

UNIVERSITY OF THE PHILIPPINES CENTER FOR INTEGRATIVE AND DEVELOPMENT STUDIES EDUCATION RESEARCH PROGRAM

UP CIDS DISCUSSION PAPER • 2021-03

# Measuring the Efficiency of Educational Institutions

Evidence from Primary and Secondary Public Schools in the Philippines

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# Measuring the Efficiency of Educational Institutions

Evidence from Primary and Secondary Public Schools in the Philippines

John Lorenzo A. Yambot<sup>1</sup>

#### ABSTRACT

In the economics of education, an educational institution is considered as a firm which transforms inputs into outputs. It is similar to a production line wherein efficient returns are expected. An education system is efficient if it can achieve the best outcomes by maximizing the available resources. Determining how schools perform in terms of their efficiency may suggest ways to improve education outcomes for a given level of resources. The general objective of this study is to analyze the efficiency of educational institutions in the Philippines. The study employed a Poisson stochastic frontier analysis to formulate education production functions for the number of examinees achieving at least a minimum overall proficiency level. The model was also used to estimate technical efficiency scores of some selected public schools. Technical inefficiency models were also constructed to identify predictors of inefficiency among public schools. In the case of public schools in the Philippines, regional characteristics, school characteristics (such as the presence of electrical supply), a higher number of Mathematics teachers, and community characteristics contribute to lowering inefficiency in public schools. A prototype of a visualization tool for education indicators was also developed. This

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#### 2 Yambot

tool aims to support the capability of education systems in making evidence-based decisions.

#### **KEYWORDS**

Basic education, efficiency, input, output, National Achievement Test (NAT), visualization

Good morning, everyone! I'm very happy to be here and be invited by the Education Research Program of UP CIDS to share my research. Here's a brief background of my presentation. The topic of my presentation today is a portion of the results of my Master's thesis in UPLB. So, today, I'll present a topic on *Measuring the Efficiency of Educational Institutions: Evidence from Primary and Secondary Public Schools* in the country. So, again, I'm Enzo from the university that sits on the foot of Mount Makiling: the University of the Philippines Los Baños. Let us begin this presentation.

So from anywhere in the world, education is perceived as a premium in order to achieve a better life. People see education as a way to receive higher income, improve social conditions, gain a competitive advantage in the labor force, and contribute to the economic health of the country. In fact, in the Philippines, the Constitution orders the state to take the necessary actions to make education accessible to all. Also, the Universal Declaration of Human Rights and other related covenants and conventions treat education as a human right. So it is for this reason that governments in every country should take the necessary steps to craft policies and programs that are geared towards the betterment of educational outcomes.

Over the past decades, we have seen considerable improvements in the country's education system. For example, the educational attainment by population share in the Philippines from 1950 to 2010 has consistently improved. It's as if we are saying that the average educational level of the workforce has dramatically increased from 1950 to 2010. In terms of participation in basic education, particularly in gross enrolment ratio between School Year (SY) 2016–2017 and SY 2017–2018, we see here that this ratio across different groups has considerably improved. Except for Grades 1 to 6, we can see a very small jump in the gross enrolment ratio. Further, more learners are completing the key stages of the K to 12 Program as evidenced by the increasing completion rate from SY 2015–2016 to SY 2017–2018.

Indeed, we can see the effects of the transformative efforts that the government has been doing to our educational system. In fact, the Department of Education (DepEd) has identified quality of education as one of the two key sensitive issues that need to be addressed. Currently, they are putting their efforts to make gains in all skills such as writing, reading and comprehension, numeracy, and communication in early grades. Other indicators include learning the required competencies, employability, responsiveness to Philippine realities, and global competitiveness. As you have seen in the numbers that I have presented a while ago, there are a lot of studies that have already looked at how we perform in terms of the educational outcomes and the available inputs for education. But there are very few studies that have looked at how we transform the available set of inputs into the desired outcomes.

In the economics of education, an educational institution can be seen as a firm, which transforms inputs into outputs. The inputs refer to the resources that are available to achieve literacy such as school facilities, community characteristics, and even student characteristics. Educational outputs, on the other hand, may refer but are not limited to achievement test scores, net enrolment rate, and completion rate.

