ASSESSING PRODUCTIVITY THROUGH TRAINING AND TVET: HOW AND WHY ?

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TESDA

"Why and how should we assess a person's productivity during their training?"

Background

In the words of Kenneth Moore in his 2020 graduate thesis at the University of Melbourne, productivity is a loaded concept. This is to say that productivity can be conceptualized or defined in different ways by different people and to find a definitive way to assess or measure "productivity" can be a challenge. However, this does not change the fact that productivity *needs* to be measured, because there is no other way for employers to determine if their workforce is efficient and effective, or not. More to the point, productivity determines if workers need further development or not (Moore 2020), through skills training, retrainings, re-skillings, and the like. Indeed, high performing organizations are 92% more likely to innovate within their market and 42% more likely to become pioneers for new avenues within said market (Deloitte 2015).

Hence, productivity assessments While the definition of productivity is subjective depending on who is asking, the US Bureau of Labor Statistics (BLS) equates productivity with a "productivity index", i.e. a measure of how much output is produced given an amount of labor or input over a set period of time. To put it succinctly, a workforce is more productive given a timeframe from A to B if they have larger output at B compared to A, assuming the amount of input or labor has remained constant. However, this may be a rather simplistic way of looking at productivity, since it can also be influenced by nonlabor factors. For example, incorporating computers can lead to higher productivity with the same or even less manpower, but it may also increase spending on software or computer upgrades (BLS, 1989), implying that this method for boosting productivity may not be amenable to all employers.

Productivity assessments are highly valuable for yielding some unique insights such as this. A 2011 study done by de Grip and Sauermann was able to demonstrate how a productivity assessment can predict returns to investment on vocational training for a company's in-house call center agents. And in Moore's paper, where he sought to know how productivity was measured by various companies in Australia, it turned out that productivity change estimates helped employers gain a better understanding of how education affects productivity. In particular, the impact of upstream secondary education systems and the differences that private institutions have from public ones were alluded to by these productivity assessments on workers (Moore 2020). It is for this latter reason that Moore was able to create a sample productivity assessment model, using training evaluation models already used by Australian higher education institutions.

Sample Productivity Assessments

What Moore specifically used is a measurement called Total Factor Productivity (TFP), which simply takes into account all inputs leading to a particular output (i.e. time, talent, resources, etc.), rather than just focusing on one type of input (called a Single Factor Productivity or SFP). In the case of TFP, human labor is considered to be the most important "input", for it is here that most operational expenses are dedicated, not just in terms of wages but also in terms of development (i.e. training programs). It follows, then, that to measure human labor inputs also entails measuring the operational expenses related to labor. In his paper, Moore used TFP to determine the relationship between education and productivity; in his case, "research productivity" when used to determine the productivity of educational institutions in creating research over a period of time. Sticking to a specific measurement is rationalized by the fact that there is no real, universal method for measuring or assessing productivity, as what counts as productivity may vary from one context to another.

For example, Moore used TFP to measure the amount of output that a randomly-selected university was able to produce from 2007-2016. Using the usual calculations for TFP (i.e. output to input ratio) and measuring them against TFP change thresholds that his study calculated separately, Moore concluded that this particular university may be less or more productive, depending if one looks at their "output" in terms of educational output (i.e. lower measure) and the amount of research they were able to produce (upper measure) as seen in the figure below.

