The Diffusion of the Interest in the Academic Disciplines as Predictor for the Philippine Industries

Max Teody T. Quimilat
College of Teacher Education
Southern Leyte State University

Abstract The pressing problem of unemployment and underemployment in the Philippines is viewed to be a product of job mismatch which in turn is a result of the diffusion of the interest in academic disciplines in the country. This interest has become the input to the work force of the Philippine industries. The highly diffusive academic disciplines were identified using time series data from 2008 to 2017 enrollment in eighteen tertiary academic disciplines. The spreading of these academic disciplines was then calculated using the Bass diffusion model. The findings showed that the spread of interest in academic disciplines has the characteristic of the Bass diffusion model. Only four among the top ten highly diffusive academic disciplines matched the current industry demands for jobs, an indication of a job mismatch. The contention of the study is that, as long as the selection of students in a tertiary academic discipline continues to be determined through the Bass diffusion model coupled with unmeaningful government policies in education, the country will always lag in its industrial development.

Keywords: *Bass diffusion, diffusion in academic disciplines, Philippines job mismatch, tertiary enrollment*

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Corresponding Author:

Introduction

The strength of the work force of a country depends on the knowledge, know-how, skills, competencies and practices of its workers (Liwinski & Pastore, 2017) and the quality of its workers depends on the skills learned from tertiary academic disciplines. As specific structures in the educational systems are consequential in the labor markets (Curl, 2020), it is also quite interesting to look at how academic disciplines in tertiary education as labor inputs for knowledge and skills in the past several years, have diffused and how it has supplied the current industry's work force. Diffusion, as described by Rogers (1962), is the process by which an idea gains momentum and diffuses (or spreads) within a population or social structure over time.

Unemployment and underemployment in the Philippines are among the important problems faced by the industry sector today (Filepe & Lanzona, 2006). These are indicators of the weakness of a country and a reflection on the low industry productivity growth (Usui, 2011). In the recent survey of the Philippine Statistics Authority, the country eased unemployment from 5.7% to 5.3%, however, underemployment increased from 16.1% to 16.4% (De Vera, 2018). Underemployment occurs when employees are underutilized either in terms of working hours or the degree to which their skills and expertise are successfully employed or financially compensated (Mousteri, Daly, & Delaney, 2020). It is also a measure of the malfunction of the correctness of the academic disciplines pursued. This phenomenon is increasing in the Philippines despite several government interventions. Apparently, one of the causes of underemployment is the wrong selection of academic discipline in congruence to the industry needs (Neugebauer & Weiss, 2018). Thus, it is important to look into the diffusion of academic disciplines and its impact to the future of the industry.

A number of studies in the literature were focused on the concepts of tertiary education and labor market outcomes (Hanushek Schwerdt, Woessmann, & Zhang, 2017; Li, Mahuteau, Dockery, & Junankar 2017; Stevens, Kurlaender, & Grosz, 2015), job matching (Belfield & Bailey, 2019; Boccuzzo, Paccagnella, & Fabbris, 2016; Xu & Trimble, 2016) and educational mismatch and equity (Li et al., 2017; Rohrbach-Schmidt & Tiemann, 2016; White, 2016). However, studies looking at the diffusion of academic disciplines is a minority in the literature.

With the dearth of literature on diffusion of knowledge in the academic disciplines, this study is concerned with describing the diffusion of the interest in the academic disciplines related to industry through the number of enrollees in the Philippine tertiary education from 2008 to 2017. In addressing the aforementioned, the Bass diffusion model is used to describe the rate of diffusion, adoption and saturation. Furthermore, the study seeks to outline the movement of these disciplines in the future as to what discipline would continue and what would stagnate based on the existing data. The findings that may be sourced from this investigation may serve as inputs to educational policy makers in looking at the current enrollment in the academic disciplines and create interventions based on their projected impacts in the industry.

Framework of the Study

Professionals in different disciplines, from agriculture to marketing, used the theories of diffusion to increase the adoption of new products and practices. In addition to Rogers' (1962) description, diffusion is the process by which an innovation is adopted and accepted by a community (Surry & Farquhar, 1997). Since it spreads through adoption, word of mouth and imitation could be one of its instruments.