In a system that works similar to a production line, it is of interest to study how we transform these inputs into outputs. This is what we call efficiency measurement. You can now see an educational institution as a firm that transforms inputs into outputs. It's no different from a businessman putting his money to a fund and expecting some value or some return after some time. The only difference with what we're talking about now is that the investors are the students, the parents, and the community as a whole. It's as if you are asking the question: Are we getting the highest possible value from this investment? Answering this question would entail us to look at how resources are allocated, managed, and used. This is the motivation for the conduct of my research. In another sense, if we aim to improve the educational outcomes in the Philippines, then we should first address the inefficiency of our educational system. Addressing inefficiency means improving educational outcomes without spending more, or reducing the expenses on education without sacrificing the educational outcomes. In return, we are equipping the local school boards and the school administrators with knowledge on how their schools are performing in terms of the available inputs and outputs in education. We must be able to trace how the schools are converting the available sets of inputs into desirable outputs. In this way, we can empower the local school boards and the school administrators as an entity that is capable of drafting policies and programs that are anchored on evidence-based decisions.

How do we go about efficiency measurement or efficiency analysis? Input-output analysis is a common approach in measuring the efficiency of a unit or of an institution. The usual approach is formulating a production function that seeks to determine the maximum level of inputs or a combination of inputs that would produce the most efficient outcome. This function also seeks to determine the relationship among the available set of inputs and the identified outputs. In doing efficiency measurement in educational research, the usual approach is to formulate an educational production function, such as the one used in this study which was formulated by Bowles in 1970. The mathematical relationship is simply expressed as the school output being a function of several inputs such as school environment, outside environment, and student characteristics. For this study, I only considered one education output due to limitations in terms of data access. I considered the total number of Grade 6 (for primary schools) and Fourth Year (for secondary schools) learners who achieved at least a minimum overall proficiency level in the National Achievement Test (NAT). You will know later on why I still call it Fourth Year examinees even if the K to 12 program is already on its full rollout. This output

indicator is based on the Sustainable Development Goals' (SDG) Target 4.1.

Meanwhile, for the education inputs, I considered five categories: the administrative region where the school is located, school characteristics, teacher characteristics, student characteristics, and community characteristics. Going into school characteristics, we have eight indicators or metrics that I considered for my study. For teacher characteristics, I have two indicators, which focus on the number of faculty assigned to teach Mathematics and English. And for the student characteristics, we have three indicators, which are the number of students whose families are included in 4Ps (Pantawid Pamilyang Pilipino Program), students whose families are IPs (indigenous peoples), and students with exceptionalities. Finally, for community characteristics, this would refer to the characteristics of the barangay (village) where the school is located. Of course, the ideal setup is that these community characteristics refer to the exact characteristics of the location or of the place where the school is located. However, I think we are not yet able to gather such kind of information, so what I did in my research is to go one geographic level higher and that is concentrating on the characteristics of the barangay where the school is located.

I considered three data sources in my study. The first one is from the DepEd's Enhanced Basic Education Information System or EBEIS. The EBEIS was the source of the data for the school, student, and teacher characteristics. The second data source is the DepEd Bureau of Education Assessment (BEA)'s national assessment data of NAT scores. Finally, the third data source is the Philippine Statistics Authority (PSA)'s Census of Population and Housing (CPH) Form 5 or the Barangay Schedule. If you are not aware of this, the CPH does not just collect data on the housing characteristics of the household, it also collects specific characteristics of the community through the Form 5 or the Barangay Schedule. This form is solely allotted for the collection of information on the characteristics of the *barangay*. In terms of data management, I noticed that two data sources—the Deped EBEIS and the Deped BEA—have independent information systems. So, what I did was to match the DepEd EBEIS data with the DepEd BEA data, and match it again with the PSA data for the characteristics of the *barangay*.

Unfortunately, the most recent data that was given to me when I conducted this research in 2018 was as of SY 2014–2015. With the EBEIS, I was provided with the most recent data. In fact, I was given data as of SY 2017–2018. But I was informed that the most recent national assessment data was as of SY 2014–2015, so I had to request again data from the EBEIS for SY 2014–2015. Further, there is a DepEd memorandum about the guidelines on the utilization of national assessment data for external stakeholders. To cut the story short, I was not given the entire national assessment data. I was given only 10 percent of the actual number of primary and secondary schools.

