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A Call to Arms to Fight Mediocre Education

by

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Abstract

The paper puts together the very alarming poor state of the Philippines education system from basic to higher education based on recent available data from international and local sources. It points to the central role of universities as producers of the principal learning inputs for all levels. Considering the poor state of higher education with only a handful of high quality universities that produce a very small output of graduates with advanced degree especially in STEM fields, the paper proposes a massive scholarship program for advanced degrees to strengthen and expand the country's ten best universities. They would be the seed to strengthen other universities and the other institutions.

A CALL TO ARMS TO FIGHT MEDIOCRE EDUCATION

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The dismal performance of our students in the 2018 PISA (Program for International Student Assessment) has shamed and worried us. PISA tests knowledge in Reading, Mathematics and Science of 15 year-old students across the world. Seventy-nine countries participated in the 2018 assessment. PISA states that the tests focus on problem solving and cognition that are deemed essential skills for life in the 21st century. Our students performed so poorly that we ranked second to the worst in all three subjects – Reading, Science and Mathematics. We ranked 77th with the Dominican Republic, 78th. All our East Asian neighbors topped the tests with China[1] performing first followed by Singapore, Macao and Hong Kong. Japan was the sixth, South Korea, the 7th and Taiwan, the 8th. Our Southeast Asian neighbors performed better than us with Malaysia being 48th, Brunei 50th, Thailand, 60th and Indonesia 70th. Our average scores were 340 in Reading, 333 in Mathematics and 357 in Science while those of China were, respectively, 555, 591 and 590. Our East Asian neighbors have consistently performed well in past PISA tests with Singapore leading in 2012 and 2015. Vietnam participated in 2012 and scored well above us, ranking 19th in Reading, 8th in Science and 17th in Mathematics. Low budget has been partly blamed for the poor performance. Definitely the low budget given to DepEd has forced it to keep large classes and provide meager learning facilities to their pupils. Most public schools have no library and laboratory. Less than a third have internet access. They do not even have sanitary facilities for their students. But the more critical explanation for the low quality of basic education is the poor quality of its teachers and textbooks. The teachers got their training from poor quality colleges and universities and textbooks are written by non-specialists in the fields.

There are now close to 2,393 colleges and universities of which only a handful are of high standard. Of the 2,393 higher education institutions (HEI), only four have been included in the Quaquarelli/Symonds rating of the world's top 1,000 universities. These are the University of the Philippines, Ateneo de Manila, De La Salle University and the University of Santo Tomas. Our best four are rated poorly in the quality of their instructional programs, research output and reputation. UP ranked 356tht, Ateneo, 651-700th, La Salle and UST, 801-1000th. Ten East Asian universities were rated among the top 50 with Singapore National University and Nanyang University (Singapore) both 11th, higher than Princeton and Cambridge. We were ahead of Singapore in both basic and higher education in the 1970s but we neglected to invest in quality advanced education and research. Government policy has aimed mainly at expansion of the higher education system allowing colleges and universities to open and offer any program of study of whatever quality. At the same time Congress founded new state universities and colleges (SUC) without prioritizing program offerings and meeting high standard. The University of the Philippines which was founded by the American colonial government in 1908 to be an institution of higher learning mandated to offer advanced instruction and research remained the only state university from 1908 the late 50s. Since then 110 new SUCs have been founded. In turn, the SUCs created campuses which now number 430. Congress has tried to maintain UP as the country's premier university by providing it with much higher budget than the other SUCS.

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[1]China was represented by major cities.

But the budget was not enough to develop it as a world class research university. The other SUCs have been granted modest budgets which allowed them to provide lower quality programs. (See Table 6 below)

It is imperative that we raise the quality of our higher education system and make it provide advanced instruction and undertake research especially in the STEM fields (science, technology, engineering and mathematics). Our universities have failed to produce a critical mass of scientists and technologist who were needed to harness advanced technologies from abroad and create new ones for our industries. The lack of scientific and technical manpower has inhibited the development of our manufacturing and agriculture sectors and slowed down our economic growth. We missed participating actively in the first three industrial revolutions as reflected in our relatively poor physical infrastructure, our failure to industrialize and revolutionize the manufacturing sector and our absence in creative developments of the IT industry. Our manufacturing sector produces mainly light products such as food and garment. We continue to import common appliances such as electric fans, television and washing machines. We have been mere consumers of IT products such as cell phones and our iT workers are employed in low-skill assembly of semi-conductors and BPO call centers.

