee population served. Nevertheless, this approach will enable us to place the outcomes of trainees in PICG-supported courses into the broader context of vocational training in Georgia, at a relatively low cost.[8]

- **A pre-post design**, which focuses on the 15 PICG-supported courses that the project sought to improve (rather than introduce as new courses), and compares the outcomes of trainees in these courses with those of earlier cohorts in the same courses before they were improved. In particular, we will compare the outcomes of the final cohort of trainees in each pre-improvement course, captured one year after they graduate, to the outcomes of the first cohorts of trainees in the improved course, captured one year after *they* graduate. These pre-post estimates cannot be interpreted as the impacts of the grant-funded improvements, because several confounding factors could be driving pre-post changes in outcomes in addition to these improvements. For example, the typical profile of trainees might change after the improvements, and there could be different labor market conditions in the years in which trainees in pre-improvement and improved courses enter the labor market. Because the differences in the types of trainees in the pre-improvement and improved courses might

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[7] In particular, because the PICG-supported courses are unique in the Georgian context, few comparable non-supported courses are available to conduct course-level matching and implement an impact evaluation using a matched comparison group design. The selection mechanism for the PICG grants also precluded an impact evaluation using a course-level random assignment or regression discontinuity design.

[8] In a previous version of this design report we considered other approaches to identifying benchmarking courses, which could have improved comparability with the PICG-supported courses. These included: (1) asking trainees in PICG-supported courses about other courses that they were interested in, using the most common responses as the benchmarking courses, and (2) identifying specific benchmarking course(s) for each PICG-supported course from an MES database of courses, using subject area or broad economic sector. However, in practice these approaches proved to be infeasible and/or were unlikely to result in a set of benchmarking courses that were comparable to the PICG-supported courses. We therefore selected the approach described in the text, which is much lower cost than the other approaches because it relies on secondary data for the benchmarking courses.

be substantial (for example, due to changes in admissions requirements) and the sample sizes in many of the pre-improvement courses are relatively small, we will likely not be able to use statistical matching techniques to account for differences in trainee profiles. Instead, we will attempt to control for the influence of observed characteristics on labor market outcomes in a simple pre-post regression model.

It will be valuable to conduct both of these descriptive analyses, because each analysis has different strengths and weaknesses. An important strength of the benchmarking analysis is that it will enable us to benchmark the outcome estimates for all of the PICG-supported courses, whereas the pre-post design will only focus on the subset of these courses that existed before the project. The benchmarking analysis will also compare trainees who enter the labor market contemporaneously and hence experience similar labor market conditions, which is not the case for the pre-post design. However, differences in the characteristics of courses and trainees in PICG-supported and benchmarking courses is likely to be substantial, which suggests that the findings can only be used to provide broad context. In contrast, an important strength of the pre-post design is that it compares the outcomes of trainees enrolled in the same providers, who have selected the same subject areas for their vocational education. Therefore, the pre-post design accounts for potentially important unobserved differences in providers and trainees to a greater extent than the benchmarking analysis, although the estimates still cannot be viewed as causal and are limited by the small number of courses (which reduces both generalizability and statistical power).

b. Qualitative study

The qualitative study will draw primarily on interviews and focus groups with key stakeholders, complemented by contextual information from grantee documents, administrative data, and grantee financial records. As we describe in Section 6.3, we will systematically organize and synthesize the key themes that emerge from each data source and triangulate the findings across these sources to answer the evaluation questions. The qualitative study will focus on the following five areas:

- **Implementation of PICG-supported courses and their sustainability after the compact** (relevant to evaluation questions 1, 2 and 5). We will seek to understand how the PICG grantees developed courses, how they calibrated curricula and instruction to industry needs, how they managed the authorization process for these courses, and how and why implementation differed from the original proposals. To do this, we will analyze data from interviews with all PICG grantees and entities involved in implementation (MCA-Georgia, MCC, and PEM), teachers of PICG-supported courses, employers and other partners who co-invested in these courses or supported course development, and the National Centre for Education Quality Enhancement (NCEQE, the MES entity responsible for course authorization), together with information from grantee documents. The analysis of interview data will also explore the perceived sustainability of the PICG-supported courses, which we will also investigate using grantee administrative data on trainee enrollment and financial records.

- **Trainees' and employers' perceptions about the potential benefits of PICG-supported courses** (relevant to evaluation questions 3 and 4). To capture trainees' perspectives about their training and labor market experiences, we will analyze transcripts from focus group discussions with trainees enrolled in PICG-supported courses, and draw on descriptive information from the trainee tracer survey conducted for the outcomes study. To capture employers' perspectives regarding the quality of the PICG-supported courses and implications for their hiring and training practices, we will analyze data from both qualitative interviews and focus groups with employers in sectors relevant to the PICG-supported courses and with the main industry groups in Georgia. This qualitative data collection from employers will include semi-structured interviews with employers who have hired PICG course graduates and focus groups with a broader cross-section of employers in relevant sectors who did not hire PICG course graduates. The analysis of qualitative data from trainees and employers will also examine differences by trainee gender and other socio-demographic characteristics. For example, we will examine the extent to which curricula, pedagogical approaches, and employer engagement (such as through provision of internships or hiring of PICG graduates) were inclusive with respect to gender, language group, and disability status. Finally, although our evaluation focuses on the fully accredited versions of these PICG courses—which underlie the project logic and ERR estimates—we will also conduct interviews with graduates of shorter (unaccredited) certificate courses established by the PICG grantees. These interviews will enable us to explore the motivation of trainees for enrolling in these courses, their perspectives about their training, and how their certification has affected them on the labor market.

- **Implementation of best-practice grants and adoption of best practices** (relevant to evaluation question 6). To document how best-practice grants were implemented, we will review administrative data on the scope of each STPP grant and reports from grantees on funded activities. We will also analyze data from interviews with the entities involved in implementation, focusing on the grant selection process and the successes and challenges of implementation. To evaluate the success of the grants in developing and disseminating best practices, we will analyze data from interviews with STPP grantees to document how practices were shared, and analyze qualitative data from a broader sample of TVET providers to assess whether these practices were adopted more widely among non-grantees.

- **Implementation and potential effects of national changes in TVET policy** (relevant to evaluation question 7). We will analyze qualitative interview data from MES staff and the entities involved in implementation to understand progress made in each of the policy areas supported by Activity 3, and to assess the likely sustainability of new policy initiatives after the compact ends. Interviews with other major donors in the TVET sector will provide additional information on changes in these policy areas, as well as broader changes in the sector. We will also analyze interview data from employers, industry groups, and TVET providers to assess the level of industry engagement and coordination with TVET providers and how this changed over time. Analyzing interview data from TVET providers will also enable us to further explore the implementation and effects of efforts related to TVET marketing and quality improvement (for example, marketing strategies, career education and guidance, and quality assessments). Finally, we will analyze data from interviews with the MES and Georgian Association of Private Colleges, together with administrative data on

course offerings, to assess whether there is a broader shift to industry-demand driven TVET courses and the role of the project in facilitating this shift (if any).

