Comparison of Higher Education Institutional Profile from one Region against Top Universities in the Philippines and their Degree Program Offerings

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Abstract – *Oversupply of graduates from different degree programs of Higher Education Institutions (HEIs) which are not priority courses of the Commission on Higher Education (CHED) is considered one of the challenges of the country on how to maintain the balance between the needs of the industry and society based on the number of qualified graduates. This study explored the institutional profile of 89 HEIs in one of the Regions in the Philippines to compare with the profile of top HEIs in the country and also considered the common degree programs being offered in the region to provide basic information on what degree programs to offer in the future by educational leaders to support the Sustainable Development Goals of the United Nations. Findings of the study revealed that most of the HEIs in the region have less than 1,000 student population with more than 20 years in operation, having 50 faculty members and below and faculty-student ratio of less than 11. The profile of top HEIs in the country is significantly higher in terms of population size, years in operation and number of faculty members compared to the HEIs in the region. Business related program is the most common curricular offering among the HEIs in the region followed by Teacher Education and Psychology. Educational leaders and managers might consider the availability of program offerings in the region in order to prevent the duplications. Cooperation among HEIs in the region is also suggested to strengthen the delivery of quality education through sharing of resources from mutual agreements.*

Keywords: *engineering, mathematics, priority degree programs, school profile, science, technology,.*

INTRODUCTION

Higher education institutions (HEIs) have significant role to play in the development of the future professionals and social transformation of communities. The school profile based on their common and unique characteristics could have been considered and utilized in strengthening their capacity to provide effective and efficient educational services to students and other stakeholders [1]. HEIs in Finland are encouraged to reallocate resources to achieve a high profile and differentiate activities to meet regional needs [2]. But due to lack of financial resources, small and medium size population institutions have limited access to information and quality facilities where students could not able to perform their duties and responsibilities upon graduation that leads to job mismatch, underemployment and unemployment. In addition, over supply of graduates from one degree program is also considered an issue which might have some effects to the graduates themselves and to the economic activities of the country because the industry could not able to absorb these graduates due to lack of positions available for certain specialization.

Making the curricular offerings relevant to the demands of the society and industry is one way of sustaining the quality /of education being provided to the next generation of the labor force. There are many ways on how HEIs measure the relevance of the degree programs through conducting tracer or employment studies [3]-[7], meeting the standards of sustainable development goals [8]; requesting feedback from the industry partners [9]-[12]. The inputs from different stakeholders served as baseline information for the periodic review of the curriculum.

The institutional profile used to describe the basic characteristics of the higher education institutions in

the region in terms of the number of student population and faculty members as well as faculty-student ratio, number of years in operation, and the degree program offerings. These are considered essential data for investigation that were used to compare with the profile of Top HEIs in the country that are included in the QS World University Ranking in Asia to benchmark some of their profiles which are doable for small and medium HEIs to achieve in the next five (5) to ten (10) years. The characteristics of these top HEIs in the Philippines have proven record of quality and excellence in their educational services.

It is also important to explore the common degree program offerings as baseline information for educational leaders on what programs that they should and should not offer due to its availability and over-subscribed baccalaureate and post baccalaureate degrees in the region. In 2014, CHED has listed priority courses to fill in the gaps between the demand of the labor market and the graduates being produced by the HEIs until the academic year 2017-2018 in coordination with other government agencies like Department of Labor and Employment (DOLE), National Economic and Development Authority (NEDA), Philippine Association of Colleges and Universities (PACU), and the Philippine Association of State Universities and Colleges (PASUC). These degree programs include information technology; agriculture and related fields; Teacher Education with specialization in mathematics, science, physics, chemistry, reading, English, educational media/technology and special education; Engineering; Arts and Humanities, Atmospheric Science, and Environmental Science; Health Sciences which include Pharmacy, Radiology Technology, Medical Technology, Physical Therapy, and Nutrition; Social and Behavioral Sciences; Business Administration with emphasis on Accountancy, Business Data Outsourcing, Business Process Outsourcing, and Construction Management; Architecture, Maritime, and Communication. These priority degree programs also serve as the focus of CHED in providing scholarships to incoming first year students in college. Meanwhile, in 2019, CHED emphasized the degree programs from Science, Technology, Engineering, Agri-fisheries and Mathematics in cooperation with additional government agencies in the identification of priority courses which include Department of Trade and Industry (DTI), Department of Science and Technology (DOST), Technical Education and Skills Development Authority (TESDA) and Coordinating Council for Private Educational Associations (COCOPEA). The Commission still considered the need for graduates in business related programs with expertise in business analytics, business process outsource, Hospitality Management/ Hotel and Restaurant Management and Tourism/ Travel Management [13].

Based on the compiled data from Higher Education Graduates by Discipline Group: AY 2008-09 to AY 2017-18 [14] of the OPRKM-Knowledge Management Division for pre-baccalaureate up to doctoral programs as of June 30, 2019, Business Administration and other related programs for several years from 2009-2018 have the most number of graduates which comprised of almost 28 percent of the total graduates during 2017-2018 data. The number of business graduates is consistently increasing year after year. This is the most popular degree program in college for most Filipinos. When compared with the data of the National Center for Education Statistics of the US Department of Education [15], Business related programs (19% or 386,000 degrees for 2017-2018) consistently have the most number of graduates every year. Even in the United Kingdom, Business degree programs are also the most common and popular for local and foreign students. This is the reason why most government scholarships are concentrated nowadays in Science, Technology, Engineering and Mathematics due to limited enrolees to these hard core degree programs that are also considered significant in the promotion economic development through break through innovations.

Academic institutions in the Philippines are also bounded by several limitations to offer priority degree programs of CHED based on schools' capacity in terms of financial resources, human resources and physical plant and facilities. Due to limited number of teachers with specialization in Mathematics, and other Sciences, HEIs have a hard time in the recruitment most especially the small and medium private institutions. Even faculty members with expertise in Engineering and Technology are very hard to find because most of them are employed in manufacturing companies while those with advanced degrees are employed in research laboratories and large universities in the country who are receiving adequate compensation packages based on their specialization and qualifications. Small and medium HEIs who are just starting to operate tend to offer basic and common non degree board programs with less required

laboratory equipment like business administration, and information technology while for board programs include teacher education and accountancy.

Findings of this study might provide insights to educational leaders on basic information they need to offer new program offerings for the institution to contribute in the economic development and sustainability of quality education in the region through having appropriate curricular offerings based on the demand of the industry and needs of the community.

METHODS

Research Design

The study utilized quantitative descriptive type of research method that explored on the profile of the HEIs that will somehow served as the basis for program offering of other academic institutions to differentiate their academic programs with the existing in other institutions. Quantitative analysis is appropriate in the study to describe the situation or event for desired decision making of educational leaders.

Participants

The HEIs included in the study came from one Region in the Philippines. There are 89 HEIs served as part of the study with available and accessible data from their institutional websites and other internet sources as one of the major considerations in the inclusion of the HEIs as well as those with more than five (5) years of existence as HEI in the region and not as satellite campus or branch. Only those institutions originated in the region were considered part of the study.

Instrument

The study utilized checklist of data sets needed to answer the specific objectives. The profile of the HEIs includes the population size, years in operation, number of faculty members, faculty-student ratio and the degree program offerings.

Data Gathering Procedure

The available data sets from the institutional websites of HEIs were gathered to answer the specific objectives of the study in terms of the years in operation and the degree program offerings in undergraduate and graduate levels except certification courses from TESDA. Meanwhile, the data sets for the population size in terms of the number of students, number of faculty members and faculty-student ratio were taken from the record of Commission on Higher Education - Knowledge Management Division during SY 2019-2020 for Public Schools as of July 8, 2019 and for Private Schools as of August 8, 2019. For ethical considerations of the study, the names of the HEIs involved in the study were not mentioned and even the region where these HEIs originated was not also identified for confidentiality of data and information.