We now face the challenge of the Fourth Industrial Revolution. Studies point to the need for highly skilled and educated workers who have the expertise to adopt and adapt rapidly changing digital technologies and contribute to their advances. A critical mass of scientists and technologists is required to draw varied applications of digital technologies to industries and services. Several speakers in the recently held conference entitled Harnessing the Fourth Industrial Revolution pointed to the need for human capital but did not specify what kind and level. The speakers did not discuss our lack of such manpower. We have to produce more scientists and technologists and raise the quality of our labor force particularly the professionals. They should be competent in adopting new technologies in their work, e.g. doctors in applying digitally-assisted surgery and investment bankers in portfolio choice. The thousands of colleges and universities produce a minimal number of graduates with advanced degree particularly in STEM fields. It is alarming that the whole HEI system produced only 71 graduates with doctoral degree in Science and Mathematics and 40 in Engineering in 2017-2018. The HEI system has meager capacity to produce doctoral graduates for they do not have the faculty to give advanced instruction.

This note provides information on the quality of our education and proposes programs for improving quality in the short run and in the long run. The short-run program can be immediately implemented through the more familiar approaches such as textbook development, building libraries and laboratories and internet connection for digital teaching for both students and teachers. The long-run program aims to develop a select number of universities into world-class research universities in STEM fields. These universities are to become seed institutions for raising the quality of other HEIs and the school system as a whole. The long-run program will principally involve a massive foreign scholarship program for faculty development for the selected universities. We propose a ten-year scholarship for doctoral studies in STEM fields in top universities of the world of 500 doctoral students for faculty development in the ten selected universities. Details of the two programs are described below. We make a tentative plan and budget for foreign scholarship. The long-run program is selective as it targets a small number of universities possibly those that are already of high quality. It would not be feasible to simultaneously improve all 2,393 HEIs. The ten selected universities are o become seed institutions for producing more competent teachers and learning materials for the whole education system.

Part 1. State of Philippine Education

The education system is very extensive with about 50,000 elementary schools, 14,000 high schools and 2,353 tertiary education institutions. In 2017-2018, they enrolled 26 million students, 15 million, 8 million and 3 million in the respective schools. The DepEd regularly conducts national achievement tests for elementary and secondary pupils for major subjects including mathematics, science and English. In 2014-2015, Grade 6 elementary pupils averaged 70% in mathematics, 67% in science and 66% in English. Of concern is the much lower performance of high school students in their tests averaging only 48% in each of the three subjects. The Philippines participated in the Third International Mathematics and Science Studies (TIMSS) in 2003 and 2005 and in PISA in 2019. The 2003 results were published but not the 2005 results. Out of the 67 country participants in TIMSS,, the Philippines scored second to the lowest while our neighbors Singapore, Taiwan and South Korea topped the tests. The average score of our Grade 8 pupils was 378 compared to 605 of Singapore pupils. Our scores relative to those of Singapore have remained about the same. The 2019 PISA performance was similar to the TIMMS.

The DEP-Ed has been given the largest share in the national budget but it had not been enough to ensure quality. The budget for public schools go mainly to teachers and administrative salaries. No separate budget is reported for textbooks, library and laboratory. Dep-Ed reports that schools do not even have adequate sanitary facilities. Schools have on average two toilet bowls and 8.7 computers which are not adequate for the teachers. Only 24 per cent have internet connection. Cajipto-Go has been hammering on serious errors in elementary textbooks but DEP-Ed has not answered his complaints. Little information is available for secondary education but the poor high school performance in the DepEd achievement tests suggests an even worse situation than for the elementary level. The government's solution for improving basic education is to add two extra years of junior and senior high school through the K-12 program. This is very costly to both the government and students' families as it increases the time for getting a college degree from four to six years. A PIDS study found majority of those in junior and senior high school classes plan to pursue college. Those who want to pursue vocational training can readily enroll in available voc-tech schools. The additional budget for the K-12 program could be used for improving the existing 1-6 years of elementary and 4 years of high school system. Extending high school to 6 years may be done after the quality of the 10-year basic education program has been achieved.