- **Implementation and potential effects of the compact's annual TVET conferences** (relevant to evaluation question 8). To assess the effectiveness of compact-sponsored TVET conferences, we will review conference documentation recording levels of participation among TVET providers, employers, and MES policymakers, as well as the sources of financial support for the conference (in particular, the contributions of industry). We will also analyze qualitative interview data gathered from each of these types of conference attendees to explore the perceptions of stakeholders regarding the effects of conference attendance. Finally, members of the evaluation team will directly observe conference activities and record descriptive information about conference implementation and engagement between participants.

4.4. Study sample and power calculations

The evaluation design for the ISWD project requires us to collect primary data from two different samples: (1) a sample of trainees in PICG-supported courses and pre-improvement courses (for the trainee outcomes analysis);[9] and (2) a sample of key stakeholders for qualitative data collection (for the qualitative study). Below we describe each of these samples in further detail.

a. Trainee sample

The sample for the trainee outcomes analysis will include trainees in all PICG-supported courses, as well as trainees in the pre-improvement courses that we identify. We will select each of these trainee samples as follows:

- **PICG-supported courses**. We had initially planned to survey the universe of trainees in the first cohort in each PICG-supported course that experienced the fully established version of the course. However, discussions with stakeholders suggested that, because these courses are so new, most of them are likely to evolve substantially after the first cohort. For example, there could be substantial changes in terms of recruitment efforts, types of trainees enrolled, course content and delivery, technical facilities and equipment, and partnerships with employers for internships or job placements. Therefore, in many cases, the training and labor market experiences of the first cohort might not reflect those of subsequent cohorts enrolled in a more developed version of these courses. (The courses would continue to evolve over time, but the changes after the first cohort would likely be the most substantial.) To address this concern, we also plan to survey the second cohort in PICG-supported courses, where this feasible within the timeframe of the evaluation (as we discuss in Section 4.5, we expect this to be the case for almost all the PICG-supported courses).

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[9] As we describe in Section 5, we will use secondary data from the MES to provide outcomes for trainees in public TVET courses used for benchmarking.

- **Pre-improvement courses.** The sample for pre-improvement courses consists of the last cohort of trainees in each course before the PICG grant period began. We have identified 13 pre-improvement courses that serve as an appropriate match for the 15 improved PICG-supported courses .[10]

To maximize the statistical precision of our estimates, we will include the universe of trainees in the selected cohorts in PICG-supported and pre-improvement courses (the first two cohorts and the last cohort, respectively). This is especially important for subgroup analyses by provider or by trainee characteristics. For example, it will maximize the precision of the estimated employment and wage rates for graduates from specific PICG-supported providers or courses, which may be of interest to MCC and other stakeholders (although these estimates might still be relatively imprecise for providers or courses with few enrolled trainees).

Table 4.2 presents our calculations of confidence intervals (CIs) and minimum detectable differences (MDDs) for the trainee outcomes analysis, focusing on the key outcome of employment. The power calculations assume an 80 percent follow-up survey response rate and a comparison employment rate of 76 percent, following the assumption in MCC's ex-ante ERR model.[11] They use sample size projections based on the number of trainees currently included in our baseline surveys. We present 95 percent CIs for the PICG-supported trainee sample, and MDDs for the pre-post design.[12]

For the pre-post design, we will be able to detect an MDD of 7.9 percentage points for employment. Because the sample size in pre-improvement courses is relatively small, the MDD increases substantially for subgroups. This suggests that it will be difficult to detect changes for subgroups using this design. Nevertheless, the change for the full sample is relevant because it is within the change of 9 percentage points expected in MCC's ex-ante ERR model. Although the evaluation's descriptive design might not be able to estimate causal impacts of the program, observing whether differences of this magnitude occur will be a useful indicator of whether projected impacts in the ERR are plausible.

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[10] The match between the PICG-supported courses and pre-improvement courses is not exactly one-to-one because of differences in levels. For example, one pre-improvement course at level 3 might have been turned into improved courses at levels 3 and 4; in that case the analysis would use the same pre-improvement course as the comparison for both of the improved courses.

[11] We do not present CIs or MDDs for wages, the other key labor market outcome, because we do not have information about the standard deviation of wages in the study's comparison groups (one of the primary inputs needed to carry out the calculations).

[12] For the benchmarking approach we do not plan to conduct statistical tests. Instead we will descriptively compare mean outcomes between trainees in our PICG-supported course sample to those of trainees in the MES benchmarking sample. This is appropriate given the lack of comparability and possibly limited access to microdata from the MES.

Table 4.2. CI and MDD calculations for trainee outcomes analysis

	Full sample	50 percent subgroup	25 percent subgroup
Number of courses			
PICG courses – first cohort	41	41	41
PICG courses – second cohort	36	36	36
Pre-improvement courses – one cohort	13	13	13
Number of trainees			
PICG courses – first cohort	895	448	224
PICG courses – second cohort	780	390	195
Pre-improvement courses – one cohort	307	154	77
95 percent CI (either side of mean employment for the pooled sample of two PICG cohorts, percentage points)	1.9	2.7	3.8
MDD for employment (pre-post design, percentage points)	7.9	11.1	15.7

Note: MDD calculations assume a two-tailed test with a 5 percent significance level and 80 percent power. We assume that the second cohort will have the same number of trainees as the first cohort and that we will be able to include a first cohort in all PICG-supported course and a second cohort in 36 of these courses within the timeframe of the evaluation (see Section 4.5). We also assume that the response rate to the follow-up trainee tracer survey will be 80 percent and that mean employment will be 85 percent in the PICG-supported courses and 76 percent in the pre-improvement courses, based on the assumption in the ex-ante ERR model. In the MDD calculations we assume an R^2 value of 0.1 due to the inclusion of covariates.

b.   Qualitative sample

Table 4.3 shows the planned respondents, sample sizes, and sampling approach for qualitative data collection. Our plan recognizes the high degree of diversity among the PICG grantees and the STPP grantees, both in provider characteristics and the specific activities funded by the grants. This diversity suggests that implementation experiences, project effects, and sustainability might differ substantially across providers. Therefore, to fully address the evaluation questions, the planned sample sizes of provider-specific respondents (in particular, providers, trainees, and employers) are relatively large and seek to maximize the coverage of grantees with the available resources. For example, in the final round of data collection, we propose interviewing four employers of graduates from each PICG grantee, a total of 40 employers. This will enable us to obtain some grantee-specific findings about the extent to which graduates' skills meet employers' needs, and to contrast these findings across PICG grantees. (We propose interviewing a smaller sample of 10 employers in the interim round because PICG trainees will not yet have entered the labor market and we will therefore draw the sample from the smaller pool of employers who co-invested in the PICG-supported courses.)