Data Analysis

This study utilized a content analysis of the data provided in the websites of the HEIs with frequency count and percentage were used as statistical tools to present the result of the institutional profile of the schools while z-test was used to differentiate the selected profile of the Top HEIs in the country as sample mean with the population mean of the HEIs in the region.

RESULTS AND DISCUSSION

Table 1. Institutional Profile of HEIs in the Region

Profile	Category	f	%
School Size	Large (>5000)	11	12.4
	Medium (>1,000 & <5000)	24	27.0
	Small (<1000)	50	56.2
	No Available Data	4	4.5
Years in Operation	20 years and below	26	29.2
	21 – 50 years	29	32.6
	More than 50	34	38.2
Number of Faculty Members	50 and Below	45	50.6
	51-100	19	21.3
	101-300	11	12.4
	301 and above	10	11.2
Faculty-Student Ratio	31 and Above	10.0	11.8
	21-30	14.0	16.5
	11-20	34.0	40.0
	1-10	27.0	31.8

Table 1 shows the institutional profile of the HEIs in the region. More than half or 56.2 percent of the HEIs are small schools having 1,000 and below student populations (M=347.98, SD=282.80) and almost a quarter of them are medium size schools having student populations between 1001 to 5000 (M=2268.92, SD=1044.13) with 24 or 27 percent and the least group is the large school having greater than 5,000 (M = 15783.45, SD=13312.97) with 11 or 12.4 percent. Based on the overall result, the average

student population of the schools in the region is estimated 2,888 having a large standard deviation of 6,868 which is more than the average population with a minimum number of 7 students and maximum number of 40,819.

Moreover, there are 34 or 38.2 percent of the HEIs in the region are existing more than 50 years (*M*= 80.03, *SD*= 20.78), followed by schools operating almost more than 20 years but 50 year and below (*M*= 35.24, *SD*=8.04), and there are 26 or 29.2 percent of them are 20 years and below in the operation (*M* = 13.35, *SD* = 4.23). The overall average of year in operation of the schools is 46 years (*SD* = 31.44). This is considered essential variable to describe the experiences and expertise of the HEIs in managing curricula and providing educational services for the stakeholders. It is believed that the longer the years of operation of the institution, they could have more best practices to share with the community against those HEIs with shorter period of existence. From the study of Fresnido and Mijares [16], the authors mentioned the years of existence as one of the important indicators in exploring the priorities and perspectives of library consortia in the Philippines.

In terms of the number of faculty members based on the collected data per school from CHED during AY 2018-2019, almost half of them or 50.6 percent have 50 and below teaching personnel (*M*=23.64, *SD*=10.69) followed by 19 or 21.3 percent of schools with 51 – 100 faculty members (*M=76.42*, *SD* = 14.94) while 11 or 12.4 percent of them have 101 – 300 teachers (*M*=166.36, *SD* = 50.51) and the least group with 301 and above (*M*=657.40, *SD* = 351.84) composed of 10 HEIs or 11.2 percent. The overall average number of faculty members in the region is about 128 teaching personnel which obtained a large standard deviation of 231.66 with minimum of 5 teachers and maximum of 1,404. Most institutions hired faculty members based on the number of their enrolled students and the standard ratio they set for the institution. When it comes to student ratio, there are 34 or 40 percent of the schools have 11 to 20 students per teacher (*M*=14.23, *SD*=2.44) while 27 or 31.8 percent of them have 1 to 10 students (*M*= 5.85, *SD*=2.07) for those HEIs with very minimal number of enrolees. Meanwhile, 14 or 16.5 percent of the HEIs in the region have 21 to 30 students (*M=25.93*, *SD* =3.25) per teachers and 10 or 11.8 percent of them have 31 students and above (*M*=46, *SD* = 20.73). The overall average of faculty student ratio in the region is 1:17 with a standard deviation of 14. Several institutions have set their limits on the class size based on their capacity to provide classrooms and number of teachers in most schools in tertiary institutions. But the class size in specific degree programs is being influenced by the popularity of the degree programs. There are some undergraduate degree programs with more than 40 students per class like business and information technology programs but there are some HEIs have limited number of students in STEM programs. But sometimes, the methodology in calculating the faculty-student ration is based on the average of number of students against the number of faculty members for the entire institution. Meanwhile, Aithal and Kumar [17] mentioned that faculty-student ratio has been part of the world university ranking criteria and has been standardized by most accrediting bodies.

The school size, year of operation and number of faculty members of the selected top universities in the Philippines are significantly higher than the population with HEIs in the region in general. Result showed that significant difference exists z=4.56, p<.001, on nine (9) schools or 100 percent of the selected Top HEIs in the country have more than 5,000 student populations ($\bar{x}$ =18,676) higher than the population mean (μ=4,399.5).

This signifies that the number of students is highly significant characteristic of becoming top HEIs based on the sample mean of the top schools in the Philippines with a minimum number of more than 5,000 students. Public HEIs in the region have greater number of students than private because of their satellite campuses within the province.

Table 2. Comparison of Selected Profile of Top Schools with the Population of the HEIs in the Region

Profile	Sample Mean ($\bar{x}$)	Population Mean (μ)	z-value	p-value
Population Size	18,676	4,400	4.56**	<.001
Years in Operation	134	54	4.79**	<.001
Number of Faculty Members	1,198	231	5.82**	<.001
Faculty & Student Ratio	16	17	-0.26	>.05

*Note: **Significant at p<.001*

Overall, there are 11 HEIs in the region with more than 5,000 students which could possibly be included in the International University Rankings in the future considering other criteria from the methodology.

Significant difference also exists, z=4.79, p<.001, that the top universities have more than 50 years in existence with an average of 134 years compared to population mean of 54 years. Top HEIs in the Philippine have been serving the country for than 100 years in average with minimum of 51 years in existence. There are 33 HEIs in the region with more than 51 years of operation but most these schools have started as basic education and later applied for higher education programs wherein World University Rankings considered the quality of higher education.

Another significant difference exists, z=5.82, p<.001, on the selected top universities (M=1,198) have more than 300 faculty members which is significantly higher than the population mean (M=231). This variable is correlated with the number of student population. The average number of faculty members of Top HEIs (min = 400) in the country is way above the mean score on the number of teachers in the region which only comprised of 19 percent. There are only seven (7) HEIs in the region that exceeded the minimum of 400 faculty members based on the record of Top HEIs in the Philippines.

However, they do not differ significantly, z = -0.26, p>.05, on the aspect of faculty-student ratio where seven (7) of them with 11-20 students/teacher and two (2) of them with 21-30 students per faculty where the population mean of 17 against the 16 students per faculty from the sample mean of the top universities. The faculty-student ratio between the Top HEIs and the schools in the region has very minimal difference of one (1). This signifies that these groups have diverse ratio across institutions regardless of being Top HEI or not. Even top HEIs in the country have higher number of faculty-student ratio.

Figure 1 shows the Top 11 Most Common Bachelor's Degree Programs Offered by Schools in the Region. Almost three quarters (75%) of the HEIs in the region are offering bachelor's degree program in business administration. This can be attributed in 27.6 percent of graduates in the Philippines from Business Administration and related programs which is the highest percentage of graduates from the 2019 Data of the Commission of Higher Education based on the number of graduates during AY 2017-2018. Because of the flexibility of the program without much requirements to put up the business administration and without licensure examination, it is being offered and considered one of the traditional programs in the country which originally known as bachelor's degree in Commerce.