There are 2,393 HEIs, 111 are SUCs with their 430 campuses, 118 local government HEIs, 1,721 private, and 13 other government schools. The 2,393 HEIs offer 30,156 programs (fields) at the undergraduate level but only 6,610 at the master's level and 1,325 at the doctorate level. (Tale 1). The programs are concentrated in Education and Business and Related fields. Expectedly these fields produced majority of graduates, in 2017, 22.7% and 40.7%, respectively. The popularity of these fields increased through time for they graduated 48.6% of the total in 2011-2016. In 2017 the five STEM fields produced 25.5% graduates: Agriculture, 4.0%, Science, 1.2%, Mathematics .43%, Engineering, 10.2% and IT related, 10.1%. To be noted is the very small proportion of HEI graduates with advanced degree: 4.8% with master degree and one-half percent with doctorate degree with the large majority in Business and Education. Only 1185 graduated with master degree and 189 with doctorate in the STEM fields: 63 in Agriculture, 45 in Science, 25 in Mathematics, 40 in Engineering and 15 in IT related.

Table 1. Number of Programs Offered by Degree Level 2018-2019

Panel A	Number of Institutions	
SUC	111	
Campuses	430	
LUC	118	
OGS	13	
Private	1,721	
Sectarian	(350)	
Total	2,383	
Panel B	Number of Programs by Degree Level	
	Number	Percent
Pre-baccalaureate	2,948	7.1
Baccalaureate	30,156	72.6
Post-baccalaureate	497	1.2
Master's	6,610	15.9
Doctorate	1,325	3.2
Total	41,536	100.0

Source: CHED, Facts and Figures, 2018-2019

Table 2. Graduates by Field and Degree Level 20122-2016 to 2017-2018

		2011-12 to 2015-16 Annual Average		2017-18	
Agriculture, Fishery, Farming					
BS/BA		10,824	7.1	21,875	4.00
Master's		381	0.7	617	0.09
Doctoral		78	0.2	63	0.01
Science					
BS/BA		5,131	1.00	8,297	1.20
Master's		821	0.16	294	0.04
Doctoral		110	0.02	46	0.01
Mathematics					
BS/BA		2,100	0.400	3,094	0.40
Master's		396	0.060	235	0.03
Doctoral		27	0.005	25	
Engineering					
BS/BA		46,547	9.00	70,666	10.100
Master's		877	0.20	772	0.100
Doctoral		54	0.01	40	0.006
IT related					
BS/BA		55,185	10.60	67,195	9.60
Master's		534	0.10	507	0.07
Doctoral		41	0.08	15	
Education					
BS/BA		79,682	15.4	140,745	20.1
Master's		11,447	2.2	16,279	2.3
Doctoral		5,535	1.1	2,329	0.3
Business and related					
BS/BA		147,415	28.40	188,300	26.90
Master's		7,421	1.40	9,584	13.70
Doctoral		401	0.08	709	0.10
Social sciences					
BS/BA		18,228	1.50	24,886	3.50
Master's		891	0.20	504	0.07
Doctoral		86	0.02	65	0.01
Grand Total	518,538	100	701,300	100	
BS/BA	487,538	94.4	665,074	94.7	
Masters	28,001	5.4	83,535	4.8	
Doctorate	3,253	.6	3,691	.5	

The UP Center for Integrative Studies recently undertook studies on the state of higher education focusing on its quality. Yee, David and Ducanes (2019) showed that in 2016, 46% of faculty had the bachelor's degree, 40%, the master's degree and 13%, the doctorate degree (Table 3). SUCs have relatively more faculty with graduate degree than the other institutional groups. Thirty-nine percent of their faculty had the master's degree and 16.1% the doctoral degree. Compare these to the private sectors' respective shares of 40% and 13%. Also shown in the table is the high percentage of part-time faculty: 49.1% in private HEIs and 35.6% in SUCs. The authors also presented the distribution of faculty with doctorate degree by field of specialization. (Table 4) As much as 40% of faculty with the doctorate degree were in Education and 15.7% in Business. The STEM fields had 1,240 or 6.1% of the total. with 422 in Engineering, 319 in Mathematics, 666 in Science and 212 in IT related.