To assure proper representation of the schools that would be sampled, I selected a random sample of primary and secondary public schools. I implemented a stratified random sampling design with the administrative regions as the stratification variable. Then, the sample size was allocated equally to the administrative regions of the Philippines. For example, out of the 38,648 primary public schools as of SY 2014-2015, I only got a sample of 3,865 schools. This was divided equally to all administrative regions, so we have 228 schools per region. However, there are schools whose national assessment data is unavailable, plus most of the schools in the Autonomous Region in Muslim Mindanao (ARMM) are underreporting their EBEIS data so I had to exclude them in my study. The final count for the primary public schools is 3,355. For secondary schools, a similar scenario was adopted. Upon computation, there should be 47 schools per region. But with 46 schools with unavailable assessment data and excluding the ARMM, I was able to gather a total of 709 secondary public schools.

I know that not all of you here are "friends" with statistics, but I still chose to present this in case there will be some of you who might be curious about how I computed the efficiency scores of each school. Let's talk about the Poisson stochastic frontier model. Now, who in this room is familiar with regression? A few. So the stochastic frontier

model works in the same way with regression in the sense that we are also considering a dependent or a response variable which is said to be a function of independent variables. The only difference is that the idea behind stochastic frontier analysis is that no set or combination of inputs will produce an output or an outcome that would exceed the frontier. As a result, all deviations from that frontier would be classified as inefficiency. Aside from that, the difference of the stochastic frontier model in comparison with the regression model is that the error term is a composite term that can be divided into two terms. The first one is the statistical noise, which simply refers to measurement errors or some gradual disturbances that were not specified in our stochastic frontier model. The other component of the error term is where we will get the technical inefficiency of a unit or a system.

Now, in my research, I used a Poisson stochastic frontier model because my response variable or my dependent variable is a count. We can talk about this specific type of modeling later on. The idea is for each of the primary and secondary public schools, I formulated Poisson stochastic frontier models to compute their technical efficiency scores. And from this, I formulated another model to examine which educational inputs influence or contribute to the technical inefficiency of a school. Two such models were also created: one for primary public schools and another for secondary public schools.

Proceeding now with some results of my study, we have here the technical efficiency score estimates for primary public schools. As we can see in Table 1 (on next page), the lowest technical efficiency score is 0.0268, representing one of the sampled primary public schools, and the highest is a perfect technical efficiency score, representing three sampled schools. The mean or the average technical efficiency score is 0.7162. Now how do we interpret this value? We can think of it this way: the number of Grade 6 examinees achieving at least an overall proficiency level in the NAT can be further increased by as much as 29 percent on the average, given the same level of education inputs. Moreover, as you can see in Figure 1 (on page 9) the sampled primary schools relatively achieved a high technical efficiency score.

#### Table 1

Summary statistics of estimated technical efficiency scores of sampled public primary schools

Summary statistics	Technical efficiency score
Minimum	0.0268
1st quartile	0.6221
Median	0.7305
3rd quartile	0.8285
Maximum	1.0000
Mean	0.7162
Standard deviation	0.1582

Moving on to the secondary public schools, we see in Table 2 (on page 10) that the lowest efficiency score is 0.0273, representing one sampled secondary public school, and the maximum efficiency score is 0.9978, also representing one sampled secondary public school. The average technical efficiency score is 0.6701, which again indicates that there is a potential to increase the number of fourth-year examinees achieving at least a minimum overall proficiency level in the NAT by as much as 33 percent on the average, without increasing the existing level of education inputs or without increasing the available resources. As compared with the sampled primary public schools, Figure 2 (on page 11) shows that the sampled secondary public schools achieved much lower technical efficiency scores.

I would like to briefly share some of the results of the technical inefficiency model. I found that the school characteristics that tend to lower the technical inefficiency of primary public schools are the presence of a main electrical supply source and the presence of a water supply source that is safe to drink. The latter is also present in the model for secondary public schools. For teacher characteristics, the following community characteristics of the barangay where the school is located tend to lower the inefficiency of schools: these are if the



Figure 1

Distribution of estimated technical efficiency scores of sampled public primary schools

barangay is accessible to the national highway; if there is a presence of a college or university in the barangay; and if there is a public library. For secondary schools, accessibility to the national highway of the barangay would lower the technical inefficiency of the school. And finally, for teacher characteristics, an increase in the number of Grade 6 teachers assigned to teach Mathematics would lower the technical inefficiency of primary public schools, while an increase in both the number of faculty assigned to teach English and Mathematics would lower the technical inefficiency of secondary public schools.