The bachelor of business administration program is also one of the most in demand undergraduate program in one business school in Cairo Egypt [18]. Meanwhile, De Guzman [19] also noted that the Bachelor's degree program in Business Administration has the highest number of student applications received annually compared to other allied business programs in a state university in the Philippines.

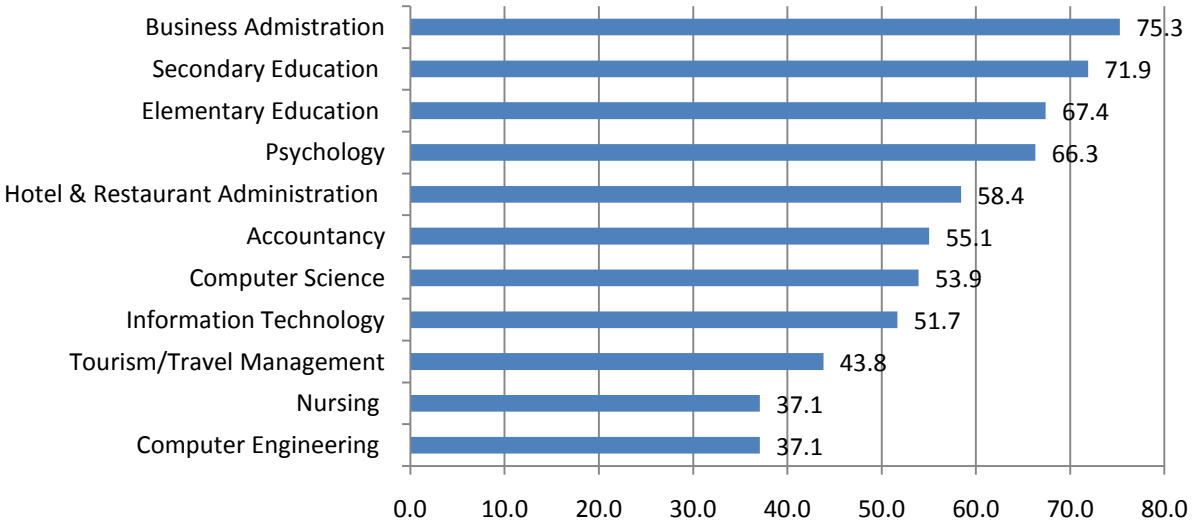

Figure 1. Top 11 Most Common Bachelor's Degree Programs Offered by Schools in the Region

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The Bachelor in Secondary Education (71.9%) and Elementary Education (67.4%) followed on the 2nd and 3rd ranks. These are the top three (3) bachelor's degree programs in the region. Meanwhile, the 21.7 percent of the graduates from AY 2017-2018 came from the Education and Teacher Training which is considered with the second highest percentage of graduates in the country because there are many schools not only in the region offering teacher education programs with various specializations. Teacher profession in Indonesia should recruit and be filled in by highly-motivated and competent candidates and understanding candidates' initial motives to pursue teaching credentials in a teacher education program is indispensible as a foundation to develop the characteristics of the teachers [20]. Moreover, Gupta [21] believed that quality teachers can be produced only if there will be quality system of teacher education. Thus revitalization of teacher education program is a powerful mean for improving the education system of India. In addition, Jalal et al. [22] emphasized that the foundations of teacher education lead human capital in Pakistan to serve various disciplines in higher education. The prior goal of higher education institutions is to produce competent future teachers through teacher education programs. The transformation of knowledge, skills, and values in students can be achieved through effective teaching. Study of Ahmad et al. [23] revealed that the choice of teacher education is affected by perceived interest, likely employability and previous grade and they also found out that teacher education as a study program is believed by the professionals to offer a very decent foundation for personal development along with future career success.

Rogers-Haverback and Mee [24] noted that intrinsic motivations and a love of the profession are some of the main reasons that undergraduate college students choose teacher education as their major. However, Ogúnlọlá [25] mentioned that teaching in Nigeria has been the last hope for' the hopeless' where students choose teacher education as their last resort and jump out of the job at the slightest opportunity.

Meanwhile, more than half of the HEIs in the regions are offering bachelor's degree programs in psychology (66.3%), hotel and restaurant administration (58.4%), accountancy (55.1%), computer science (53.9%), (52.8%), and information technology (51.7%). These are also considered most common degree programs in the country. Moreover, Tourism and Travel management (43.4%) ranked 9th in the most common degree programs in the region followed by nursing (37.1%) and computer engineering (37.1%).

High school students choose psychology as their future profession who wanted to help people in solving their problems or having other motives, often hidden [26] while others choose psychology to help develop an understanding of themselves and others and to develop 'people' skills useful later in a range of careers [27]. Rubio et al. [28] believed that students choose computer science and information technology because of the popularity of these degree programs in the Philippines.

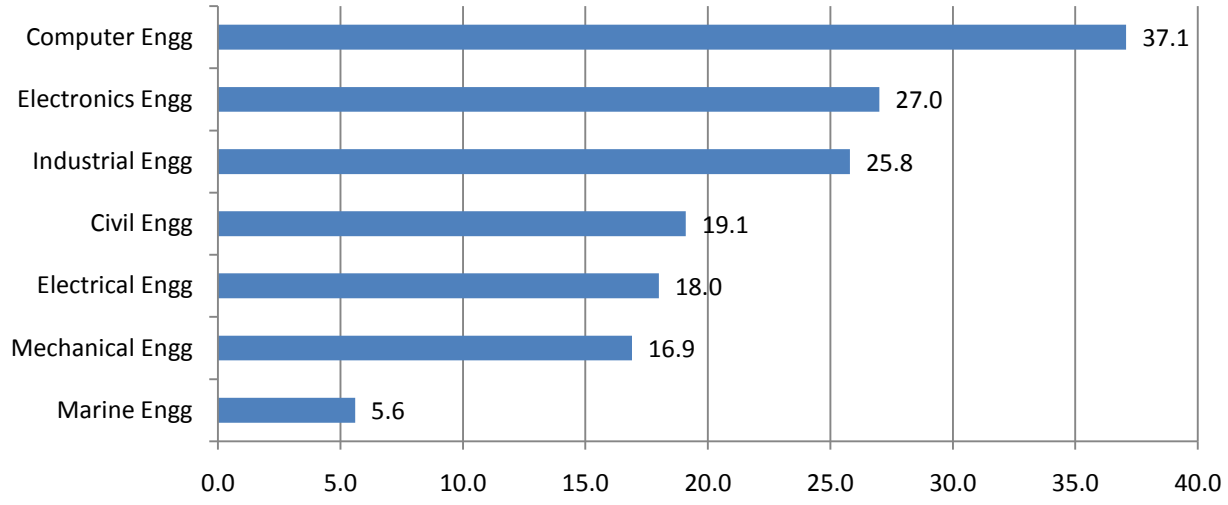

Figure 2. Percentage of Most Common Bachelor's Degree Engineering Programs

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Likewise due to popularity of the tourism and hospitality programs, according to Maria-Cristina and Ioana [29] that the students choose these programs without having any clear understanding of the working conditions and career paths in the industry. When they start their internships or begin working as full-time employees, tourism organisations do not always treat them well or pay a sufficient salary.