Table 4.3. Respondents and sample sizes for qualitative data collection

Respondent	Interim round, 2018		Final round, 2021	
	Sample size	Sampling approach	Sample size	Sampling approach
Interviews and focus groups to be conducted by local data collection partner				
STPP grantees and related TVET providers	8 interviews	8 STPP grantees, selected as those whose practices have the best potential for wider adoption (based on discussions with PEM)[a]	18 interviews	8 STPP grantees (same as interim round); 10 non-grantees, identified as potential best-practice adopters by the selected STPP grantees
Trainees	12 trainee focus groups	One mixed-gender focus group per PICG grantee, and up to two female-only cross-grantee focus groups; each focus group will include 8–12 trainees, with participants selected to be diverse in terms of socio-demographic characteristics		
Graduates of PICG-supported certificate courses			16 interviews	Up to 4 graduates per certificate course
Teachers	10 individual or small-group interviews	One teacher or small group of teachers per PICG grantee, selected from those teaching PICG-supported courses		
Employers	10 interviews	One employer per PICG grantee, selected from those who co-invested in the PICG-supported course or supported course development	40 interviews[b]	Four employers per PICG grantee, selected from the most common employers of PICG gradates (according to the follow-up trainee tracer survey)
			2 focus groups[c]	Employers in sectors covered by PICG who did not hire PICG graduates, with 6–8 employers per focus group selected to be diverse in terms of sector and size
			2 focus groups[c]	Employers in sectors outside of those covered by PICG but that could potentially benefit from Activities 2–4, with 6–8 employers per focus group selected to be diverse in terms of sector and size[d]

Respondent	Interim round, 2018		Final round, 2021	
	Sample size	Sampling approach	Sample size	Sampling approach
Interviews to be conducted by Mathematica				
PICG grantees	10 interviews	All 10 PICG grantees	10 interviews	All 10 PICG grantees
International PICG partners	5 interviews	Up to one international partner per PICG grantee, selected from those who supported course development		
Industry groups	1 interview	Georgia Chamber of Commerce and Industry	1 interview	Georgia Chamber of Commerce and and Industry
MES and NCEQE staff	2 interviews	Head of TVET department; NCEQE staff	2 interviews	Head of TVET department; NCEQE staff
Georgian Association of Private Colleges			1 interview	Staff familiar with courses offered by association members
PEM	3 interviews	Team leader and key program staff		
MCA-Georgia, local MCC staff, and the MCC consultant	3 interviews	Key program staff		
Other donors in the TVET sector	2 interviews	European Union delegation; United Nations Development Program	2 interviews	European Union delegation; another major international donor

Note: Blank cells indicate that we will not collect qualitative data from a particular respondent in the relevant round.

[a] We will review the final presentations compiled by all 17 STPP grantees to gain a summary understanding of all the best practices that were developed, even for those grantees that we do not interview.

[b] These qualitative interviews will also gather basic descriptive quantitative information about the employers.

[c] If arranging focus groups with employers proves to be too logistically difficult, we will interview them instead.

[d] We will use the interim round of data collection to identify the non-PICG sectors and employers most likely to be affected by Activities 2–4, if any (for example, through interviews with MES staff and an analysis of attendance at the annual TVET conference).

There is substantial overlap in the respondents across the two rounds of qualitative data collection, which will enable us to explore the evolution and sustainability of the project activities after the compact ends. For example, repeating interviews with grantees will provide an opportunity to uncover important insights about whether supported programs and practices can be sustained after financial support ends (as was assumed in the project logic and ERR), and in what form. However, there are also some important differences in the respondents across the two rounds. First, the interim round will include entities involved in implementation—MCA-Georgia, local MCC staff, and PEM—to capture their responses toward the end of the compact, after which their involvement will end. Second, the final round will include a broader set of providers and employers than in the interim round to provide a more comprehensive assessment of the long-term effects and sustainability of the project activities.

4.5. Time frame

Table 4.4 summarizes the planned timing of data collection for the various primary data sources we will draw on for the evaluation.

Table 4.4. Timing of data collection for the ISWD project evaluation

Type of data	Respondents	Timing
Trainee tracer surveys	Trainees in PICG-supported courses and pre-improvement courses	Baseline while enrolled in training (in mid-2017 for pre-improvement courses, and between early 2018 and early 2019 for other courses); follow-up one year after training (between late 2018 and late 2021)[a]
Qualitative data: key informant interviews and focus groups	TVET providers (PICG grantees, STPP grantees, and others); trainees from PICG-supported courses; employers; industry groups; MES staff; Georgian Association of Private Colleges; PEM staff; MCA-Georgia and MCC; other donors	Interim round in late 2018 (toward the end of the compact); final round in 2021 (post-compact)[b]

[a]Survey dates will vary by course, depending on the course start and end dates.
[b]Some respondents vary across the two rounds of qualitative data collection (Table 4.3).

For the trainee tracer survey, we plan to survey trainees in PICG-supported courses and pre-improvement courses while they are still enrolled (at baseline) and again one year after they graduate (at follow-up). This one-year follow-up period is typical in the literature discussed in Section 3 (the typical period is 12 to 18 months, although some studies do have a longer follow-up), and was the same period used in our recent evaluation of MCC's vocational training investments in Namibia. The exact timing of the baseline and follow-up trainee tracer survey for a particular course will depend on when the course starts and the duration of training. Therefore, both the baseline and follow-up rounds of data collection will take place over several months.

Most of the PICG-supported courses will have enrolled their first two cohorts of trainees between the fall 2017 and fall 2018 semesters.[13] Because we plan to include these first two cohorts in the evaluation, the baseline data collection—which began in spring 2018—will extend until early 2019. In May and June 2017, our local consultant collected baseline data from trainees in pre-improvement courses that will be part of the pre-post design because it was necessary to do so while trainees were still enrolled in those courses.

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[13] Courses conducted by the Georgia Mountain Guide Association started earlier, in late 2016, well before the other PICG-supported courses. To ensure that we are able to include these courses in the baseline data collection procured by MCA-Georgia in early 2018, and that we are measuring the outcomes of the fully established version of these courses, we plan to include the second and third cohorts of trainees in these courses (enrolling in fall 2017 and fall 2018, respectively). Therefore, the baseline survey timeline for these courses will be similar to the other PICG-supported courses.