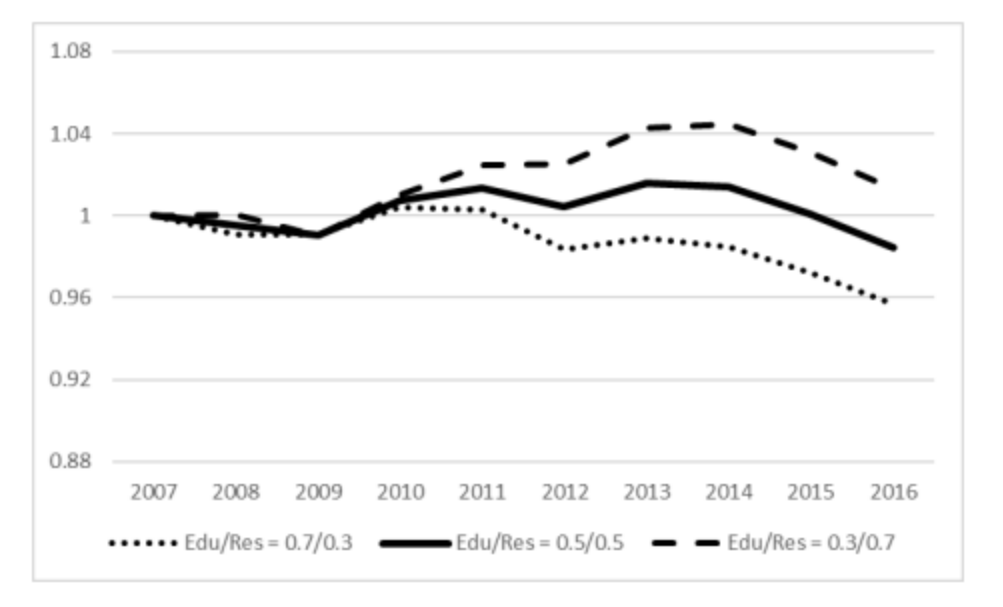

Figure 1. Sample Productivity Assessment, Showcasing a TFP System Change at a Randomly-Selected University (Moore, 2020)

Thus, it is important for any productivity assessment to carefully and specifically define what kind of productivity it seeks to measure. In this regard, the 2011 study conducted by de Grip and and Sauermann on call center agents in the Netherlands is more straightforward, for it sought to determine how education or training can affect the productivity (i.e. number of calls taken) of agents, vis-a-vis those that did not. The study involved dividing the participants into two groups, one that will receive training and another that will not, and then gauge their respective outputs or productivity over three distinct periods (i.e. pre-training, during training, and post-training). This study was undertaken with the point of view that estimating the impact of training on productivity, without any bias, will be crucial in determining the role that in-house worker trainings have on human capital development (de Grip and Sauermann, 2011).

As with Moore's study, the study done by de Grip and Sauermann measured productivity via a ratio of inputs and outputs. However, interjected into their calculations is the first group's training participation and the cost of their training; again, the second group is not intended to be trained for the study's duration. The first group's change in productivity through training was properly measured, as seen in Figure 2, with the x-axis being the training interval from before and after the week that the group was supposed to be trained (i.e. week 0, represented by a red vertical line), with the dashed lines showing the averages in a 95% confidence interval.

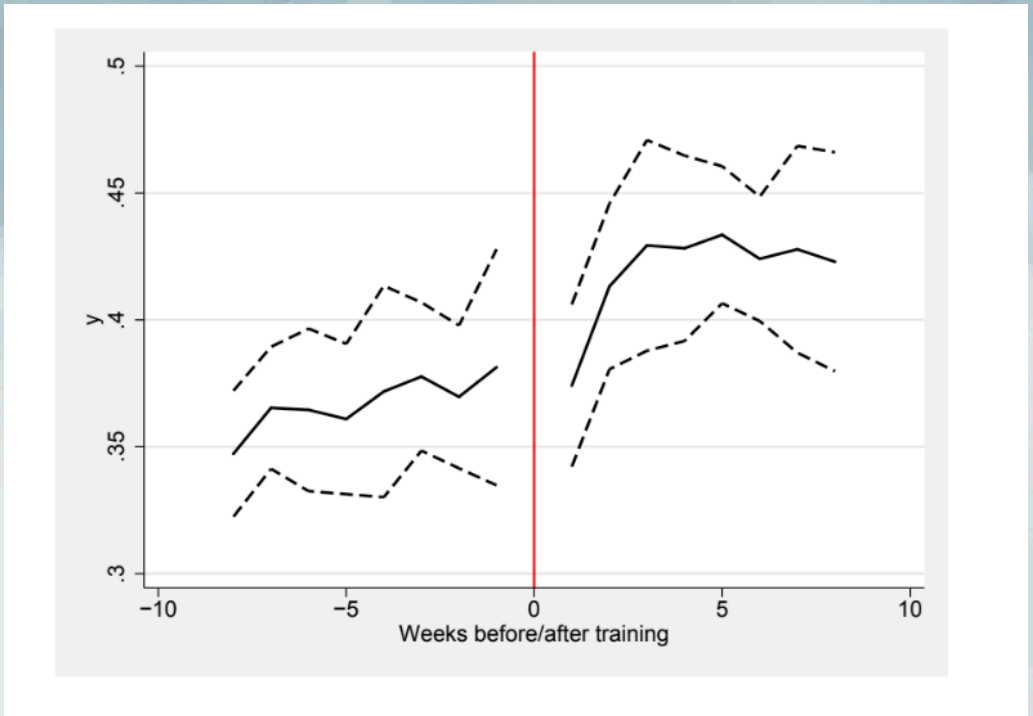

Figure 2. Treatment Group's Average Performance, Before and After Training, to Measure Productivity (de Grip and Sauermann, 2011)