#### Table 2

Summary statistics of estimated technical efficiency scores of sampled public secondary schools

Summary statistics	Technical efficiency score
Minimum	0.0273
1st quartile	0.5481
Median	0.6753
3rd quartile	0.8094
Maximum	0.9978
Mean	0.6701
Standard deviation	0.1764

Now in reality, there might be some inconsistencies or differences since, again, I only considered a sample of schools. In regression or any type of modeling procedure, we should always remember that the estimates or the numbers that you get from your model would only be good for the data that you have. If we have the complete set of data of all the schools in the Philippines, we might be able to come up with another set of estimates and indicators and another set of input variables that tend to lower the technical inefficiency of schools.

The main highlight of my presentation today is the development of a prototype of a visualization tool that would explore the relationship among the available set of inputs and outputs for a school. I constructed this dashboard using an analytics software called Tableau. It is very popular with private companies doing advanced analytics. When I was conceptualizing this tool, I was thinking of something like what if there is a gathering of school administrators in the Schools Division Office (SDO) and they want to check how their school, municipality or city, or province is performing. It will be good if you have this kind of tool that could give us instant and up-to-date information and ultimately guide us in making decisions towards crafting policies and



Figure 2

Distribution of estimated technical efficiency scores of sampled public secondary schools

programs. I named the prototype as Educ-ACTION, which literally translates in thinking the appropriate and advanced steps towards the betterment of our educational system through informed actions.

There are three modules in this tool. The first one is the Philippine School Resources Mapper. A screenshot of this module is seen in Figure 3 (on page 12). The map of the Philippines is displayed on the left side wherein schools are represented by the red school icons. I hope you can also see the blue icons which represent the SDOs. So again, there might be inconsistencies with reality because I only sampled

#### 12 Yambot

#### Figure 3

The general interface of the Philippine School Resources Mapper of Educ-ACTION



# schools. Now, my vision for this map is that it will not only be limited to displaying schools and their division offices. My vision is that it will show other relevant characteristics of the community where the school is located. For example, is there a public library in the area? Is there a market in the area? Is the school near a city hall? Is it near a shopping mall? Or is it near a college or university? It's as if that if I select this school, a radius reference will appear and it will show the establishments that are near the school. However, data collection is very difficult for that scenario. We still have limited geographic data available for the presence of a library, market, shopping malls, and other establishments.

Anyway, for example, if I hover my mouse on a certain school, it will display the name of the school, municipality and province, division office, total enrolment, and the interpretation of the efficiency estimate based on my computation. Now, if I click on that certain school, the information that is displayed on the right side will change right away. For example, I clicked the icon for Bonga Mayor Elementary School, it will now display the total enrolment, its technical efficiency score, and other characteristics (see Figure 4 on the opposite page). We know

## **Educ-ACTION: Philippine School Resources Mapper**

that the school has electricity, a water supply that is safe to drink, an internet connection, and a feeding program. Then, here are the student demographics such as student performance, pupil-teacher ratio, and pupil-school resource ratio. In the same way, if I click on another school icon, the visualizations on the right side should change. When I developed this module, I was thinking that it would be very useful for students or parents if they want to know specific information about the school. Suppose I am a parent, where should I send my child? This school is good because it has an internet connection and a feeding program. This school is good because it scores high on the National Achievement Test.

The second module is the Provincial Education Performance Assessment with a screenshot shown in Figure 5 (on next page). We can still see a map on the left side and it is a thematic map that shows the efficiency scores of each province. A darker shade would represent a higher technical efficiency score, while a lower shade represents a lower technical efficiency score. Again, there may be discrepancies in the actual scenario. For example, if we hover the mouse in a certain province, it would show the average efficiency score of the schools

#### Figure 4

The interface of the Philippine School Resources Mapper of Educ-ACTION with a school selected



#### **Educ-ACTION: Philippine School Resources Mapper**

in that province. If I click on certain areas, say, Rizal, again, the visualizations on the right side will change based on the average of some of the education inputs that are available in the schools in that certain province (see Figure 6 on the opposite page). For example, in the province of Rizal, the total enrolment among all schools in the province is 49,694. There are 18 elementary schools and there are six secondary schools. Again, that's just based on my sample data. Now, the student demographics, student performance, average pupil-teacher ratio, and average pupil-school resources ratio are also displayed. It will also show the number of schools that have an electrical supply, water supply, with a subscription to the internet, and with a feeding program. This module might be of good use to the administrators in a province if they want to know or track the performance of the schools in their province.