The follow-up round started in the third quarter of 2018, one year after the graduates of the final cohort in the pre-improvement courses entered the labor market. This round will continue until September 2021 as additional graduates from PICG-supported courses enter the labor market. This cutoff date, about nine months before the expected end of the evaluation contract in July 2022, will give us sufficient time to process and analyze the data for the final report.[14] Under the current projected timeline for PICG courses, the evaluation's projected end-date will enable us to include the first cohort in all 41 PICG-supported courses in the follow-up round, as well as a second cohort in 36 of these courses (all but those conducted by the Georgian Railways grantee, which are only enrolling their first cohort in late 2018).

The timing for the study's qualitative data collection activities is less complex. We will conduct two rounds of qualitative data collection: an interim round in late 2018, toward the end of the compact, and a final round in 2021, toward the scheduled end of the evaluation contract. The interim round will focus on implementation issues and preliminary results at a point when implementation is still active or relatively recent and key implementation-related stakeholders (such as PEM and MCA-Georgia) are still available in country. The final round will explore the longer-term effects of the project activities and their sustainability in the post-compact period.

5. Data sources and outcomes

In this section, we describe each of the primary and secondary data sources that we will draw on for the evaluation in further detail, including the key outcomes that we will capture through each source.

5.1. Data from the trainee tracer survey

The baseline trainee tracer survey will be a short survey of trainees enrolled in PICG-supported and pre-improvement courses. It will capture detailed trainee contact information, background characteristics, information about other training courses considered, and trainees' expectations for future employment and wages. This information will enable us to contact trainees for the follow-up survey, describe trainee background characteristics, identify relevant benchmarking courses, identify relevant employers for qualitative interviews and focus groups, and eventually compare trainees' initial expectations to their actual outcomes. The baseline survey will be self-completed by trainees in the classroom while they are still enrolled in training, and will largely be conducted by an MCA-procured local data collection firm.[15]

The follow-up survey will be a longer survey that captures detailed information about trainees' training experience, as well as labor market outcomes such as employment and wages. A local data collection firm will conduct the survey one year after trainees graduate from each course; because the staggered timeline of follow-up data collection will extend beyond the compact period, MCA-Georgia will procure some of these surveys (those conducted during the compact period) and Mathematica will procure the post-compact data collection. To maximize

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[14] The current evaluation contract ends in January 2022, but we have agreed with MCC to request a 6 month no-cost extension until July 2022 to enable us to include a second cohort in most of the PICG-supported courses.

[15] As noted earlier, our local consultant collected baseline data for trainees in pre-improvement courses in May and June 2017 because it was necessary to mobilize quickly to collect these data while the trainees were still enrolled. The MCA-procured data collector will collect baseline data for all PICG-supported and benchmarking courses.

the follow-up survey response rate, we will use a multi-pronged strategy to locate respondents and have them complete the survey, which we will develop in close coordination with MCA-Georgia and the local data collection firm. This strategy will likely include a combination of emails (with a link to a self-completed web-based survey), phone contacts (a web-based survey completed over the phone by the survey team), and additional contact information from the baseline survey (social media contact information and phone numbers of relatives or friends) to obtain updated phone contact information for nonrespondents. We will also consider visits to nonrespondents' permanent home addresses, the work sites of major employers of graduates, or both to conduct face-to-face surveys.

The MES also conducts follow-up tracer surveys of graduates from all public TVET courses. However, it will be important to conduct a separate tracer survey for our study for several reasons. First, we are interested in measuring course completion rates and the labor market outcomes of those who enrolled but did not graduate; this will require us to collect information from all enrollees rather than just graduates, whereas the MES tracer survey focuses on graduates only. Second, we are interested in measuring longer-term labor market outcomes measured one year after graduation; in contrast, the follow-up period for the MES survey varies across courses and is shorter than one year, on average. Third, the response rate to the MES survey has been about 50 percent—we are seeking a higher response rate (closer to 80 percent) for our study, to limit possible non-response bias. This might be realistic given that we are surveying a smaller set of courses than MES and can devote additional resources to locating respondents using the multi-pronged strategy described above. Finally, we plan to use a more comprehensive survey instrument that will capture additional information relative to the MES survey—for example, detailed information on training experiences. As described below, we will use the MES tracer survey data for non-supported courses for benchmarking purposes.

We summarize the planned contents of the baseline and follow-up survey in more detail in Table 5.1.

5.2. Secondary trainee tracer survey data

For the benchmarking analysis we will use data that the MES collects on the labor market outcomes of graduates from public TVET courses in Georgia through their own tracer survey. This phone-based survey, which has been conducted annually since 2014, attempts to contact all graduates of public TVET courses in the preceding academic year (the timing of the survey relative to graduation is unclear and could vary across courses and years, but is likely between six months and one year after graduation). However, response rates are typically only about 50 percent because of poor student contact information.[16] Based on the timing of the evaluation's tracer surveys for PICG-supported courses we believe it will be appropriate to seek MES survey data from 2019 and 2020 (covering graduates from the 2017-2018 and 2018-2019 academic years, respectively). Reports with findings from the aggregated MES tracer survey data are publicly available on the MES website. As part of our future data requests to MES, we will assess if it is possible to obtain de-identified student level information to conduct more detailed analysis. If not, we will request aggregated information for relevant subgroups of graduates (for

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[16] The MES is currently considering outsourcing the data collection in future years, with donor support, which might lead to an improvement in response rates.

example, by gender) to complement the publicly-available information for the full set of graduates.

Table 5.1. Preliminary contents of the baseline and follow-up trainee tracer surveys

Domain	Survey contents
Baseline survey	
Contact information	Primary and secondary phone number; email address; Facebook contact information; name, phone number, and email of relatives or friends
Training information	Provider, name, and level of other training courses to which trainee applied; initial perceptions of current training
Expectations for the future	Expected main activity one year after graduation; expected wage; main employers of interest
Demographics and background information	Gender; age; marital status; number of children; disability status; home language; region of origin; education level; parental education level; score in vocational training entry exam; prior training completed and other concurrent training; work experience and current employment status
Follow-up survey	
Training receipt	**Completion of training**; perceptions of training quality; course content and pedagogical approaches (use of laboratories, practical component, teaching practices, etc.); receipt of and duration of internships; career guidance received; job placement assistance received; enrollment in further training after graduation
Employment	**Paid employment**; productive engagement (employed *or* engaged in further training); self-employment; hours per week worked; time to find a job; relevance of training to job; effects of training on existing job (if employed at time of training); job satisfaction; availability for work and job-seeking activities (for those not working)
Wages	**Monthly wages from employment (or profits from self-employment)**

Note: Key outcomes for the follow-up analysis are in bold.

5.3. Qualitative data

We will develop a qualitative data collection protocol for each type of respondent in each of the two rounds of qualitative data collection. Although we will tailor the protocols for each respondent type, they will all cover similar topics related to the research questions (Table 5.2 presents illustrative areas of focus for each type of respondent). We anticipate that a combination of Mathematica staff and an MCA-procured local data collection firm will collect the qualitative data in the interim round; for the final round, Mathematica will hire a local data collection firm directly.