Through this information, the study was able to estimate the pay-off that the agents' employers may get from the training, calculating training costs vis-a-vis the agents' wages. A breakeven point was also identified that shows the high point at which the training program provides the greatest benefits. This indicates that employers that seek to train their employees to improve productivity need only do so within a fixed amount of time, because otherwise the training will not lead to high productivity, and therefore significant returns on investment.

How to Assess Productivity in Training and Assessments?

As stated earlier, "productivity" is easiest when measured as a ratio of inputs and outputs, with other elements introduced into the equation if specific results are desired. Measuring or assessing productivity in the middle of a worker training session is also possible, but that assumes that the assessment is done over a period of time. The study done by de Grip and Sauermann involved having the training session done while the workers were still performing their normal functions at the workplace, with one group of workers undergoing the entire training session and another group being left out.

A key component for assessing productivity is determining what defines a change in productivity, whether positive or negative, in the first place.

a. Output-Based

An increase in output may be seen as the most obvious indicator of a productivity increase, but this is not as straightforward as it seems. This is because not all employee or worker activities are directly related to producing output (Chew, 1988); even if they are, not all of these activities are tangible enough to be measured. Ergo, training programs to improve productivity by increasing output may not be as nuanced as they first appear to be.

The Harvard Business Review presented an example: comparing the job done by a plant worker and a designer in a car plant. The first one's job is to screw bolts into place, which is an action that can be observed and measured. By contrast, a car designer focuses on more abstract concepts such as designing and prototyping: tasks that may be just as significant or more so for the plant, but these are not so easily quantified. While both jobs lead to the production of a car, it is easier to measure the number of cars produced in a period of time than it is to determine if a certain car design will lead to greater efficiency and productivity at the car plant. And even then, improved designs may necessitate higher production costs, which negates the purported increase in productivity that a better car design is implied to have.

Thus, when using outputs for measuring productivity during worker training, it is important to consider how "output" is defined in the first place (Chew, 1988). Using the aforementioned example, a plant worker being trained to screw bolts faster may see them have an increase in productivity, but only if the resulting output leads to a retainment or a reduction in overall production costs.

It should also be noted that focused training isn't necessarily self-contained, leading to the presumption that only those who underwent training will improve their productivity while those who did not will remain the same. In de Grip's and Sauermann's study, they discovered that while the group of participants who underwent training during the study period did have an increase in productivity, those not in the same group saw marginal productivity increases as well. It is believed that this is due to spillover of knowledge from the training group, due to informal conversations or peer pressure between the groups. This further reinforces the idea that training is still a great way to improve productivity, as there is a chance for dissemination of knowledge from the trained workers to the untrained workers,

increasing productivity among both, albeit with one group seeing a greater improvement than the other (de Grip and Sauermann, 2011).

On the other hand, an output-based evaluation may be best used when comparing productivity between two distinct groups of workers. For her 2020 thesis at the De La Salle University (DLSU), Seva, R. sought to compare the productivity of ordinary workers and those with disabilities (PWDs) at a Philippine company, using a work assessment and a time assessment system. At the end of the study, it was found out that PWDs have the same work output and duration to achieve that output, as compared to ordinary workers. However, her study did suggest that this outcome is best achieved if all workers are given a thorough orientation of PWDs and if any given task is profiled appropriately to the capabilities of PWDs.

b. Returns on Investment (ROI)

Simply put, ROI is the perceived or calculated benefit of an investment when compared to the investment's cost or price (UNESCO UNEVOC, 2020). In a way, this parallels how a productivity index is measured by employers regarding their performance of their workers. For assessing productivity through training, it may require quantification of training costs and also of the perceived training benefits. Within the purview of TVET, ROI is the net amount of perceived training benefits divided by training costs.

An ROI analysis can be influenced by various factors, however; this makes it similar to a TFP as previously mentioned. For any policymaker, it is important for them to first understand the factors affecting the results of an ROI, which is just as important as identifying costs and benefits. Factors like the characteristics of stakeholders, the training programs themselves, the enterprises, the training providers and the quality of the data will impact the calculations for benefits of TVET training, and thus the ROI.