In the Bass diffusion theory, diffusion is a process in which an innovation (behaviour, practice, program and idea) travels or spreads through certain channels from a person, organization or any unit of adoptions (Norton, Frank, & Bass, 1987). The rate of diffusion depends on several factors such as socio-economic influences, that could affect the rate of adoption from the imitators of a certain diffusive idea. In this study, the interest of the students in different academic disciplines is seen to be diffusive and could be adopted or inflicted to others by imitation, influence from peers and word of mouth. Following this flow, we could deduce that the diffusion pattern of these academic disciplines follows the bass model. Then the result of this diffusion among tertiary disciplines becomes the input to the industries work force.

The industry work force would have been better if the training received in tertiary education match the industry requirements. Going on without substantial improvement and the reason why they don't match is because students choose their careers or line of specialization based on word of mouth and endorsement from other more experienced workers in the field. Indeed, the bass diffusion which is a word-of-mouth model is operant in this situation.

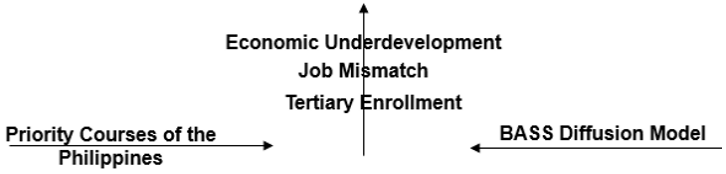

Figure 1. The Framework of the Study.

In this study, the word of mouth and experiences of friends and relatives, as the source of the interest among tertiary students in choosing their careers and not on priority tracks recommended by the government had led to economic

underdevelopment. This underdevelopment is characterized by high degree of unemployment and underemployment.

In countries that are highly developed like Japan, career choice is determined by the government based on scholastic aptitude. The choice of tertiary discipline is determined by the government. Contrary to the practices in the Philippines where the students exercise their own freedom of choice. Since the choice is governed by the bass diffusion, it becomes counterproductive to productivity of the Philippine industries.

Priority courses with high employability are less common among undergraduates in the Philippines. Courses that lead to work mismatch and economic underdevelopment, on the other hand, are common in the country's colleges and universities. If this trend persists, our country will be doomed to underdevelopment, as the framework predicts.

Purposes of the Research

This study aims to show that ensuring a job match between tertiary enrollment and the country's current needs is an important part of the Philippines' growth. Specifically, the study sought answers to the following questions:

1. What academic disciplines are available for the industry sector?
2. What is the rate of diffusion of these disciplines based on enrollment data?
3. Does this data meet current industry demands?

The answers to these questions are critical and should be one of the pillars of educational policy.

Methodology

Data for this study was obtained using data mining method. Using the internet, data was mined from the online database of the Commission of Higher Education as compiled by its knowledge management division (https://ched.gov.ph/higher-education-enrollment-by-discipline). The data includes pre-baccalaureate up to doctoral programs as of April 10, 2017. A total of 18 academic disciplines with complete data on enrollment from school year 2008 to 2017 was used as the raw data of this study.

In order to determine the diffusion rates of the enrollment in the academic disciplines, the data was processed to fit into the Bass diffusion calculator [a software designed using the formula of Frank Bass (Norton et al., 1987)]. The software determines the rate of adoption and generates graphs ready for presentation and analysis of data in accordance with the Bass diffusion model.

The ranking of the academic disciplines in terms of diffusion were determined through the rate of adoption. Then, the movement of the academic disciplines were obtained based on these rankings to determine what academic disciplines have maintained, increased and decreased in their rankings. Then the top 10 highly diffusive academic disciplines were compared to the current in demand jobs in the Philippine job market taken from the website of jobaxy.com to determine if there is a match between the current industry needs with the fast diffusive academic disciplines.

Results and Discussion

The industry sector is the manufacturing or the technically productive enterprise in a particular field, country or region (*What Is an Industry? Definition and Meaning* -

BusinessDictionary.Com, 2019). A single industry is usually named after its primary product. These products are the results of different studies from several disciplines. Thus, it is vital to look at the academic disciplines as feeders for human capital in the industry sector.