Table 5.2. Illustrative areas of focus for qualitative data collection

Respondent	Illustrative areas of focus	
	Interim round, 2018	Final round, 2021
PICG grantees, STPP grantees, and related TVET providers	• Successes and challenges of implementation • Nature of and reasons for deviations from original implementation plans, including course development and industry collaboration • Level and patterns of demand for training in PICG-supported courses • Perceived sustainability of PICG-supported courses and risks to achieving long-term outcomes • Dissemination activities and potential for broader best-practice adoption (STPP grantees) • Perceived effects of policy changes supported by the project • Involvement in and perceived effects of annual TVET conference	• Changes to PICG-supported courses since the end of the compact • Level and patterns of demand for training in PICG-supported courses since the end of the compact • Sustainability of PICG-supported courses and barriers to continued sustainability • Perceptions of best practices, extent of adoption, and effects of adoption (STPP grantees and non-grantees) • Perceived effects of policy changes supported by the project
Trainees	• Motivation for enrollment in PICG-supported courses and types of trainees who enroll • Perceived strengths and weaknesses of course content, training quality, and training approaches • Plans and expectations for further training and employment	
Graduates of PICG-supported certificate courses		• Background information (quantitative), for example: gender, age, language, education, employment status, and work experience • Motivation for enrollment in PICG-supported certificate courses • Perceived strengths and weaknesses of course content, training quality, and training approaches • Effects of certification on labor market experiences (for example, employment, position, wages, and job mobility)
Teachers	• Changes in curriculum and teaching methods (for example, teaching materials, practices, and delivery methods) associated with the PICG-supported courses • Training and professional development associated with the PICG-supported courses, and additional training needs • Perceptions of trainees in PICG-supported courses (for example, their ability, interest, and motivation) • Main challenges of teaching PICG-supported courses, and how these might be addressed	
Employers and other	• Motivation for involvement with PICG-supported courses	• Background information (quantitative), for example: nature and location of business,

Respondent	Illustrative areas of focus	
	Interim round, 2018	Final round, 2021
PICG partners	• Nature and extent of involvement during the course development and implementation phases, satisfaction with the process, and key challenges faced • Nature of and reasons for deviations from original course development plans • Plans for continued involvement with PICG-supported courses after the compact, if any • Extent to which initial expectations about these courses have been or are likely to be met • Perceived sustainability of PICG-supported courses and risks to achieving long-term outcomes • Involvement in and perceived effects of annual TVET conference	annual revenues, total number of employees, breakdown of employment by primary occupation and other employee characteristics (for example, tenure, gender, and nationality) • Perceived skills of graduates from Georgian TVET programs before the PICG-supported courses were introduced • Awareness of PICG-supported courses and perceptions of these courses • Current hiring, training, and wage-setting practices, how these have changed over time, and reasons for these changes • Key challenges faced in hiring employees with the right skills, how these have changed over time, and reasons for these changes • Satisfaction with skills of graduates from PICG-supported courses and graduates from other courses, including key skills gaps • Differences in perceptions of graduates from PICG-supported courses by gender and other socio-demographic characteristics • Extent and nature of engagement with TVET providers, and future plans • Extent and nature of engagement with the MES, and future plans • Perceived sustainability of PICG-supported courses • Involvement in and perceived effects of annual TVET conference
Industry groups	• Extent and nature of engagement between industry, TVET providers, and the MES • Perceived skills of graduates from Georgian TVET programs • Awareness and perceptions of PICG-supported courses	• Changes in the extent and nature of engagement between industry, TVET providers, and the MES, and reasons for these changes • Perceptions of graduates from PICG-supported courses • Perceptions of broader trends in the skills of TVET graduates
MES and NCEQE staff	• The authorization process for PICG-supported courses, implications for course design, and related challenges • Status of various policy changes supported by the ISWD project, expectations for further changes, and related challenges • Perceived effects of policy changes supported by the project • Other policy changes in the TVET sector • Involvement in and perceived effects of annual TVET conference	• Long-term status of various policy changes supported by the ISWD project • Perceived long-term effects of policy changes supported by the project • Other policy changes in the TVET sector • Extent of a broader shift to industry demand-driven TVET courses, role of the ISWD project, and remaining barriers
PEM, MCA-Georgia, and	• Successes and challenges of implementation	

	Illustrative areas of focus	
Respondent	**Interim round, 2018**	**Final round, 2021**
local MCC staff	• Nature of and reasons for deviations from original implementation plans • Perceived sustainability and risks to achieving long-term outcomes	
Georgian Association of Private Colleges		• Awareness of best practices by members, extent of adoption, and effects of adoption • Perceived long-term effects of policy changes supported by the project • Involvement in and perceived effects of annual TVET conference • Extent of a broader shift to industry demand-driven TVET courses, role of the ISWD project, and remaining barriers
Other donors in the TVET sector	• Nature and scope of current and planned investments in the TVET sector • Interaction and coordination with ISWD project • Perceived sustainability of ISWD project and risks to achieving long-term outcomes	• Nature and scope of current and planned investments in the TVET sector • Perceptions of whether the ISWD project had a significant long-term impact • Perceived sustainability of ISWD project

Note: Blank cells indicate that we will not collect qualitative data from a particular respondent in the relevant round.

5.4. Project documents and administrative data

To complement the information gathered through the qualitative data collection effort, we will draw on several types of project documents and administrative data. First, we will examine the original PICG proposals and related documents, to investigate the extent of deviations from the original plans. We will also be able to compare the estimated employment and wage rates from the trainee outcomes analysis to the assumed rates that grantees used to justify their PICG proposals. Second, administrative data on enrollment trends in PICG-supported courses will help us explore the long-term sustainability of these courses. Third, financial data from PICG grantees on their revenues and the costs of training will be useful to assess the long-term financial viability of the PICG-supported courses.[17] Fourth, administrative data on TVET course offerings from the MES (public courses) and the Georgian Association of Private Colleges (private courses) will help us assess broader changes in these offerings over time. Fifth, we will analyze documents from STPP grantees (including the final PowerPoint presentations compiled by each grantee) to describe the best practices identified and the dissemination process. Finally, information on TVET annual conference attendance and financing will contribute to our analysis of the effects of the conference.

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[17] Public colleges' revenues are determined by a government formula. However, we could still assess how that formula is determined and whether it covers training costs, in addition to examining the revenues and costs for private colleges.

6.   Analysis plan

In this section, we describe the main types of quantitative and qualitative analyses that we plan to conduct for the evaluation.