Finally, the Municipal/City Comparison module works in the same way as the previous one, except that we are now able to compare schools in a certain municipality and among municipalities or cities in a certain province (see Figure 7 on the opposite page). I will choose a specific province, say Rizal. Then I will select up to three cities or

#### Figure 5

General interface of Educ-ACTION's Provincial Education Performance Assessment



#### **Educ-ACTION: Provincial Education Performance Assessment**

#### Figure 6

The interface of Educ-ACTION's Provincial Education Performance Assessment with a province selected

#### **Educ-ACTION: Provincial Education Performance Assessment**



#### Figure 7

General interface of Educ-ACTION's Municipal/City Comparison



municipalities, say Antipolo, Cainta, and Taytay. Then, I can further trim down the results, concentrating say only on primary schools, secondary schools, or both. It will display the same information found in the School Resources Mapper and the Provincial Education Performance Assessment modules. In the same way, if administrators in a certain municipality or city want to compare and chart their performance, they can use this visual tool.

For those of you who might be curious, Tableau is not free. You need to pay for a license to use it, but it has a special license for teachers and students. It would be very good if you can also explore it on your own. Of course, if you do not have the resources to buy such software, you can always do it from scratch. But again, it would take some time and experience.

Now, what's next for this research? In this study, I only considered one education output indicator due to the limitation in terms of access to the data. But in future researches or the improvement of this research, we can actually use more than one education output, such as completion rate, cohort survival rate, and school leaver rate. Most probably, these education outputs are interrelated. Aside from the results of the National Achievement Test, we may also consider results from other standardized tests. I just learned that the Philippines participated in the most recent Program for International Student Assessment (PISA). I think we can also use that data and try to check if there will be differences with the results obtained using the NAT.

Here are some policy recommendations which might spark some future researches. These are based on the experience that I've gathered from the conduct of my research. I would like to recommend to the DepEd the reinforcement of the collection of complete and accurate school-level data, with emphasis on the "high-quality" school-level data. My experience opened my mind to the actual scenario of the difficulty of the DepEd when it comes to gathering and managing data. The ideal scenario is that we have a comprehensive set of data available for research and monitoring. In the future, when other researchers would like to conduct their studies using the EBEIS data, they would have access to a complete and comprehensive set of education inputs.

Second is that in my study, I also discovered that regional disparities still exist in educational outcomes and even in efficiency measurements. It is recommended to have an increased share of

local government funding provided directly to schools. The existing education fund formula may be further improved by including an equity component. In this way, we will give more funding to schools in poorer areas or schools that need much attention, instead of putting more funding or putting more support to well-equipped schools.

The third one is, as seen in this study, teacher characteristics really play a big role in the achievement of education outcomes. I would like to recommend investing in programs that aim to support the professional growth of teachers. I think we all know that if teachers are well-equipped, it would translate to better or improved student learning outcomes.

And lastly, we should enhance mechanisms for operational funding because this is what this research is all about. I studied how an educational institution transforms its available set of inputs into outputs. We must really look at how we are efficiently managing, allocating, and using our resources in education. So that's it, thank you very much for listening.

### **Question and Answer**

Bella Lucas (UP Center for Integrative and Development Studies): I'm Bella Lucas. I must confess that when the ERP was created, nandito na ako with the founding mothers Josefina Cortes, Lucila Manalang, and Malou Doronila. Si Dr. Dina, siya 'yung pinakabata noon sa mga experts in education. Natutuwa ako sa malawak na issues na pinuntahan ng ERP, pero meron akong isang problema sa presentation. Kasi noong nagdi-discuss si Dr. Cortes noon, sabi niya sa'min, "we are a nation of fifth graders." And from the initial data that you gave us, it seems that ang taas ng literacy natin pero hanggang elementary lang ang mga Pinoy. Tama ba 'yung prinesent mo, hindi siya (total number of Filipinos) nationwide in the elementary level?