According to UNESCO UNEVOC, the following steps must be taken in order to properly calculate ROI on TVET trainings (in verbatim):

- Select an appropriate statistical technique that isolates the effect of variables. For example, a multivariate statistical method using regression analysis to validate the impact of training
- Determine the control variables. For example, for employers this can relate to company size, region or domain of training and for society benefits in

terms of health and well-being, variables such as gender, country effects or initial educational qualifications may be appropriate
- Analyze the data to determine the influence on ROI estimates
- Determine the reasons for any variations in the ROI estimates when interpreting the results

One of the most common ways to calculate ROI during training is the model developed by Jack Phillips, aptly-named the Phillips Model, which consists of five levels of evaluation during training, from beginning to end.

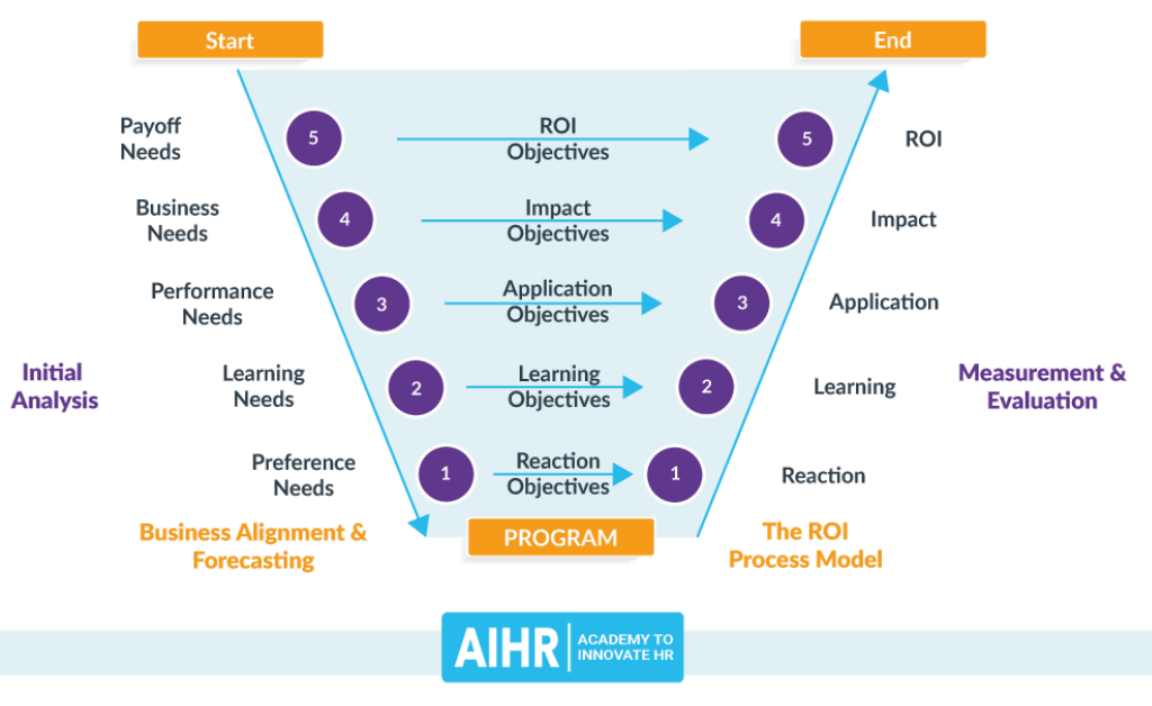

Figure 3. Phillips Model for ROI Evaluation (AIHR, 2023)

As illustrated, the Model requires an extensive analysis of the employer's various needs for training, each of which is linked to an expected outcome in each level. To start off, the whole point of training is for an employer to have an ROI for the training they need to initiate, which can be further broken down into business needs, performance needs, learning needs, and preference needs.

The first level is a Reaction Evaluation, which simply seeks to determine if the trainees are satisfied with the training they have received or not. The second level is a Learning Evaluation, which simply seeks to answer if the training program's learning objectives were met or not. Application Evaluation, as the name implies, is intended to figure out if the trainees can apply their learnings to the actual workplace, which

then immediately progresses to an Impact Evaluation, or the process of determining if the learnings have a positive or negative impact on productivity. Once all these levels have been evaluated, only then could an employer determine the ROI of the said training program, which can give them an idea about the change in productivity that their workers will demonstrate.