6.1. Quantitative analysis

We will conduct the following quantitative analyses using data from the trainee tracer survey:

- **A descriptive outcomes analysis of tracer survey data for trainees in PICG-supported courses.** For each trainee-level outcome that we examine, we will present both graphical and numerical descriptions of the averages for the full sample of trainees in PICG-supported courses. We will also provide similar descriptions of background trainee characteristics such as gender, education level, marital status, language group, region of origin, parental education, and disability status. To complement the overall averages, we will also present averages for specific providers or courses, and for other subgroups of interest to MCC (for example, those defined by gender or language group). However, the estimated averages will be less precise for these subgroup analyses and will depend on the sample sizes for each subgroup. We will also contrast averages for the first and second cohorts, to examine how trainee characteristics and outcomes changed as the PICG-supported courses matured.

- **A descriptive benchmarking outcomes analysis using data from the trainee tracer survey and secondary data from the MES trainee tracer survey.** For this analysis, we will descriptively contrast the average characteristics and outcomes of trainees in PICG-supported courses to those of trainees in other public TVET courses in Georgia. We will conduct these comparisons using the overall averages from our tracer survey and the MES tracer survey, for contemporaneous cohorts. If we obtain access to the microdata from the MES or can request them to provide aggregated information by subgroup, we could potentially conduct these contrasts by subgroup too (for example, by gender).

- **A pre-post analysis of tracer survey data for trainees in improved courses.** This analysis will compare the outcomes of trainees in improved PICG-supported courses to those of trainees who enrolled in the pre-improvement versions of the same courses. To conduct this comparison, we will use the following regression model:

$$Y_{ijt} = \alpha + \beta POST_t + \gamma X_{ij} + \delta_j + \varepsilon_{ijt} \ ,$$

where Y_{ijt} is the outcome for trainee i enrolled in course j at time t (where t is before or after the improvements); $POST_t$ is a binary indicator for the trainee being enrolled after the PICG-supported improvements; X_{ij} is a set of pre-determined trainee characteristics such as gender and education level; δ_j is a set of binary indicators, one for each PICG-supported course and its pre-improvement version, which ensure that the pre-post comparisons are made within each course and then averaged over the full sample; and ε_{ijt} is a random error term. The estimated value of the coefficient β represents the pre-post change in the outcome of interest

for the average trainee; with appropriate reweighting we can also estimate the change for the trainee in the average improved course or average provider in the sample.[18]

6.2. Cost-benefit analysis

According to documentation MCC provided to Mathematica, MCC produced an ex-ante cost benefit analysis model with an estimated ERR of 14 percent for the ISWD project. The ERR is a summary statistic that is used by MCC to determine the cost-effectiveness of its investments. Conceptually, it is the discount rate at which the cumulative benefits of a program over time are exactly equal to its costs; a higher (positive) ERR represents higher benefits and lower costs.

MCC's ex-ante ERR model focuses on Activity 1, which accounts for most of the ISWD project funding and has the most clearly defined benefits. The costs in the ERR model include the total PICG investment amount from both MCC and the private sector, as well as tuition costs. The main benefits are higher earnings of PICG trainees compared to their earnings had they taken existing courses. These higher earnings are driven by: (1) a higher expected employment rate (an increase of 9 percentage points); and (2) higher expected wages for those employed (an increase of about 24 percent from a base of 319 GEL per month, in 2010 currency). MCC plans to update the ex-ante ERR model to reflect updated information on investment costs, the number of expected trainee beneficiaries, the timing of the PICG courses, and so on.

Because the evaluation design for the ISWD project does not currently include an impact evaluation, we will not be able to produce a comparable ex-post ERR estimate that uses rigorous evidence of the employment rates and wages of trainees in PICG-supported courses relative to the counterfactual in which the PICG training did not exist. However, our outcomes analyses can still shed light on whether the assumed improvements in employment and wages, as well as the estimated base wage rate (a crucial parameter in the model), are reasonable. For example, if employment rates are similar for graduates from PICG-supported and benchmarking courses, then large increases in employment might not be plausible. Similarly, if the wage rate for trainees in benchmarking courses is very different from the assumed baseline wage level, it would be important to consider revising this parameter.

6.3. Qualitative analysis

To analyze qualitative data, Mathematica will use qualitative transcript-coding software to organize and synthesize the key themes that emerge from document reviews, in-depth interviews, and focus groups. More specifically, we will follow four steps to analyze the data (Creswell 2009):

1. **Raw data management.** Raw data management is the process of organizing such data into meaningful units of analysis (that is, from audio files to transcripts). During this step, we will review all data and eliminate any that are incomplete or not useful to our analysis.

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[18] This is relevant because a large fraction of trainees in the improved course sample are receiving training from one provider; therefore, the pre-post estimate for the average trainee will largely be driven by the pre-post change for this provider. Although this estimate is of interest because most of the improved course beneficiaries are receiving training from this one provider, it might mask interesting differences in pre-post changes across courses and providers.

2. **"Chunking" and initial coding.** Often referred to as *data reduction*, this step will allow us to read the transcripts several times and obtain a holistic sense of the data. We will develop a detailed initial coding scheme—a set of themes we might encounter in the interview and focus group transcripts, which are mapped to the research questions and logic model (for example, initial themes might include "implementation challenges," "employer/provider engagement," and "adoption of new practices"). We will also begin developing internal memos to accompany the broader coding themes.

3. **Detailed coding.** This step will involve refining the coding scheme and recoding data as we look at the data in greater depth. We will use Atlas.ti or NVivo software to review and code the transcripts based on the initial codes developed during the "chunking" process. We will expand and refine these codes during the coding exercise and subsequent analysis of the coded transcripts iteratively as additional themes emerge.

4. **Data interpretation and writing.** Analyzing the coded transcripts will involve triangulating the findings across stakeholders to highlight mechanisms, context, and similarities and differences in perspectives. For example, for Activity 1, the analysis of interviews with employers of graduates from PICG-supported courses might identify differences in employers' perceptions of and satisfaction with graduates across PICG grantees. By comparing these to grantee-specific implementation challenges reported by implementers and grantees, as well as to differences in training experiences and perceptions reported by PICG trainees, we will seek to identify why some PICG-supported courses were more successful in meeting employers' needs than others.

   For Activity 2, we will compare the dissemination steps reported by STPP grantees and implementers to non-grantees' reported awareness, perceptions, and adoption of best practices. This should enable the study to determine the extent to which practices were likely to be widely known and adopted, and which dissemination mechanisms are likely to have been most successful.

   For Activity 3, we will compare the progress on specific MES-reported policy reforms to the effects observed by key stakeholders in the TVET sector. For example, the analysis will cross-check MES-reported progress on national regulations for public-private partnerships and sector skills councils with the perceptions of and involvement in these mechanisms by TVET providers and employers. This will enable us to assess how and to what extent the implemented reforms have affected or are likely to affect the TVET sector.