Assistant Professor John Lorenzo Yambot: Actually, Ma'am, that is just only an introductory part of my presentation. So I would not be

very confident in answering that question because I did not look at it during my research. I just presented this so that we can somehow have an overview that we are looking too much at educational outcomes, but we are not too much looking—especially in the Philippines—at the efficiency measurement of our educational institutions. But maybe if we look at the numbers, we see that somehow the completion rate has consistently improved even after the fith grade or even during the secondary education portion.

**Ched Arzadon (UP College of Education):** I noticed that you cited Samuel Bowles who was a sociologist who wrote a lot about inequality in America. And his work became the basis for major education reforms in the US in the 1970s, especially when they found out that the government's investments in the education of people of color was not comparable with other populations. So based *doon sa ginawa mo, ano 'yung masasabi mo lang na* conclusion or statements about these data? Are you saying that those who live in places near a highway or university are receiving better quality of education compared to those who don't? Can you give us some statements about these points?

Asst. Prof. Yambot: Actually, Ma'am, if we are to base on the results of the sample primary and secondary public schools, we are seeing that those schools with community characteristics such as accessibility to national highway [and] presence of a public library tend to have lower technical inefficiency scores. So, in a sense or in effect, they are able to translate the available resources into the desired educational outputs.

**Unidentified audience member:** Okay, so does this include all regions—for example, Region IV-B?

Asst. Prof. Yambot: I did not look at regional models. I only looked at national level data. I could have done it, but I just decided to include the regional characteristics in the model.

**Dina S. Ocampo (UP CIDS Education Research Program):** Is there a way in that program, for example, to put in data from another source? Did you have to migrate the data into the program and key it manually?

Asst. Prof. Yambot: No, Ma'am.

Dr. Ocampo: Or do you bring it in?

Asst. Prof. Yambot: Yes, Ma'am. It can connect to external data sources. In fact, you can also connect to real-time data.

Dr. Ocampo: Can it connect to different data sources simultaneously?

Asst. Prof. Yambot: Yes, Ma'am.

**Dr. Ocampo:** Kasi one of the things you said is that we could actually look at, one of your points in your last slide was to increase the education funding from LGUs (local government units). But we recently worked on a very timely analysis of NCR and whether local government funding actually improved education outcomes, particular, achievement. And there was no relationship between education quality, meaning scores on the NAT, and the amount of funding that came from the LGU. So the question therefore is "Where does that money go?" Is it used to actually improve education delivery and learning, or is it used for non-learning... so *parang* we can actually parcel—learning intervention versus [...] support. Example, *bubong*, '*di ba*? Better *nga talaga may bubong kaysa wala. Pero bindi siya* directly *may* impact on learning, *parang ganoon*. And that kind of sensitivity is difficult to obtain. What would be your suggestions to be able to get to that point of data analysis?

Asst. Prof. Yambot: Actually, Ma'am, we had the same observations in my study because I included MOOE (Maintenance and Other Operating Expenses) as a proxy of the local government support. **Dr. Ocampo:** *Pero ang* MOOE *kasi.* GAA (General Appropriations Act) *ng* DepEd. *Hindi siya* LGU funds.

Asst. Prof. Yambot: Hindi siya LGU; 'di ko rin siya ma-consider for my study dahil 'di ko din siya mahanap from the EBEIS data.

Dr. Ocampo: Yeah.

Asst. Prof. Yambot: But when it comes to funding, I had the same observation. MOOE was not a significant predictor of educational outcome and even of the measure of technical inefficiency. So my point on operation funding is maybe we should not just look at the amount that we give to each school, but let's look at how they are spending that money.

Then with regard to your next question on data analysis po, actually, Ma'am, marami pa pong puwedeng puntahan 'yung study ko. In fact, in my initial proposal, I considered a lot of input indicators such as whether the school is being used as an evacuation center and the average cost of public transportation from the school to the house of the learner. But again, I found that there are some underreporting issues in the information system of DepEd. So maybe, Ma'am, if we can also include the local government funding, then we can also do it the same way po and do or perform an efficiency analysis po.