Table 3 Distirubtion of HEI Faculty By Degree Attained, by Institution, and those on Full-time Employment 2017-2018

Institution	BS/BA	Master	Doctoral	Full-time
SUC	22,252	19,974	8,804	64.40%
	44.20%	39.00%	16.10%	
LUC	3,983	3,129	986	46.20%
	49.20%	38.60%	11.80%	
OGS	198	192	61	53.00%
	43.90%	42.60%	13.50%	
Private	38,712	24,466	10,987	51.90%
	46.00%	41.00%	13.10%	
Total	65,145	57,761	20,118	59.40%
	45.60%	40.40%	14.10%	

Source: Yee, David and Ducanes (2019)

Table 4

Distribution of Doctorate Degree Holders in HEI
By Field ,2016-2017

	Number	% Total	% in Disciplines
Education	8,149	40.4	19.4
Business	3168	15.7	13.5
Engineering	422	2.1	4.0
Mathematics	319	1.6	12.5
Natural Science	666	3.3	11.4
Medical Field	272	1.3	2.6
IT related	213	1.1	2.1
Other Fields	6,940	34.4	
Total all fields	20,149	100.0	13.3

Source: Yee, David and Ducanes, J., 2019.

HEI quality has been partly gauged by performance of graduates in profession licensure tests. CHED has published the percentage of takers from each HEI who passed each field examination. Passing rate varies widely across schools and fields. Among the fields, Dentistry had the highest passing rate of 95.6% and Medicine,75.6%. , Nursing,43.8%. Electrical engineering averaged 57.2%, Civil Engineering, 43.7%, Mechanical engineering, 65.1% and Geodetic engineering, 41.4%. Nursing passing rate was 43.85. Accountancy and Elementary Teachers tests had the lowest passing rate with respective averages of 36.7% and 26.3%. The test for Secondary Teachers had 36.8% passing rate. Passing rate varies very widely across schools. The rate for Teacher Training ranged from 100% for a number of HEIs including small sectarian schools and zero for some schools. There were many teacher training schools that sent fewer than ten graduates to take the tests and a number had zero passing rte. There is greater proliferation of quality of education in Education and Accountancy which are offered by the largest number of HEIs and enrolled the largest number of students. They include schools that charge very low

tuition that can only pay for poor instructional inputs including part-time teachers. Medicine, Dentistry and Engineering are more costly to run and so attract fewer students, possibly the brighter and those who come from higher income families.

Table 5
Annual Average Number of Takers and Passing Rate
in Professional Licensure Tests, 2014-2018

Profession	Takers (Annual Average)	Passing Rate (%)
Secondary teachers	157,367	36.8
Elementary teachers	130,892	26.3
Nursing	43,451	43.8
Accounting	18,908	36.7
Medicine	4,055	75.6
Medical technology	6,339	80.4
Civil engineering	14,528	43.7
Mechanical engineering	5,577	65.1
Chemical engineering	1,336	53.4
Dentistry	790	97.6

Source: CHED Facts and Figures, 2018.

Some schools have programs that CHED has considered to be of excellent quality and were granted the status of Center of Excellence or COE. Eighty-nine COE status have been granted with 6 in Engineering and 21 in the sciences and 5 in Mathematics. Education has obtained the largest number of COEs, 18 in all, Nursing had 8, Medicine 3, and Agriculture 3. There was no COE in Business, a popular field with many HEIs offering the field. The COEs in STEM fields are concentrated in 6 HEIs: 21 in UP, 6

in Ateneo, 6 in La Salle, 6 in Central Luzon University, 5 in Sto. Tomas and 4 in Mindanao State University in Iligan. The COE in education are scattered over other HEIs.