   Finally, for Activity 4, we will analyze qualitative interview data from participants in the annual TVET conferences and observe conference activities directly, to assess whether these events are likely to have encouraged deeper levels of collaboration and engagement among TVET stakeholders.

6.4. Analysis of project documents and administrative data

Our analysis of quantitative administrative data will be descriptive in nature. For example, we will describe trends in enrollment in PICG-supported courses, the training levels and areas of broader public and private TVET course offerings, and the numbers and types of attendees at the annual TVET conference. We will also conduct a structured document review of the original PICG grant proposals and related documents to summarize the planned set of courses,

qualification levels, course durations, and enrollment levels under each PICG grant, and compare that information to the actual set of courses that were implemented.

7. Limitations and challenges

Our evaluation of the ISWD project faces some important challenges and limitations that we will attempt to address to the extent possible:

- **Absence of a rigorous counterfactual.** Our evaluation design is a descriptive performance evaluation. The study will not identify a rigorous counterfactual for trainees in PICG-supported courses—that is, we cannot confidently determine what the labor market outcomes of these trainees would have been in the absence of the project. Our benchmarking and pre-post analyses will provide information about outcomes in non-PICG courses, but this should be viewed as suggestive and not rigorous evidence about the counterfactual situation.

- **Potential for low response rates in the trainee tracer survey.** Our ability to provide quantitative evidence on trainee outcomes that is generalizable to the full group of PICG beneficiaries depends on achieving high response rates to the tracer survey. Otherwise, there may be a concern that only certain types of trainees—for example, those with better outcomes—are appearing in the data and driving the findings. We will use several strategies to ensure high response rates, including collecting detailed contact information at baseline and using a multi-pronged approach to locate trainees for the follow-up survey (as discussed in Section 5). In the analysis, we will also be able to get a sense of a lower bound on some outcomes by assuming a "worst case" scenario—for example, by assuming that all those who do not respond are unemployed.

- **Potential for heterogeneous effects across PICG grantees.** There is substantial variation across PICG-supported courses in terms of course content, course design, and delivery approaches. In addition, grantees could differ in terms of their capacity to effectively implement the new courses and could face different challenges related to implementation and sustainability. Therefore, it is likely that the effects of new and improved courses on labor market outcomes will vary substantially across grantees. Our ability to explore this variation in effects quantitatively through the trainee outcomes analysis will be limited, because small provider-level sample sizes will result in imprecise estimates of labor market outcomes for specific grantees. However, the qualitative study will enable us to focus in some detail on the experiences of specific grantees. In particular, we plan to conduct a detailed structured document review focused on each of the grantees, together with two rounds of in-depth qualitative interviews with each grantee to fully understand their specific experiences with implementation and sustainability. In addition, by conducting qualitative interviews with a relatively large sample of employers in the final round of data collection, we will be able to explore differences in employer perceptions across different types of grantees, including whether there is variation in the extent to which their PICG-supported courses met employers' needs.

8. Administrative details

8.1. Institutional review board requirements and clearances

Mathematica has prepared and submitted an institutional review board (IRB) application for approval of the research and data collection plans for the baseline trainee tracer survey, follow-up trainee tracer survey, and both rounds of qualitative data collection. The application materials included three sets of documents: (1) a research protocol, which drew heavily on the present design report and added more information about plans for protecting study participants' confidentiality and human rights; (2) copies of all currently available data collection instruments, including statements of informed consent; and (3) a completed IRB questionnaire that summarized the key elements of the research protocol, plans for protecting participants' human rights, and possible threats to participants if their confidentiality were compromised. The IRB has approved this application.

IRB approval is valid for one year from the date of approval and must be renewed annually. We expect that the annual renewals will require minimal updates to the core application materials. In addition, if data collection instruments change substantially from those that the IRB approved, then we must reapply for approval. Small changes to the instruments (such as rewording or reordering of questions or editing changes) do not require reapplication, but the finalized instruments must be submitted to the IRB for documentation.

We have also coordinated with MCA-Georgia to ensure the data collector and local stakeholders agree on the data collection protocol. The data collector's contract with MCA-Georgia (for data collection that occurs during the compact) or Mathematica (for data collection that occurs after the compact) specifies that it will abide by the IRB's recommendations. The data collector and Mathematica have also signed an IRB authorization agreement stating that the data collector will adhere to the IRB-approved data collection procedures and protocols.

8.2. Data access, privacy, and documentation

After producing each of the interim and final reports, we will prepare corresponding de-identified data files and codebooks that MCC can make available to the public. We will de-identify these data files, user manuals, and codebooks according to the most recent guidelines set forth by MCC. The public-use data files will be free of personal or geographic identifiers that would allow users to directly identify individual respondents or their households, and we will remove or adjust variables that could introduce reasonable risks of deductively disclosing the identity of individual participants. Mathematica will remove all individual identifiers, including names, addresses, telephone numbers, and any other similar variables. We will also remove unique and rare data using local suppression, replacing these observations with missing values instead. If necessary, we will also use top and bottom coding, setting upper and lower bounds to remove outliers and collapse any variables that make an individual highly visible depending on geographic or other factors (such as home language) into less easily identifiable categories. Our manner of data perturbation will not significantly degrade the data.

8.3. Dissemination plan

Mathematica will present interim and final evaluation findings in person to MCC and to stakeholders in Georgia. The interim analysis will occur after completing the baseline trainee

tracer survey and interim round of qualitative data collection. This analysis will produce an interim report that summarizes the characteristics of the sample from the trainee tracer survey and the qualitative findings related to implementation and early results from all activities, which we expect to submit in March 2019. Following the follow-up trainee tracer survey, employer survey, and final round of qualitative data collection, we will produce a final evaluation report for the ISWD project, which we expect to submit in March 2022.[19] Table 8.1 shows how the timing of the interim and final reports aligns with the planned data collection activities for the evaluation.

We will work with MCC to increase the visibility of the study's findings, particularly among education policymakers and development practitioners. We will collaborate with MCC and stakeholders to identify a variety of forums—including conferences, workshops, and publications—during which to share results and encourage donors, implementers, and policymakers to integrate the findings into future programming. For example, in addition to the project's final report, we will develop issue briefs summarizing and visualizing key findings for a broader audience of readers and stakeholders. Potential conferences for presenting evaluation findings will include forums hosted by the Comparative International Education Society, the American Evaluation Association, or the Association for Public Policy Analysis and Management. We will also seek to publish a peer-reviewed article disseminating the study's results in academic or sector-specific journals focused on vocational education systems in developing countries.