Academic Disciplines in the Industry Sector

Enrollment population from the different academic disciplines is a key factor in determining the strength of the discipline. This factors reflects how many students choose to work in these areas in the future. The diffusion of academic disciplines is a clear path in describing the future of the industry sector in the country as to what academic disciplines would remain strong and what falters.

A panel data on the enrollment population of different academic disciplines related to industry from year 2008 to 2017 was taken from the Commission on Higher Education (CHED) Statistics as agents in this study. These disciplines are the direct feeders of manpower and experts that would propel the development of the industry sector.

In the year 2008, five disciplines had over a hundred thousand students enrolled. Business administration and related fields, education and technology training, engineering and technology, information technology, and medical and allied fields are the foci disciplines. Their long-term viability, on the other hand, varies. A study in UK found out that in universities, technology oriented disciplines are directly related to industry involvement (Perkmann, King, & Pavelin, 2011). Since most of these disciplines utilize technology, then these academic disciplines have direct involvement with the industry.

Table 1.

Enrolment Panel Data of Academic Disciplines

Academic Disciplines in the Industry Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1. Architectural and Town Planning	18780	17994	20491	23116	26356	31352	34698	39532	45583	40238
2. Business Administration and Related	621726	647292	723997	796302	845031	915191	970558	990676	1066639	921324
3. Education and Teacher Training	335468	322703	352343	404261	450225	536854	624254	725183	791284	740713
4. Engineering and Technology	305848	315453	339045	354321	367620	406831	424143	463221	517010	448550
5. Fine and Applied Arts	15316	16362	16327	18149	19260	21778	23710	26755	28055	16324
6. General	13979	10830	12365	12832	10232	10586	11132	8813	8425	7614
7. Home Economics	4672	4852	5095	5331	5681	6655	6939	7310	7575	5960
8. Humanities	28311	28560	28219	30470	31775	35605	40575	43623	48482	40753
9. Information Technology	279826	302057	346427	377438	393913	404813	425416	433712	460862	398765
10. Law and Jurisprudence	21075	21067	21099	23087	22479	24092	21349	20387	21691	23239
11. Maritime	74853	68115	88567	111469	125905	152657	156794	161229	156087	119387
12. Mass Communication and Documentation	27670	27363	28818	33284	35068	35520	38605	41078	44786	36527
13. Mathematics	11688	12115	12310	12792	13595	13992	16195	17544	18247	14109
14. Medical and Allied	560296	520026	440160	365715	284598	243285	228484	224897	228537	203561
15. Natural Science	24389	23580	24242	25758	27442	30394	38219	41454	45069	34923

Source: CHEd Statistics

The Diffusion of the Academic Disciplines

Diffusion is the spread of a certain idea or innovation to a certain population. Figure 2 shows the graph of the diffusion of the 18 academic disciplines. Three significant observations can be seen in the graph. One is that there are academic disciplines whose rate of fast diffusion are maintained from 2008 until saturation point. These academic disciplines are medical and allied, trade crafts and industrial, general, and law and jurisprudence. Another observation is that there are academic disciplines such as mathematics, engineering and technology, mass communication and documentation, humanities, business and related, social and behavioral sciences, natural sciences, architectural and town planning and education and teacher training that decreased from a faster diffusion rate into a slower pace. Lastly, there are also academic disciplines whose rate of diffusion increased. This is the case of information technology, home economics, religion and theology, fine and applied arts and maritime.

There are several factors that affect the diffusion rates of the academic disciplines. The medical and allied field which was decreasing in the early 2000's (Dacanay, 2005) had bounce back in the late 2000s due to work demands in this field. Medical transcriptionist, nurses and health providers were in demand during those years. With government help, the Philippines has since become the world's leading primary source country for nurses, as the 2001-2004 Medium Term Philippines Development Plan views overseas jobs as a key source of economic growth (Aiken, Buchal, Sochalski, Nichols, & Powell, 2004). Filipino medical practitioners were seen to be educated in college-degree programs and can communicate well which is an added factor for Filipino medical practitioners. This attribute have propelled the medical and allied industry to maintain its fast diffusion rate.