Dr. Ocampo: Thank you.

Audience member from the UP National Institute for Science and Mathematics Education Development (UP NISMED): Were you able to relay your results to DepEd?

Asst. Prof. Yambot: I was just about to relay this to DepEd. My research gained the attention of DepEd when I presented this during the National Convention on Statistics last October (2019). I was actually invited by DepEd to deliver a similar talk today in their research forum—yes, it's the Research O'Clock Forum, but I informed

them that the ERP came first. But yes, Ma'am, I'm really, really eager to inform them of the findings of my study.

Audience member from UP NISMED: I wonder how open the DepEd is to recommendations. You mentioned how difficult it was for you to collect data. We can only speculate why they cannot give data right away? You also recommend more efficient and accurate collection of data. We also experienced the same thing in requesting for NAT data from them.

Asst. Prof. Yambot: Yes, Ma'am. In fact, during my presentation in the National Convention on Statistics, Usec. (Jesus Lorenzo) Mateo was there. And he was able to hear my sentiments regarding the access to national assessment data. In fact, former secretary general of the NSCB Dr. Romulo Virola also asked Usec. Mateo why is that so—why is there no open data in DepEd. So, I think *po*, with that comment and my experience, we already brought attention to this issue.

Ms. Azarcon: There are issues about the NAT scores being tied up with teachers' performance-based bonus (PBB). So there is tension around this issue. So the DepEd really needs to improve its data collection to make studies like yours really useful.

Asst. Prof. Yambot: I would have to agree, Ma'am. In fact, when I was selecting the educational output that will be used in this study, I am having second thoughts of using the NAT score as my education output indicator. But my adviser told me that I am an MS Statistics student, so the output that would highly matter is the methodology that I used in conducting efficiency analysis for educational institutions. As you have seen in my presentation, even if the data was a bit outdated, I was able to show that we can measure efficiency using the available indicators for education outputs and education tools. I also included in my recommendations to consider other output indicators. In fact, during the early stages of my study, I included a lot of education output indicators.

Naomi Fontanos (UP CIDS Education Research Program): Did your study include senior high schools?

Asst. Prof. Yambot: No, because during the time of the study, there were no senior high schools yet.

Astrid Sister (Save the Children): You mentioned that schools being used as evacuation centers is one of your indicators and I think that's a very important disaster-related indicator connected with what Save the Children (STC) is currently doing with the DepEd. STC is working the Disaster Risk Reduction and Management Service (DRRMS) and the Information and Communication Technology Service (ICTS) to come up with a school watching app so schools can share their disasterrelated information immediately to DepEd separate from the EBEIS.

Asst. Prof. Yambot: Thank you, Ma'am. For the teachers who are here, I think you are aware that the EBEIS collects a huge amount of data. In fact, part of the objective of my study was to aggregate these input indicators. It's as if that, for example, I have ten variables that are being measured in the EBEIS, but I can't proceed with the analysis of determining whether these ten variables only measure just one characteristic because of the limitations to data access. This only means that for future researchers, we can actually proceed with not measuring all these ten. We can just measure just one of them, because all these ten items reflect the same characteristic. If we'll be able to do this, we can save time in the reporting and data collection.

# Reference

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#### THE CENTER

Established in 1985 by University of the Philippines (UP) President Edgardo J. Angara, the UP Center for Integrative and Development Studies (UP CIDS) is the policy research unit of the University that connects disciplines and scholars across the several units of the UP System. It is mandated to encourage collaborative and rigorous research addressing issues of national significance by supporting scholars and securing funding, enabling them to produce outputs and recommendations for public policy.

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The **Education Research Program (ERP)** aims to contribute to the deeper understanding of education delivery and implementation in the Philippines. In addition, the Program seeks to understand the influence of educational reforms in the last decade on student learning and teacher competencies. Finally, it seeks to nurture a community of scholars who conduct research on education.

One of the oldest programs of the UP CIDS, the the Education Research Program (ERP) has carried out from 1991 to 2005 a research agenda which inquired into functional literacy and non-formal education, focusing on comprehensive community-based development through education interventions for adults, and into the indigenization of basic education curriculum to suit the knowledge, values, practices, culture, and skills of members of indigenous or cultural groups.

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