The four most respected HEI in the country have been rated poorly in the Quaquarelli-Symonds international ranking of the world's top 1,000 HEI. The Quacquarelli-Symonds ranking takes account academic reputation, employer reputation, citations per faculty, international faculty and students. In 2019, UP ranked 365th, Ateneo, 601-700th, De La Salle and Sto. Tomas, 800-1000th. Noted below are the ranking of Asia's best universities.

Singapore National University – 11
Nanyang Technological University (also of Singapore) -11
Tsinghua University (China) -16
The University of Tokyo - 22
Peking University – 22
The Hong Kong University of Science and Technology – 32
Kyoto University – 33
Seoul National University – 37
Fudan University (China) – 44
Korea Advanced Institute of Science and Technology – 41

Singapore National University and Nanyang Science and Technology University which are both ranked 11th surpassed many US and Western universities such as Princeton ranked 13th, Cornell, 14th, University of Pennsylvania, 15th, Yale,17th, and Columbia, 18th. In Southeast Asia, 3 Malaysian universities outranked the rest of the region: Universiti Putra Malaysia, 159th, University Kebangsaan Malaysia, 160th and University Saens 165th. Chulalongkorn is ranked 247th, University of Indonesia, 296th, Mahiidol University, 314th and University Gadja Mada, 320th. UP's score in academic reputation was 34, employer reputation, 40 and very low in citations of faculty research, 2.1, international faculty, 1.8 and international students, 1.5. Compare these to MIT at the very top of 100, 100, 99.8, 100 and overall score of 100. Singapore National University scored 91.8.

Recently published is the TIMES ranking of 1,400 world universities. UP is ranked 400=500, La Salle 1000-12000. It is encouraging that UP is ranked better than the South East Asian Universities.

Congress provides very unequal budget to SUCs. Table 6 shows that in 2017-2018, budget per students in SUCs ranged from less thanP15,000 to P199,000. The table shows the distribution of SUCs by budget per students. There were 21 SUCs that received less than P15,000 per students, 28 SUCs given P16,000 to P25,000 and 23, P26,000 to P35,000. A decreasing number of SUCs received increasing budget. Only 3 got more than P80,000. Expectedly, UP got the highest allocation of almost P200,000 per student, The Philippine Merchant Marine Academy, P182,306 and Batanes State University, P100,000. Eulogio Rodriguez Institute of Science and Technology got the lowest allocation of P8,778. There has not been a study to explain the budget allocation to SUCs. (Table 6)

Table 6 Average Cost per Student in SUCs, 2017-2018

Cost Range in Pesos	Number of SUCs
≤15,000	21
16,000-25,000	28
26,000-35,000	23
36,000-45,000	19
46,000-60,000	15
61,000-80,000	2
> 80,000	3

Philippine merchant Marine Academy	Peso 182,306
Batanes State University	100,028
University of the Philippines	199,686
Central Luzon State University	70,788
Philippine Normal University	80,172
Mindanao State University Institute of Iligan	84,758
Eulogio Rodriguez Institute of Science & Technology	8,778
Nueva Ecija University of Science and Technology	15,191

Source: Facts and figures 219

Part. B. Proposed Programs of Action

B1. Short-term Program for raising the quality of elementary and high school education

1. Review the curriculum and assign more hours to Reading (English and Filipino), Science. Mathematics, History and Social Studies

2. Organize a project for a thorough review and development of textbooks for the above subjects for elementary and high school levels. The review is to be undertaken by a carefully selected faculty from the most respected HEIs for each field of study. They will be tasked to review existing textbooks and those used in high quality schools including those in Singapore, UP, Ateneo, Poveda, PNU. They will recommend teams of specialists in each field to write the textbooks and recommend the process of their publication (to avoid corruption).

3. Increase access to internet in the public elementary and high schools to 100%. Develop a Dep[Ed division that would be responsible for accessing and adapting digital learning packages for each of the three basic courses (English, Mathematics and Sciencce) for each the elementary and high schools grade.

4. Develop a program for teacher training via digital lessons. Promotion may be based on performance in the program. We have to rely on digital learning given the lack of qualified trainors for teachers.