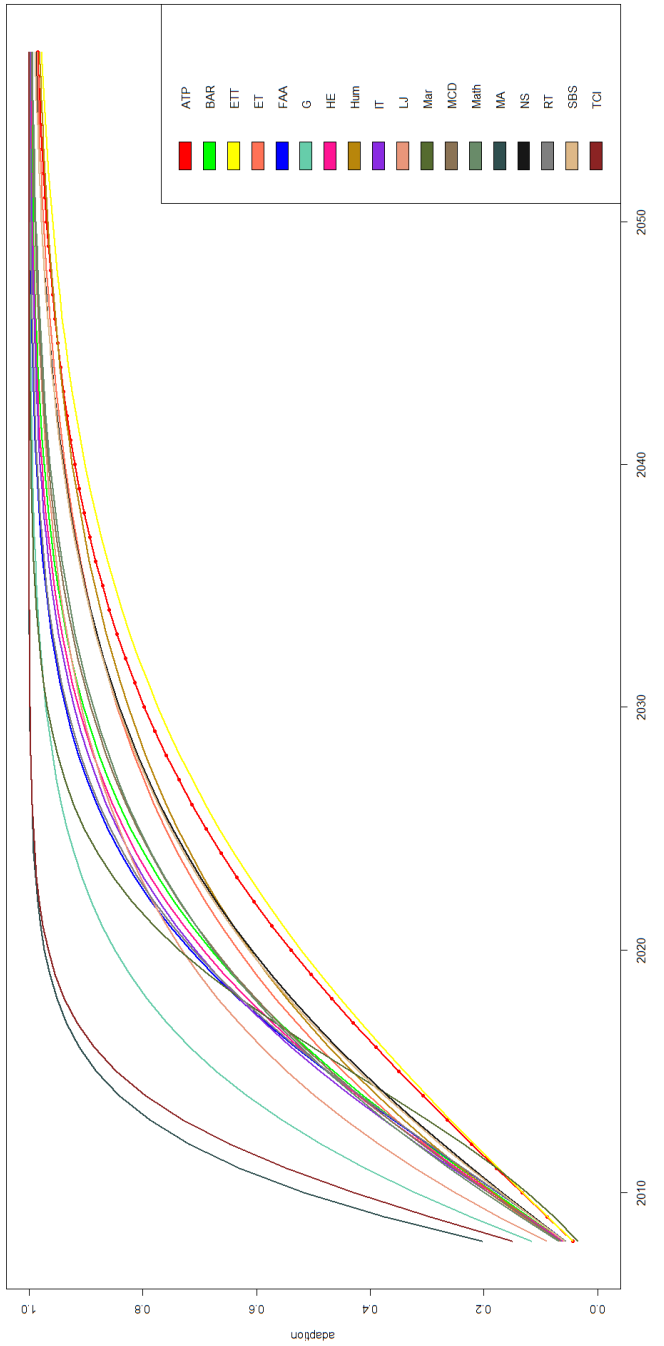

Figure 2. The diffusion Graph of Academic.

Since 2010, the Philippines' Gross Domestic Product (GDP) has grown at a rate of over 6% per year; however, poverty and hunger remain especially to those whose livelihood is agriculture, and in some rural areas, they are getting worse (Oakeshott, 2020). This holds true also to the handicraft industry. Today, many Filipinos are engaged in handicraft business. This has become a means of livelihood for some and have an international clientele. The Philippines has become the second largest world producer of handicrafts (Simbala, Massie & Tielung, 2019). The sector has provided livelihood for than a million Filipinos and has gained respect from high end markets in Japan, US, Canada, Australia, Hongkong, Singapore and other countries (Mitra, 2013).

Fresh graduates in the law and legal field have the highest paying jobs in the Philippines. These jobs require a bachelor's degree in law or pre-law courses like political science and legal management ("High Paying Jobs in the Philippines for Fresh Graduates," 2019). In fact, an average lawyer earns around 600,000 pesos in a year (*Attorney/ Lawyer Salary in Philippines | PayScale, n.d.*). This reality have somehow become the pull factor of this academic discipline.