Table 8.1. Evaluation timeline and reporting schedule

Year	2017			2018				2019				2020				2021				2022			
Quarter	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Data collection																							
Baseline trainee tracer survey[a]	▓				▓	▓	▓																
Follow-up trainee tracer survey						▓	▓					▓	▓	▓	▓	▓	▓	▓					
Qualitative data						▓											▓	▓					
Reporting																							
Interim and final evaluation reports								▓												▓	▓	▓	

(Vertical markers: "End of compact" at end of Q1 2019; "End of evaluation" at Q3 2022.)

[a] Baseline data collection in Q2, 2017, is for trainees in pre-improvement courses. Baseline data collection for PICG-supported and benchmarking courses began in Q2, 2018.

8.4. Evaluation team roles and responsibilities

Mathematica's project team has extensive experience conducting mixed-methods, multicomponent, large-scale evaluations in the fields of general and vocational education. Mr. Ira Nichols-Barrer will serve as the program manager, acting as the primary point of contact for MCC. He will manage the relationships with government agencies and other local entities and contractors, while supervising the evaluation design and implementation process and ensuring high data quality. Dr. Evan Borkum is the principal investigator for this evaluation, providing methodological and technical oversight and serving as a senior analyst overseeing the study's quantitative data collection and analysis process. Dr. Camila Fernández will serve as a

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[19] As mentioned earlier, this assumes an extension of our current evaluation contract from January 2022 to July 2022.

senior analyst overseeing the study's qualitative data collection and analysis process. Ms. Irina Cheban will serve as the project analyst, supporting data collection, analysis, and reporting efforts on the evaluation. Dr. Natia Gorgadze will serve as the project's in-country consultant, providing substantive knowledge of Georgia's education system and assisting with the study's data collection and other local evaluation management tasks.

8.5. Budget

At this time, Mathematica does not anticipate that the ISWD evaluation design and data analysis plans described in this report will require changes to the total evaluation budget figure presented in the study's original proposal. Mathematica will work closely with MCC and MCA-Georgia to ensure data collection is feasible within the compact's budget parameters.

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APPENDIX:

LIST OF PICG-SUPPORTED COURSES AND STPP GRANTS

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Table A.1. Program Improvement Competitive Grants (PICG)-supported courses, by provider

Provider	Course	Level	New or existing
1. Agricultural University of Georgia[a]	Farmer/Agribusiness manager	Certificate	New
	Veterinary service specialist	Certificate	New
	Viticulturist-oenologist	Certificate	New
2. Batumi State Maritime Academy	Crane operator	3	New
	Crane operator	4	New
	Fishing vessel navigator	5	New
	Cargo handling logistics operation	4	New
	Port logistics management	5	New
	Welder	3	New
	Welder	4	New
3. Community College Spectri	Air-conditioning technician	4	Existing
	Electrician	3	Existing
	Electrician	4	Existing
	Water supply systems exploitation	4	New
	Water sewage systems exploitation	4	New
	Welder	3	Existing
	Welder	4	Existing
4. Georgia Railway Transport College	Railway power supply system mechanic	4	Existing
	Locomotive driver	4	New
	Rail car maintenance mechanic	4	Existing
	Rail carrier	4	Existing
	Rolling stock mechanic	4	Existing
	Rail signalization, centralization and blocking	5	Existing
	Monitoring of railway track	3	New
	Construction of railway track	3	Existing
5. Georgian Aviation University	Aircraft maintenance technician B1.1	5	New
	Aircraft maintenance technician B2	5	New
	Helicopter pilot	5	New
6. Georgian Institute of Public Affairs	Occupational health, safety and environmental specialist/manager	5	New
7. Georgian Mountain Guide Association	Mountain guide	4	New
	Trekking guide	3	New
8. Georgian Technical University	Electrical technician, high voltage	4	New
	Industrial automation technician	5	New
	Mechanical engineering technician	5	Existing
	Mechatronics technician	5	Existing
9. Vocational College Phasizi	Farming in fisheries	4	New
	Laboratory work in fisheries	4	New
	Fish processing	4	New

Provider	Course	Level	New or existing
10. Vocational College Tetnuldi	IT support specialist	3	Existing
	Computer network administrator	5	Existing
	Network and systems technician	4	New
Total			

Source: Personal correspondence with PEM.

[a] The course offered by this provider are currently certificate courses but are expected to be authorized by NCEQE as full programs soon.

Table A.2. Strengthening TVET Provider Practice (STPP) grants

Grantee	Project name
Round 1: $68,994	
1. Business Academy of Georgia (SBA)	Development of Assessment Tools for the Entrepreneurship and Introductory Practice Modules
2. Community College AISI	Teacher's Professional Development Practice
3. Georgian Employers' Association	Non-formal Educational Program in the Work-Based Learning Format
4. Georgian Technical University	Development of E-learning Course in IT
5. Kutaisi Public School #33	Social Enterprise in Public Schools
6. Mindstream Ltd.	Career Planning & Employer Communication Strategy
7. Vocational College Icarosi	Employers Forum for Industry Engagement in TVET Sector
Round 2: $172,186	
1. Akaki Tsereteli State University	New Professional Personnel for the Use of Solar Energy
2. Community College Akhhali Talga	Supporting individual learning paths of TVET students
3. EasySoft LTD	Learning platform of innovation technology for professional education
4. EMIS	Introducing Informal Education Recognition Methodology
5. Georgian Adult Education Network (GAEN)	Strengthening entrepreneurial training in non-formal education
6. GeoTuran Ltd.	Euro Master 2017
7. ISET Policy Institute	Strengthening entrepreneurial training in formal TVET system
8. Mindworks Ltd.	Flipped Classroom Deployment in BLACKSEA and ERKVANI
9. The Georgian Patriarchate Community College of Decorative Gardening	Promoting TVET related to decorative gardening professions among general school students
10. Vocational College Modus	Vocational training through distance learning, based on theory, practice and visual media
Round 3: $177,010	
1. NGO Green Sector	Mariculture Vocational Education Program
2. Akaki Tsereteli State University	New Professional Personnel for the Green Building Sector in Georgia
3. Imereti Scientists' Union SPECTRI	Recycling: New Challenges and New Professional Opportunities
4. Olive Ltd	Piloting New Model of Working Skills Development (WSD) Program for School Pupils
5. Innovations for Inclusive Society	Inclusive Model in Dual Education
6. LEPL 112 of Ministry of Internal Affairs of Georgia	Developing Dual-Modular Vocational Education Program for Call Center Operators on the Basis of 112 Training Center
7. Colors of Caucasus	Internet marketing and Sales for TVET products and Professions
8. Triesdorf Agribusiness Consulting	Development of competences of professionals supporting work-based learning experiences in Agriculture
9. Jump Start Georgia	GOGO code
10. Aris.ge Ltd	Increase the attractiveness of professional education and support its popularization

Source: The ISWD project website: http://www.iswd.ge/.