5. Provide schools with libraries and laboratories, also with sanitary facilities.

B.2. Long-run Programs for Developing Ten Universities

1. Select the best 10 universities, public or private, that offer STEM fields based on size and education of faculty and researchers, COE status, graduate program, passing rate in the licensure examinations and research activities and facilities.

2. Create a working group with members representing the ten target universities, CHED Commissioner, DOST Secretary and NEDA Secretary to plan for the development of the ten target universities into top world research universities. The plan focuses on faculty development through scholarship for doctoral studies in top universities abroad. Our HEI system has no capacity to produce high quality faculty. The plan needs to identify what particular STEM fields each of the target universities decide to develop.

3. Develop a plan for domestic scholarship for undergraduate and graduate studies that will increase the supply of STEM majors for domestic employment and for foreign scholarship.

4. Schedule the flow of scholars from year 1 to10 and estimate the required budget.

5.b. Plan the enrichment of library and laboratory facilities in the target universities.

C. Rough estimate of foreign scholarship for advanced studies

Annual Cost: living allowance of $20,000 and tuition of $40,000, total $60,000

Transportation and miscellaneous expenses per year $4,000

Approximate number of years to complete a Ph.d. degree – 4 years

Total cost per graduate - $64,000 x 4 years = $256,000 or PP3.2 million

Total cost of 500 scholars = P3.2million x 500 scholars = P6.4 billion

We consider sending scholars in increasing batches starting with 50 each in the first two years and 100 each in the next four years.

Cost may be reduced by shortening the duration of study abroad by requiring the scholars to undertake preparatory graduate study here. Sandwich programs have also been adopted here before where a student takes some of the graduate courses domestically and the rest abroad. The internet allows much access to instructional materials from abroad.

Budgeting library and laboratory facilities are more easily planned and budgeted.

We dare to propose a revision of the recently passed law that provides free tuition study in SUCs.Note that SUCs admit students from varied socio-economic classes. The higher the quality of an SUC, the more applicants for admission it attracts. Richer students have an advantage to pass its admission tests for they tend to study in high quality elementary and high school and have better learning environment at home. In fact, the prestigious UP have attracted an increasing number of applicants. In the past few years, it is able to select less than 10% of applicants. Of those admitted, Less than 10% come from poor families. Majority come from rich families. The Congress may consider adopting UP's socialized tuition scheme which the recent law abolished. The scheme charges graduated tuition depending on the student's family income and assets. An earlier study suggested not only for SUCs to adopt the socialized tuition scheme but to set tuition at average cost level. This would force the SUCs to b efficient and allow private HEIs to compete more favorably with SUCs. Private HEIs now face even greater difficulty competing for students who are offered free tuition in public HEIs. They also face difficulty competing for faculty who get higher compensation than they could pay. Subsidy should be directed at all brilliant students especially the poor. Improving the quality of basic education would enhance the chance of poor students to get admitted to high quality SUCs and for scholarship provided by private foundations and private HEIs.

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Endorsement letters to the following:

Senator Sherwin Gatchalian

Chair, Senate Committee on Basic Education

The Senate of the Philippines

Manila

Senator Joel Villanueva

Chair

Senate Committee on Higher Education

Senate of the Philippines

Manila

Congressman Romulo T. Roman

Chair.

Congressional Committee on Education and Culture

Congress of the Philippines

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Dear ------

I take the courage to send you a note entitled A Call to Arms to Fight Mediocre Education. As a citizen and one who has studied the country's educational system, I feel it a duty to write on what we can do to address the poor quality of our education system. The note is only one man's study of the system's weaknesses and suggestions for their solution. I am sure that other concerned officials and experts in education have other ideas on what we can do to significantly raise the quality of basic and higher education. You will want to consider them also. May I suggest that the Congressional committees on education convene a meeting of relevant authorities and experts to discuss the issues and recommend policies and strategies. We cannot delay implementing measures to address the quality problem of education. Our future very much depends on our ability to compete in the fast advances in digital technology. Moreover, the Constitution does provide for giving equal access to quality education.

I have addressed this note to all concerned principals in the executive and legislative branches of our government. It is being emailed as well.

Sincerely yours

Edita A. Tan

Professor Emeritus