As there are reasons for the perpetuation of the faster pace diffusion in this group of academic disciplines, there are also reasons why some academic disciplines have a decreased slower diffusion rate. Mathematics and natural science for example has a dropped achievement rate in basic education especially in mathematics and science among fourth year students in the year 2006 and 2007. This drop in achievement also affect their interest in taking up mathematics and natural sciences in the tertiary level. This problem has been attributed to the lack of professionals who can teach math and science (Denton, Baliram, & Cole, 2021). In basic education for example, teachers of math and science are not math and science majors but education majors who might

lack the expertise in delivering learning in this discipline. This paved way to several educational policies in the country to address this problem (Morales, Anito, Avilla, Abulon, & Palisoc, 2019).

The slow diffusion in the academic disciplines seen in Figure 2 can be attributed to the following problems seen in the previous years. Reasons for its slow diffusion are attributed to declined quality of education, non-affordability of education, government budget and education-job mismatch (Salihu, 2020). Meanwhile, Durban and Catalan (2012) discuss the main issues in the Philippine education system that leads to the decrease of enrollment population in some disciplines. One cause is the role of education in the national development in which education has been looked into as a means of alleviating poverty and uplifting the standard of living of the Filipino masses. However, data shows that seven out of 10 pupils who enrol in Grade 1, only seven finish the elementary curriculum, and from seven only three are able to complete the secondary curriculum, and from that number, only one completes tertiary education. Another is that the curriculum is not responsive to the basic needs of the country (Durban & Catalan, 2012). Many students have dropped out because of poverty and access to education. Lastly, the educational system does not receive much budget from the government which means that support is not enough (Lim, Lomer, & Millora, 2018).

Home economics, religion and theology, fine and applied arts and maritime enrollment have overtaken some of the other academic disciplines and have shown an improvement in diffusion rate. One of these is information technology, which is a core discipline in Industry 4.0. Developed countries appear to be the most frequent consumers of IT, followed by newly industrializing economies, and finally developing countries. Furthermore, IT investment directly increases labor productivity by increasing worker productivity, as well

as capital productivity by complementing other investments (Kraemer & Dedrick, 1994). In the Philippines, there is an increasing demand for automation in variety of industries, which will provide ample opportunities for software and services. The president's promotion of ease of doing business (Philippines - Information and Communications Technology | Export.Gov, 2019) adds to strengthening the main reason why information technology attracts a large number of students.

On the other hand, the establishment of museums and art exhibits has recently seen its higher growth. This development also paved way for the increase in the demand for fine arts as artworks from painters, sculptors and crafts increased its market. In addition, wealthy families collect artworks to embelish their houses and businesses. This is why the country's art market is booming, with the country ranking as the world's 20th art auction market in 2017, according to global auction sales. The country's significant increase in wealth and strategic position have fueled its rapid development (Jurado, 2018). This growth has inspired students who are interested in fine arts to pursue them.

The maritime industry is one of the high paying jobs in the country. It is one of the most attractive academic disciplines to pursue in college. The increase in the diffusion of enrollment in the maritime sector has been attributed to the current demands in the industry. In the year 2005, an alarming situation of theoretical shortage of marine officers surfaced in the industry. In order to address this shortage, government interventions were made to boost and promote maritime industry in the country (Baylon, 2011). With the implementation of these programs, an increase in the number of schools offering maritime courses surfaced. Coupled with the higher pay scale of the maritime practitioners and government support, there is no reason that the diffusion of maritime discipline would not bulge (Baylon, 2011).

Table 2.

Rate of Adoption 2008 and 2017

	Agents	2008	2017
1	Medical and Allied	20.34	93.44
2	Trade, Crafts and Industrial	14.97	91.59
3	General	11.66	75.79
4	Law and Jurisprudence	9.03	63.16
5	Mathematics	6.83	56.52
6	Engineering and Technology	6.70	52.97
7	Mass Communication and Documentation	6.50	65.03
8	Humanities	6.46	51.10
9	Information Technology	6.37	58.65
10	Home Economics	6.18	57.25
11	Business and Related	6.06	55.99
12	Social and Behavioral Sciences	5.81	50.45
13	Natural Sciences	5.70	49.96
14	Religion and Theology	5.61	57.99
15	Fine and Applied Arts	5.60	58.38
16	Architectural and Town Planning	4.41	42.98
17	Education and Teacher Training	4.40	41.68
18	Maritime	3.53	56.67

Table 2 shows several significant changes in the positioning of the academic disciplines based on the highest to lowest rate of adaption. Some disciplines exhibited significant increase in positioning while some have decreased. Table 3 summarizes these findings from the first ten fast adopters to the first ten top diffusive academic disciplines. The rate of adaption in the top adapters is determined through the extent of adaption in the beginning while the rate of diffusion is determined through how fast had it ballooned through the years.