Figure 2 shows the percentage of most common bachelor's degree programs in engineering among schools in the region. Computer engineering (37.1%) is the most common engineering degree program in the region which is also included on the Top 11 in the region. It was followed by Electronics Engineering (27%) and Industrial Engineering (25.8%). Electronics Engineering is the most common engineering program with licensure examination in the region being facilitated by the Professional Regulation Commission (PRC) followed by Civil Engineering (19.1%), Electrical Engineering (18%), and Mechanical Engineering (16.9%). Computer Engineering and Industrial Engineering programs are both without licensure examination. However, the certification for Industrial Engineering graduates is being conducted by the Industrial Engineering Certification Board (IECB) under the direct supervision of the Philippine Institute of Industrial Engineers (PIIE). Meanwhile, few schools are offering marine engineering (5.6%) in the region.

Students who are computer enthusiasts take computer engineering if they wanted to major hardware and software designs. But sometimes students also choose degree programs based on its attractiveness and demand in the market most especially engineering. Those students without plan of taking licensure examination for various reasons choose to take computer engineering and industrial engineering. Liu et al. [30] noted that a collaborative effort between Computer Science and Electrical and Computer Engineering provides students with the technical competence, knowledge and skills in software processes and project management, as well as teamwork and professional skills for a successful career in today's software industry. Meanwhile, Akkaya et al. [31] defined Industrial engineering as a field of profession that offers various work areas around the world. Since it has a wide variety of work areas, students encounter with the problem of taking a decision on which sector to work in the future. Laguador et al. [32] described Industrial Engineering as non-board program with majority of the professional courses are related to industrial management and human resources.

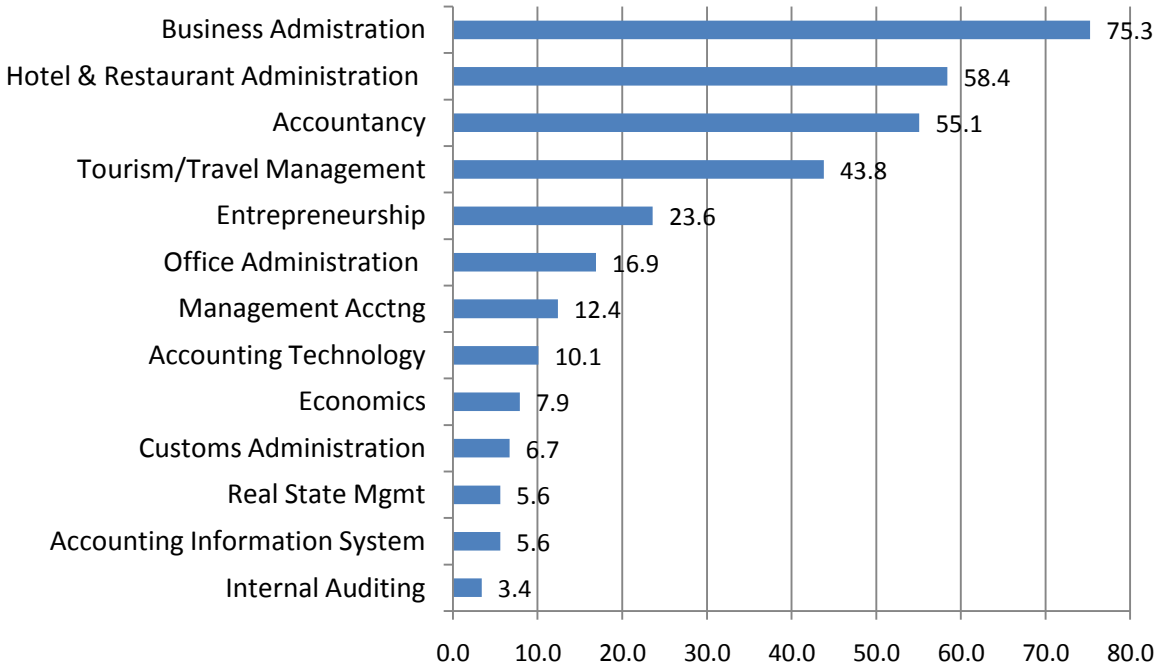

Figure 3. Percentage of Most Common Business Related Bachelor's Degree Programs

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Figure 3 shows the percentage of most common business related bachelor's degree programs in the region. The top four most common business related degree programs are already included in the overall Top 11 most common degree programs in the region. From the study of Amwila [33] found out that high school students' interest in Business Administration Program is influenced by their own current background study. Other factors also significant in influencing the students' interest are the parents' social condition and the campus' facilities. There is a tough competition among business schools in the region because majority of the HEIs have business administration program which only vary in specializations. But HEIs are making great edge to become competitive when it comes to quality as they submit the program for Center of Development and Excellence. Students and parents make choices on where to spend college education but majority still chooses schools with low tuition fees in private and free tuition fee in public schools.

Furthermore, accountancy is now experiencing new drivers of change according to Gardner and Bryson [34] which have presented, or continue to give rise to, interesting implications for accountancy professionals, and in turn the wider business ecosystem, and disrupt the roles traditionally enacted by accountants. Even though, there is a continuous decline on the national passing rate of Certified public accountants in the Philippines, students still continue to take and pursue the program because of the prominence of the Accountancy program in the country.

Many schools are also offering Hotel and Restaurant administration due to the booming industry of tourism and hospitality in the country. De Castro [35] noted that hotel and restaurant management (HRM) is one of the in-demand degree program because of the increasing number of industries in tourism, accommodation, and restaurants while Robles [36] also emphasized that HRM is one of the common choices of students in college. But these findings were considered before the pandemic still without community quarantine. But due to the current situation of the economy in times, the hospitality and tourism industry has been heavily affected. With high number of student enrolees from previous years on these programs, this year 2020 might somehow have decline its currently enrolment. These programs are skill-based program. With the online resources without laboratory activities and simulations, the required student outcomes will not be fully attained. Choices of the parents and students had been changed a lot because of the current situation and further study may be considered if these common degree programs will still remain stable with high number of enrolees at the end of the Academic Year 2020-2021.

In addition, entrepreneurship (23.6%) is on the 5th rank followed by office administration (16.9%), Management Accounting (12.4%), and Accounting technology (10.1%). Entrepreneurship is increasingly being recognized as a significant channel for bringing about a transformation to sustainable products and services and the implementation of new projects addressing various social and environmental concerns [37]. It is considered common and widespread in the Philippines according to Dye and Dye [38] as part of the specialization under Business Administration or an independent undergraduate degree program. Meanwhile, Office Administration is one of the study programs in Vocational High School according to Yolanda et al. (2018) which aims to develop the students' specific skill as much as possible on the target language skills according to the requirements of the target department.

The business related programs less than 10 percent of the school offering the degree programs include economics (7.9%), customs administration (6.7%), real-estate management (5.6%), and accounting information system (5.6%). However the least degree program in business is the internal audit which is being offered by 3.4 percent of the HEIs in the region. Degree in customs administration is still in demand for business students who would like to pursue a career in custom brokerage as well as in the supply chain management which is another program in business with licensure examination aside from being real-estate broker and certified public accountant as most common.

Figure 4 shows the percentage of the most common health related bachelor's degree programs in the region. It has been noted that most of the academic institutions or 37.1 percent of them are offering Bachelor's degree in Nursing as the most common health related program followed by Medical Technology (15.7%) and Physical Therapy (13.5%). Because nursing is also considered a traditional or common degree program in the Philippines and its great demand for incoming first year students during the early years of 2000s.