Philippine Situation

According to economists and analysts from CEIC, labor productivity of the Philippines grew by 2.27% in December 2022, much higher than 0.08% recorded last year and -3.54% in 2020. The latter of whom is likely caused by large-scale workplace disruptions from the COVID-19 Pandemic. CEIC measured labor productivity by dividing the country's Gross Domestic Product by the total number of employed persons. From 2011 to 2022, the highest labor productivity value was seen in 2017, at 8.71%.

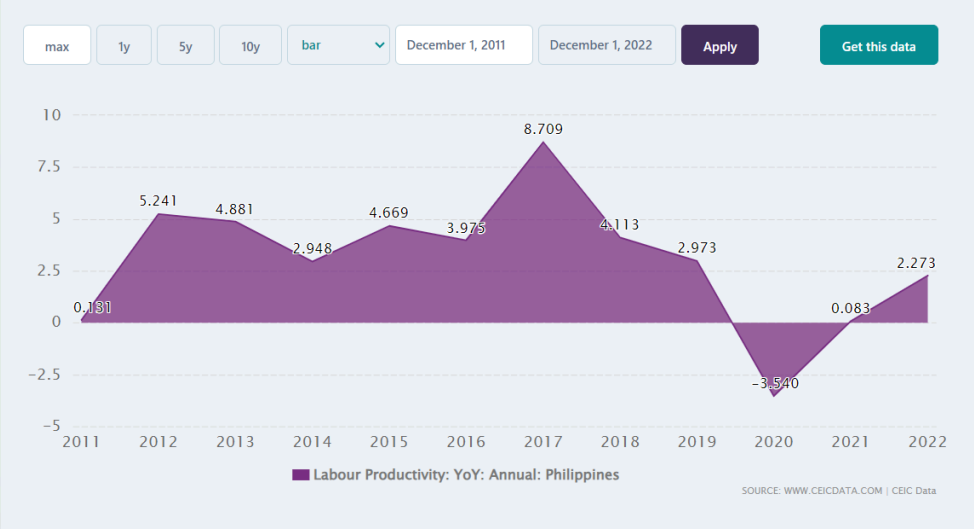

Figure 4. Annual Labor Productivity in the Philippines, from December 2011 to December 2022 (CEIC, 2023)

It can be assumed that various factors were responsible for this improvement, though a thorough assessment of workplace productivity in the Philippines is yet to be conducted, save for individual studies like the one done by Seva from DLSU. As of this writing, there are no productivity assessments that have been done during training or assessment within the Philippines, which represents a limitation in the existing literature.

Moving Forward

Admittedly, productivity assessments during TVET training are not yet done at a considerable scale, at least to TESDA's knowledge, so any such assessment done in the future will be the first of its kind. That said, TESDA has a few courses of action it can undertake in order to lay the groundwork for such an assessment, and perhaps institutionalize the practice in order to better uphold its mandate as the leading authority for TVET in the Philippines:

1. Study how a Productivity Assessment could be incorporated into a graduate's competency assessment procedure. TESDA regularly conducts assessments and certification for TVET graduates, and it may be possible that a Productivity Assessment can be inserted into these procedures, maybe with an output-based assessment or ROI prior to their accreditation. This matter may be taken up by TESDA's Certification Office and Qualifications and Standards Office to define the measures.

2. Work with another government agency for the conduct of a large-scale Productivity Assessment in the country. As said earlier, there are no studies on productivity assessments yet conducted in the Philippines. To begin with, it is not certain which industry should be subjected to this kind of study. Nevertheless, this does not discount the value of such a study as productivity in the Philippines is currently increasing, as indicated in the CEIC graph. The matter of deciding on a Productivity Assessment for a specific industry likely falls under the purview of the Department of Labor and Employment, which TESDA is currently subordinate to.

3. Consult with industry groups and other relevant stakeholders about how they conduct their own Productivity Assessments (if any). TESDA needs to know if Productivity Assessments are being done by companies and industry groups in the Philippines at an individual level. Should these studies exist, they will help expand the literature that TESDA currently has regarding the feasibility of determining a person's productivity during their training and assessment. The matter may be raised during TESDA's regular gatherings with industry groups, such as through the quarterly meetings of the Provincial and Regional Technical Education and Skills Development Committees by the Planning Office, as well as those from the TVET Industry Groups managed by the Partnerships and Linkage Office.

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