Table 3.

Ranking of Academic Disciplines by Rate of Diffusion

Rank	Top Adapters	Top Diffusion Rates
1	Medical and Allied	Medical and Allied
2	Trade, Crafts and Industrial	Trade Crafts and Industrial
3	General	General
4	Law and Jurisprudence	Law and Jurisprudence
5	Mathematics	Information Technology
6	Engineering and Technology	Fine and Applied Arts
7	Mass Communication and Documentation	Religion and Theology
8	Humanities	Home Economics
9	Information Technology	Maritime
10	Home Economics	Mathematics
11	Business and Related	Mass Communication and Documentation
12	Social and Behavioral Sciences	Business and Related
13	Natural Sciences	Engineering and Technology
14	Religion and Theology	Humanities
15	Fine and Applied Arts	Social and Behavioral Sciences
16	Architectural and Town Planning	Natural Sciences
17	Education and Teacher Training	Architectural and Town Planning
18	Maritime	Education and Teacher Training

Table 3 shows the movement of places of the academic disciplines as reflected also in Figure 2. However, there are significant movements in some academic disciplines in either way. Table 4 highlights these movements.

Table 4.

Significant Movements of Academic Disciplines along the Diffusion Curve

Academic Discipline	Increase (steps)	Academic Discipline	Decrease (steps)
Maritime	9	Engineering and Technology	7
Fine and Applied Arts	9	Humanities	6
Religion and Theology	7	Math	5

Among all the disciplines, two academic disciplines exhibit an increase in diffusion. The diffusion of the maritime discipline, and fine and applied arts moved nine steps above its original position in 2008. It has overtaken eight disciplines in the process. While religion and theology has also moved seven steps higher overtaking six academic disciplines. Meanwhile, three disciplines also exhibited marked decrease in their positions. Engineering and technology moved seven steps down, humanities with six steps and mathematics with five steps.

Fine and applied arts, on the other hand, has increased its market worldwide because of the new trend in tourism particularly cultural heritage tourism. In line with such is the establishment of different kinds of museum, art exhibits and preservation of the arts. In 2017, the nation was ranked 20th in the world in terms of art auctions (Jurado, 2018). Art has become a primary investment in the country which leads tertiary students who have the inclination to do arts flock to this discipline. Lastly, many teenagers today enter the seminary, religious convent and other religious organizations. Data for jobs related to religion and theology is hard to find in the literature because work in this sector is not regarded as job, but of missionary work (Jurado, 2018). Work in religions in the Philippines like priests, deacons and

pastors are exempted from taxes and would enjoy donations from believers. These underlying reasons support why these three disciplines have an increase in diffusion and were able to overtake several disciplines.

The trend in the diffusion of the tertiary disciplines has been characterized by different factors like the high pay scale of the future job and the benefits that it would give in the future. These are the products of experiences and what the students have seen and experienced from people who are currently working in these specific trades. The rewards have become the pull factors for these academic disciplines to become highly diffusive. It has become the driving force of the population of students flocking to these disciplines.

The Current Industry's Demands

A mismatch has been cited from the data collected. This demonstrates that the country's need for industrial jobs is not being met by tertiary enrollment.

Table 5.

Job Matching Between Ten Demanded Jobs (2019) and Top Diffusive Academic Disciplines

Ten In Demand Jobs in 2019	Highly Diffused Academic Disciplines
BPO/ Call Center Agent	
Information Technology	Information Technology
Computer Software Engineer	
Law and Legal	Law and Jurisprudence
Architecture	Fine and Applied Arts
Accountant/Business/ Financial Management	
Medical Field	Medical and Allied
Engineering	
Marketing Consultant	
Writer	

Findings from the comparison in Table 5 shows that there are only four highly diffusive academic disciplines that corresponds to the demanded jobs in 2019. These are information technology, law and jurisprudence, fine and applied arts, and medical and allied. Six of these demanded jobs do not have a match in the highly diffusive academic discipline. Table 6 shows that the top diffusive academic disciplines that matched and did not match.