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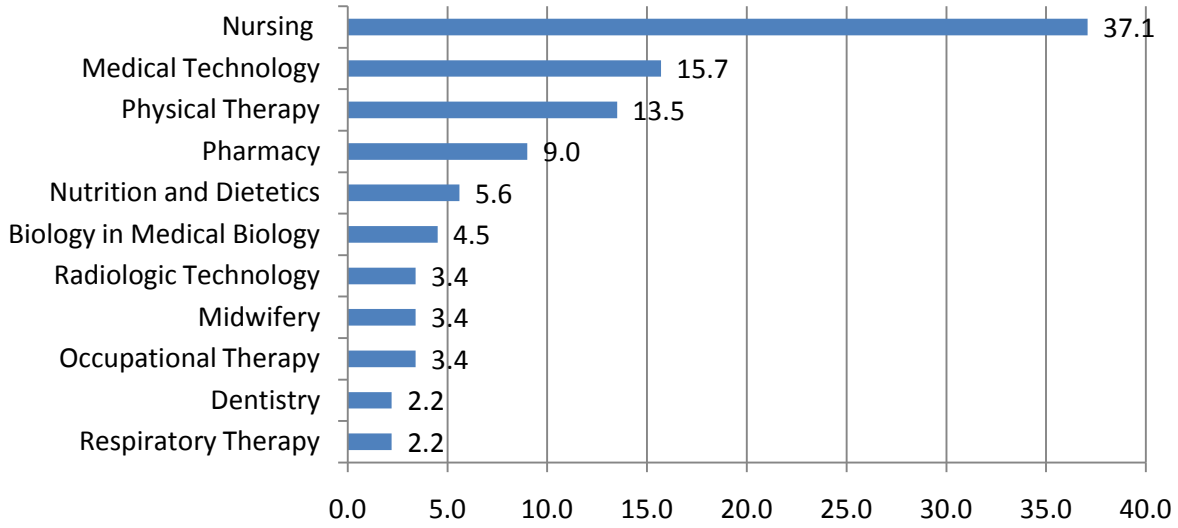

Figure 4. Percentage of Most Common Health Related Bachelor's Degree Programs

But despite the number of students in Nursing have suddenly declined several years ago in the country which has been noted in the study of Isles et al. in 2009 and even in the US where this phenomenon had been felt as early as 2000 according to American Association of Colleges of Nursing (AACN) but at a slower rate [39]. The nursing schools in the Philippines have still continued to offer the program even with very minimal number of students which could barely fill in at least one whole class of 30 students per year level. But now, it is continuously reviving the Nursing program due to the increasing demand of health professionals where the health care facilities are experiencing shortage of manpower due to the aging population of nurses [40]-[43].

Meanwhile, the Medical technology program in the Philippines is consistently producing graduates based on the demands for medical technologists in the country and abroad. According to the Job Outlook of US Bureau of Labor Statistics [44] that Clinical/Medical Technologist continues to grow by 11 percent from 2018-2028 much faster than the average for all occupations. The demand for medical professions is due to the aging population which leads to a greater need for diagnosing medical conditions such Type 2 diabetes and cancer through laboratory procedures.

However, the least number of institutions offering the medical programs include Radiologic Technology (3.4%), Midwifery (3.4%), occupational therapy (3.4%), Dentistry (2.2%) and Respiratory therapy (2.2%). There are many factors that might affect the preference of students in choosing the degree program in college based on its popularity and the perceived demand as dictated by the labor market, as well as the economic and practical aspect of the program and intellectual capability and interest of the students to pursue medical profession. Shehnaz [45] emphasized in a study that globalisation has resulted in an increased demand for medical professionals from foreign countries (outsourcing). This lure of increased income has led to more entrants into health professions. This enhanced need for medical schools is fulfilled by private medical schools.

Figure 5 shows the percentage of most common arts related bachelor's degree programs. The most common arts related undergraduate program is the mass communication or communication arts (30.3%) degree followed by English/English Language (15.7%) and Multimedia Arts (10.1%). Meanwhile, Broadcasting (4.5%), Fine arts (4.5%), Literature (2.2%) and Filipino Language (1.1%) are also available in few HEIs in the region. De Luna et al. [46] noted that part of mass communication is the production of materials that disseminate information in forms of writing and print such as magazines, newspapers, journals, and folios. Student publications are part of this category of mass communication. Production of student publications is of no joke. This requires good writing skills for writers, good analytical skills for editors, and good taste for images, colors, and design for photographers and graphic artists.

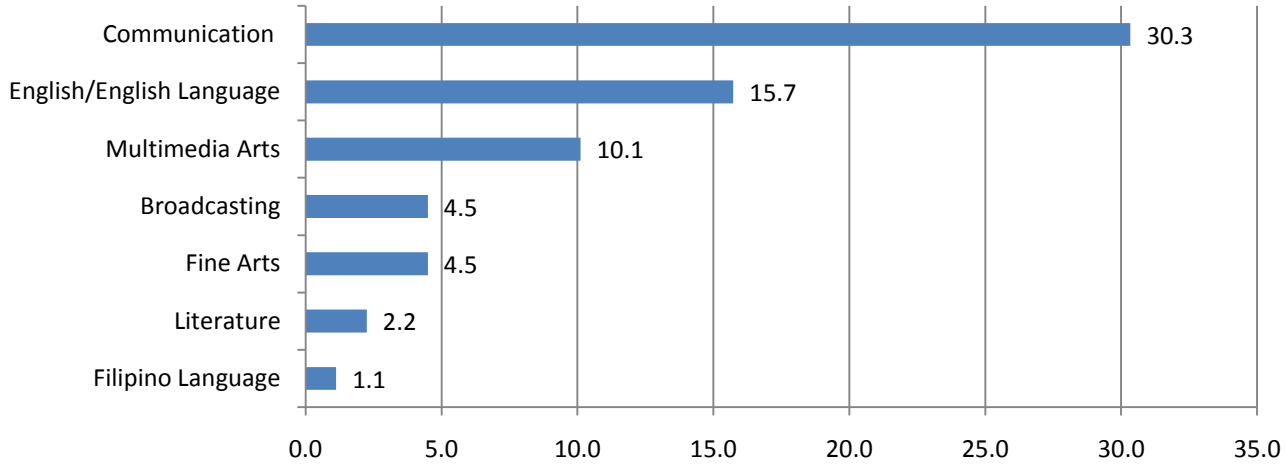

Figure 5. Percentage of Most Common Arts Related Bachelor's Degree Programs

On the other hand, Digital multimedia art is based on the use of digital technology in the process of artistic creation, and the combination of digital multimedia art and mobile game is entertaining and interactive [47].

Other field of arts like broadcasting is also part of mass communication or later named as communication arts. Meanwhile, Multimedia art also gained its popularity with the advent of digital art and online marketing and social media where many platforms and channels to communicate messages are made available in different devices and gadgets. There are few computer schools have initiated to open these programs as part of their innovation in education.

Figure 6 shows the percentage of the most common education related bachelor's degree programs. In the Teacher education undergraduate programs, the most common is secondary education (71.9%) followed by Elementary Education (67.4%). Meanwhile, there are certain Teacher education programs which can be considered as part of the specialization for secondary education but some schools treat them as independent program like Teacher Technical education (9%), Physical Education (9%), Early Childhood Education (5.6%), Religious Education (3.4%0 and Technology and Livelihood Education (2.2%). Abas [48] noted that undergraduate teacher education is the education and training provided to pre-service teachers before they undertake any teaching work.

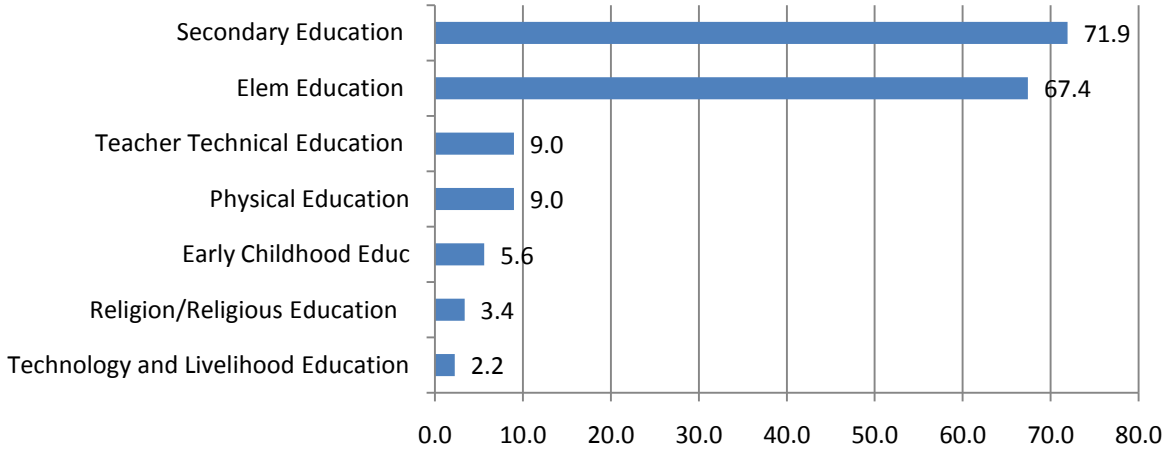

Figure 6. Percentage of Most Common Education Related Bachelor's Degree Programs

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A major focus during the last year in teacher education program in the Philippine context is the field experiences consisting of off-campus observation and practice teaching where pre-service teachers are placed within a school setting either in elementary or secondary level. It has become increasingly clear that the quality of teacher education is among the most important factors shaping the learning and growth [49].

Likewise, early childhood education is a specialization in teacher education which prepares an instructor to teach young children, including infants and children up to the third grade. Teachers at this level help children develop social, personal, and academic skills to properly prepare them for higher levels of education. Furthermore, Mitchell [50] noted that it is increasingly portrayed as childcare while parents work, rescuing vulnerable children from disadvantage, and promoting future economic benefits for the country.

Figure 7 shows the percentage of most common math and science related bachelor's degree programs. There are 14.6 percent of the HEIs in the region are offering undergraduate degree in Biology followed by Mathematics (13.3%) and Architecture (9%) as the top three most common programs under Math and Science related programs. Furthermore, Environmental Science (6.7%), Agriculture (5.6%), and Fisheries (4.5%) are also being offered in the region by few HEIs because of the limited number students who have an interest to take STEM programs in the country. In addition, there are also few schools offering Chemistry (3.4%), forestry (3.4%) and Applied Math (2.2%). The degree in biology provides enhanced knowledge and appreciation of life on earth while also providing courses and training that will enable students to succeed in academics, develop a career path, pursue graduate studies, obtain employment and promotion in the field of specialization [51]. Meanwhile, a degree in mathematics provides a broad range of skills in problem solving, logical reasoning and flexible thinking which leads to careers that are exciting, challenging and diverse in nature [52].

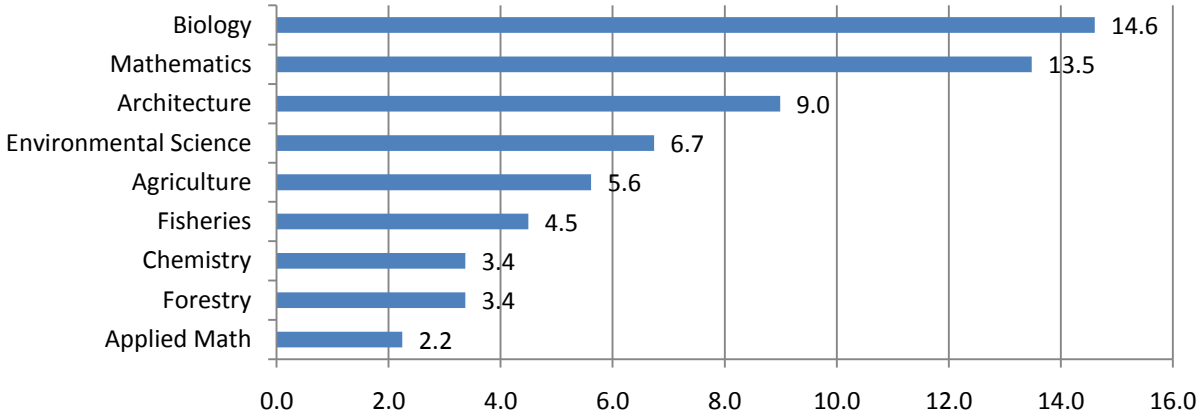

Figure 7. Percentage of Most Common Math and Science Related Bachelor's Degree Programs

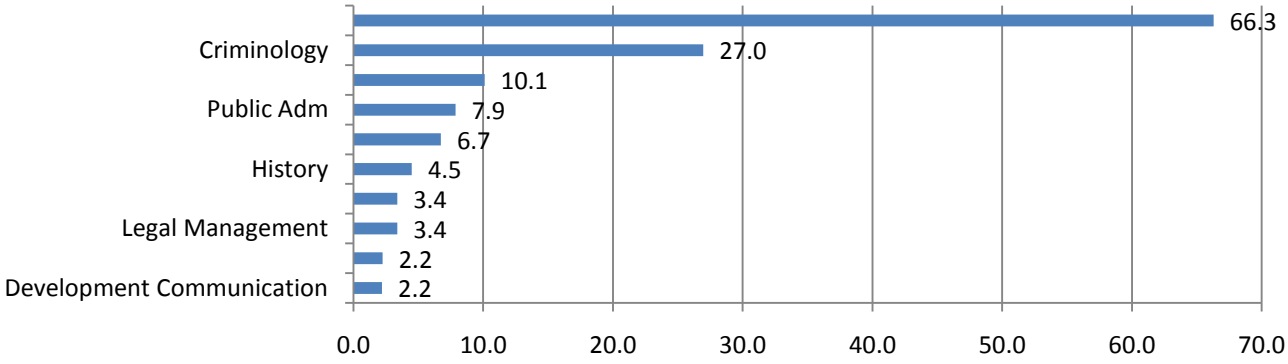

Figure 8. Percentage of Most Common Social Science Related Bachelor's Degree Programs

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For the social science related degree programs, psychology (66.3%) is the most common college degree program in the region followed by criminology (27%) and political science (10.1%). Meanwhile, there are also schools offering Public Administration (7.9%), Social Work (6.7%) and history (4.5%). However, the least common programs include theology (3.4%), legal management (3.4%), philosophy (2.2%) and development communication (2.2%). Completing an undergraduate or conversion degree in psychology provides a really sound platform for a number of careers within the health and social care sector [53]. Furthermore, there is also an increasing demand for criminologists for those students who would like to join the Philippine National Police and other related military and government service like civil defence.

Anoyo et al. [54 mentioned that the Bachelor of Science in Criminology program as designed to provide students with knowledge and skills in the study of historical and contemporary patterns of crime, responses to crime of the society, the causes of criminality in the society and study of delinquency. It focuses on the processes involved and the functions of the criminal justice in the country. Meanwhile, the course offering in public administration provides wider perspective on management and leadership towards attainment of organizational vision and mission in government service.

Figure 9 shows the percentage of the most common technology related bachelor's degree programs in the region. It is not anymore a surprise for the popularity of computer science (53.9%) program in the Philippines and information technology (51.7%) due to the demand for digital literacy as one of the most useful skills for employment. There are many schools offering Computer Science programs with different specializations in data science, game development, mobile application development and among others. Students are prepared to develop application software for different handheld devices and embedded systems and become proficient in designing software solutions for specific purpose.