Table 6.

Matched and Mismatched Academic Disciplines

Matched Academic Disciplines	**Mismatched Academic Disciplines**
Information Technology	Trade, Craft and Industrial
Fine and Applied Arts	General
Law and Jurisprudence	Religion and Theology
Medical and Allied	Home Economics
	Maritime
	Mathematics

Based on Table 6, 60% of the top 10 highly diffusive academic disciplines do not match the needs of the industry. These are the trade, craft and industrial, general, religion and theology, home economics, maritime and mathematics. Such is a manifestation of a job mismatch in the Philippines as seen by several authors (Alejandre et al., 2015; Bringula Balcoba, & Basa , 2016; Cayetano Paderanga, 1989). Even with several government interventions to address the problem of the job mismatch in the Philippines, the problem still persists. The reason may be sourced from how student choose their careers, which does not depend on the industry needs but on the word of mouth and experiences of other people who have reaped great rewards in their chosen field as characterized by the Bass diffusion model.

In highly developed countries like Japan, educational system was decentralized and deregulated in order to answer the lag in their industrial development in the late 19th century (Muta, 2000). Muta described in his article that the government took overall control of the military, police and education. This endeavour had reaped its fruits in the past years as Japan's educational system has been envied by several developing nations. Japanese people had become highly efficient professionals and had quantum leaped in industrial development. The japan government had designed their educational system in such a way that would yield the best results. In an article by Barria (2014), there are several reasons why other countries envy Japan. One example is that their tertiary education has a very strict entrance exam that would require another strict exam if you shift courses. It also carries with it very stringent requirements and qualifications in every discipline. Choice of academic discipline to pursue is also influenced by the government. This transformation of Japan, however carries with it an enormous chunk in their national budget and the intervention was not put to vain.

Comparatively, the Philippines do not provide an enormous budget to its educational transformation, and policies crafted for education are not meaningful enough to address the recurrent problem of job mismatch in the country (Lim et al., 2018). This pressing problem has translated into the low status of the industrial development in the country. Such problem would persists and even progress, unless a significant turn will happen in the focus of the government and put emphasis on its educational system. The root cause may be traced from the tertiary academic discipline choice of students to the course to pursue in college which is influenced by peers. Employment mismatch is solely due to this behavioral preference. A decision that has the potential to have a significant effect on economic development. In

light of this debate, it is proposed that Philippine legislators and educators follow Japan's lead and introduce a similar intervention.

Conclusions and Recommendations

The objective of the study is to determine the highly diffusive academic disciplines in the Philippine tertiary education using the Bass diffusion model. Specifically, the investigation focused on identifying what academic disciplines are available for the industry sector, the rate of diffusion of these disciplines based on enrollee data, and if this data meet the current industry demands?

Apparently, the entire study proved that there is a job mismatch in the Philippines from the enrollment data taken from CHED. There are specific needs for jobs in the industry every year. These jobs are highly useful in answering the challenge of the country towards reaching economic development. Thus, a mismatch of the skills from the tertiary discipline have a very big impact on the country's industry performance. There is a rising growth in the Philippines but with decreasing investment (Huang & Bocchi, 2008). The manpower of the industry has seen to contribute to the current's unemployment and underemployment rate. This is a clear product of the mismatch.

Students entering in the tertiary education, who have based their selection on the experiences and word of mouth of the community, and not on the priority courses set by the government will certainly result to unemployment and under employment. These results have a strong impact to the economic development of the country. This is well supported by the data of enrollment and its incongruency with the needs of the Philippines. Thus, if the culture of the selection of a college discipline is based on a Bass Diffusion model

characterized by the word of mouth and national policies are not in place, job matching in the Philippines will continue to be problematic and will always be a contributor to our low industrial performance.

This analysis is restricted only to the data gathered from the year 2008 to 2017. This does not include the period after that stretch. A confirmatory study is recommended to make sure whether policies and expenditure allocations in the recent years have somehow reduced the difference between tertiary enrollment in higher education disciplines and the country's present needs in the industry.

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