Meanwhile, Information technology is another most popular degree program under computer studies that prepares the students to become IT professionals who serve as technical support in the maintenance, installation and operation as well as to become system administrators, network engineers, information security practitioners, technology consultants, and enterprise system specialists. There are also available specializations in multimedia technologies, digital animation, information systems, and among others. Information technology skill is one of the qualifications being required by most industries to possess by the graduates who will be joining the workforce. Although digital literacy has been part of the 21st century skills, taking Information technology as a degree program is still advisable for students who would like to strengthen their knowledge and skills in computer operations and other underlying processes. But graduates from other programs like business and engineering tried to participate in boot camps for IT and other computer training for IT certifications. This serves as one of the reasons why enrolment in other IT schools decreases because of the flexibility of training being provided to learn IT skills in other means aside from formal education.

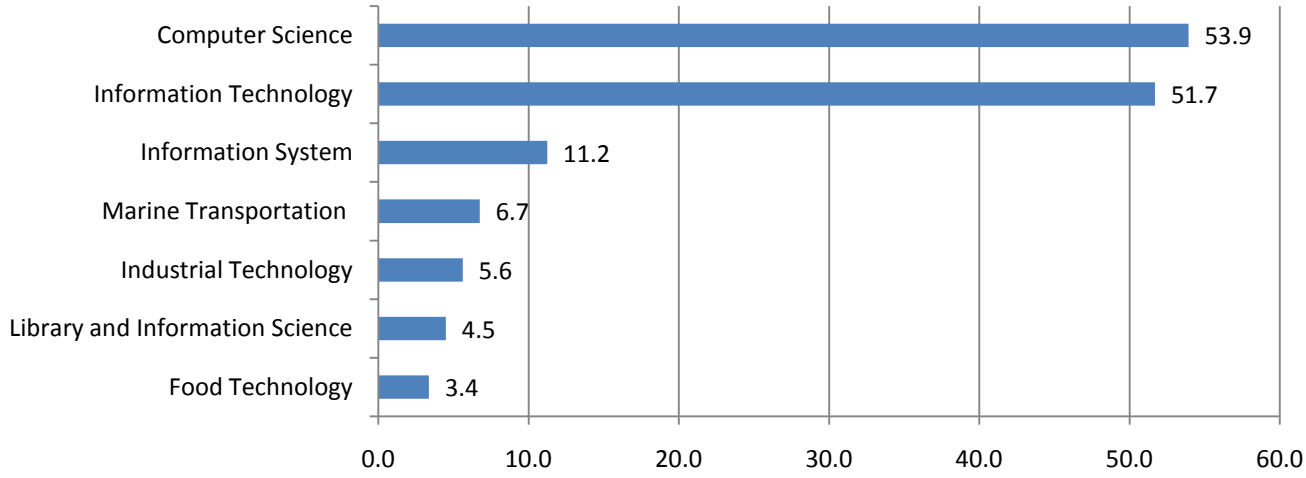

Figure 9. Percentage of Most Common Technology Related Bachelor's Degree Programs

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Furthermore, Marine transportation is an important service sector to support natural resource development and international commerce [55]. This program is also very popular for males and they thought of taking this as education in college would bring them more opportunities with high paying salaries while exploring different countries.

Food technology is also one of the undergraduate degree programs which is considered not too popular for the students but there is a great demand for jobs in food processing industry that helps in developing healthy and safe food products. This program is not too familiar with the high school students which need more information to be disseminated for wider understanding of the degree programs under STEM.

Figure 10 shows the percentage of the most common master's degree programs in region. It is understood that not all HEIs could able to offer Master's degree programs based on the minimum requirement of the Commission on Higher Education in terms of level of program accreditation in the undergraduate and the qualification of faculty members who will be teaching in the Graduate Program. There are 21.3 percent of the HEIs in the region are offering Master in Business Administration (MBA) followed by Master of Arts in Education (MAEd) with different specializations and Master in Public Administration (MPA). These are considered the Top 3 most common Graduate degree programs in the region. Obtaining higher degree after completing undergraduate study aims to intensify the professional goal of the learner towards better professional career. Macalalad et al. [56] and Refozar et al. [7] believed that taking graduate studies serve as investment for future promotion and competitive advantage for higher responsibility most especially those in the field of business.

Teachers are the number one required to take advance studies for them to qualify for regularization, promotion, higher compensation and teach general and professional courses in the institutions of higher learning as being required by the Commission on Higher Education (CHED). Both government and private institutions believed that teaching to undergraduate students with one degree ahead means that the knowledge and expertise of the teachers could be an advantage for them to share information and learning experiences. Torneo [57] noted that the Philippines was the first country to offer Public Administration (PA) degree programs in Asia beginning in 1952. PA programs were offered by the newly established Institute of Public Administration at the University of the Philippines (UP) in 1951, in line with the Bell Mission's recommendations to rebuild the civil service and facilitate recovery from World War 2.

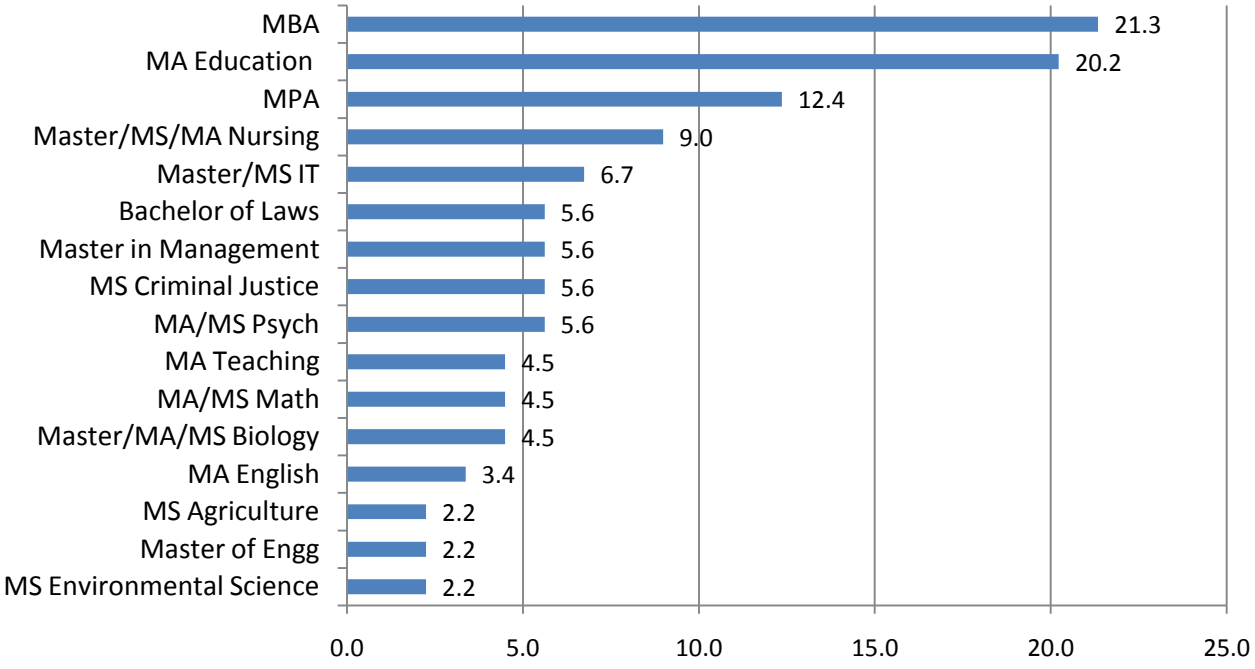

Figure 10. Percentage of Most Common Master's Degree Programs

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Meanwhile, Master's Degree in Nursing (9%) and Information Technology (6.7%) are already considered popular because many schools are offering Nursing and IT programs in the undergraduate level. Furthermore, Bachelor of Laws, Graduate degree programs in Management, Criminal Justice and Psychology have 5.6 percent each. These are also included in the most common programs in the undergraduate level in the region.

The least master's degree program which can be considered common in the bachelor's degree from most schools but in Master's degree only one HEI offering in the region and all of these following programs belong to STEM: Computer Engineering (1.1%), Computer Science (1.1%), Electronics Engineering (1.1%), Mechanical Engineering (2.2% - including UPLB), Master in Chemistry (1.1%), and Master of Technology (1.1%), Master in Architecture (1.1%), Master of Engineering in Electrical Engineering (1.1%), Industrial Engineering (1.1%). Majority of these STEM programs are offered in State Universities and Colleges.

Figure 11 illustrates the percentage of the most common doctorate degree programs in the region. There are more schools in the region offering PhD in Educational Management (10.1%) than Doctor of Education (6.7%) while the same percentage of schools are offering DBA (9%) or PhD in Business Administration (9%). Meanwhile, PhD in Agriculture (4.5%) is being offered by State universities and Colleges. Furthermore, there are also schools offering majority of the programs in social sciences, arts and humanities such as DPA (3.4%), PhD Psychology (3.4%) and PhD English (3.4%), Juris Doctor (2.2%), PhD Language Studies (2.2%), PhD Criminal Justice (2.2%) while one science program in PhD Biology (2.2%).

Results showed that majority of the doctorate programs of most HEIs in the region belong to education, business, social sciences and arts where majority of the STEM doctorate programs are offered in UPLB. These programs help promote career advancement among lifelong learners in the region that seeks to develop the competence of the workforce and continuously enhance the human capital [58]-[61] for higher responsibilities. Most of these programs cater to the needs of the teachers who wanted to advance their knowledge and gain expertise on their respective fields of specialization. Other employees from the industries who would like to join the academe in the coming years also tried to invest their time, money and effort to take advanced studies in the graduate school.

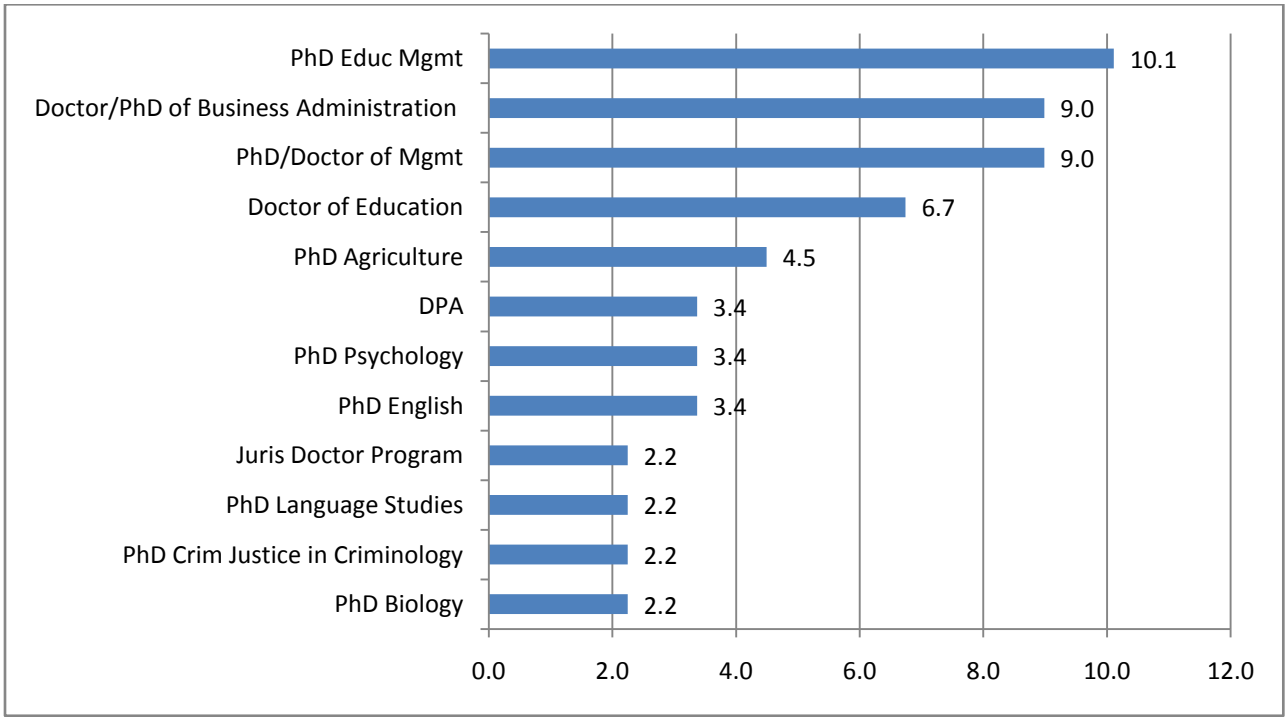

Figure 11. Percentage of Most Common Doctorate Degree Programs

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CONCLUSION AND RECOMMENDATION

Majority of the HEIs in the region are having less than 1,000 student populations with 50 faculty members and below; having more than 20 years in operation and an average ratio of 11 to 20 students per faculty members. Business Administration and Teacher Education programs are the most common degree programs both in undergraduate and graduate levels. The school size, year of operation and number of faculty members of the selected top universities in the Philippines are significantly higher than the HEIs in the region.

Stricter monitoring of schools in the delivery of degree programs must be conducted periodically most especially the implementation of Outcome-Based Education and the impact of K-12 Curriculum to the first year students as products of senior high schools from different tracks who were allowed to enrol in degree programs even they were not came from the same strand. The limitations in the opening of new schools and programs may also be considered in order to avoid the existence of too many schools in the region that will compete from the small number of students. The student population might have been considered as important profile of the institution in intensifying its reputation from having more students to choose from who will represent the school in various academic, skills, sports and cultural competitions. Increasing the number of enrolees with appropriate and reasonable retention policies could able to sustain the quality of students and enhance the image of the institution as part of the marketing strategy.

Educational leaders should not also be too aggressive in the opening of new programs without identified market or enrolees for the program. Feasibility study must be conducted in order to determine the appropriateness of the program to be offered. They might focus first in strengthening their existing programs through providing quality instruction and enhancing the skills and the learning outcomes of the students.

Offering relevant post graduate studies that will address the needs of the Sustainable Development Goals of the United Nations may be considered by HEIs to meet the pressing needs for experts in various disciplines of STEAM. Though, it would take a lot of effort and time for HEIs to open such graduate programs due to several requirements from its Bachelor's degree accreditation which must be Level III status to ensure the preparedness of the institutions to offer advanced degrees on the same discipline. HEIs must work out on the subject areas which are considered priority of the country for economic sustainability and human capital development. Cooperation from different stakeholders is necessary in order to provide relevant degree programs for the community.

This study is only limited to only one region in the country. Additional data from other regions might be considered to generalize the result of the study. Exploring on the institutional performance between private and public institutions may be considered for further investigation. The capacity of the HEIs in the country to offer modular distance learning approach during pandemic is also good to be part of future research projects most especially in degree programs which are skill-based where the delivery of laboratory courses or subjects is very challenging for most institutions especially the teachers who will be handling the subject load.

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