

**THE SUPPLY OF AND DEMAND FOR
HIGHER EDUCATION GRADUATES IN THE
PHILIPPINES (DAVAO CATCHMENT AREA)
(1999-2005)**

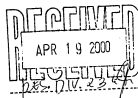
A CHED-COMMISSIONED RESEARCH

**An Executive Summary on Davao Catchment Area
Submitted to the
Commission on Higher Education (CHED)
DAP Building, San Miguel Avenue, Pasig City
PHILIPPINES**

by

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EXECUTIVE SUMMARY

In this micro level presentation of catchment area, the focus was in line with the thrust of the macro level presentation which focused on the supply-demand situation of graduates in the following disciplines: Engineering and Technology; Agriculture and Fisheries; Sciences and Mathematics; Business and Commerce; and Information Technology.

The study has the following objectives:

1. To determine the magnitude and flow of the supply of graduates from higher education institutions in Davao City in the following clusters of disciplines: Engineering and Technology; Agriculture and Fisheries; Sciences and Mathematics; Business and Commerce; and Information Technology;

2. To assess the quality of the supply of graduates provided by the country's higher education institutions (HEIs) in these clusters of disciplines through indirect measures such as: accreditation of institutions providing the training, licensure

examination results, educational qualification of faculty, admission requirements of students and criteria in hiring faculty;

3. To project the supply of graduates in these clusters of disciplines over a five-year period given past trends and data of graduates;

4. To determine demands for these graduates through indirect measures such as employment and labor statistics over the period;

5. To project these demands over a five-year period given the past trends and data of demand figures from establishments and industries;

6. To assess the gaps between the supply of and demand for higher education graduates in these disciplines through stock and flow analysis of graduates and supply-demand equilibrium.

This study made use of the survey and trend analysis types of descriptive research design. It considered a two-tier sampling cohorts: the supply sector and the demand sector.

The unit of analysis in the supply sector was collectively the HEIs, each with an enrolment of 2,000 or more on the assumption that their contribution to the labor market would be very substantial. The frame of reference was the collective HEIs located within the catchment area regardless of the type of institution. The identified program offerings considered to be the focal point of analyses in this study were the following: Engineering and Technology; Agriculture and Fishery; Business and Commerce; Science and Mathematics; and Information Technology.

The unit of analysis in the demand sector was the collective establishments or industries each with 100 or more employees during the period of investigation. The frame of reference was the collective establishments and industries located within the catchment area regardless of the type of industries. The types of industries considered to be the focal point of analyses in this study were the following: manufacturing, service, trading and agriculture.

The frequency and percentage were typically used in the analysis of data. The AR Model (Auto-Regressive) and the Geometric Growth Rate Model were used in the forecasting activity. Ratio was used in the Cohort Survival Analysis and the Stock-Demand Analysis of graduates in the labor market.

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SUMMARY OF FINDINGS

The Supply Sector

On the Quality of HEI Outputs. Most of the HEIs in Davao (62.5% to 87.5%) were not yet accredited. In both the national and regional (Region 11) levels, there was an over-all low passing percentage in government licensure examinations (34.3% and 32.31%, respectively). Among the types of institutions, SUCs had the highest board examination performance (52.4%). Barely a third of the total HEI faculty in Davao City were graduates of a Masteral Degree while a very negligible percentage (8.75%) were Doctoral Degree holders. Mathematics Qualifying Examinations and Personality Test as admission requirements for students in the higher education institutions in Davao City were not well subscribed by the cluster of disciplines in the study. However, all of the HEIs considered College Entrance Examination as an admission requirement for students seeking tertiary education. As to the hiring of faculty in the educational system, Teaching

Demonstration Skills and Proficiency in Written and Oral Communication were the most subscribed among the HEIs.

On the Quantity of HEI Outputs. The Business and Commerce cluster had consistently topped the enrolment of students despite its not being offered in SUCs. The attraction to Information Technology as a cluster, was seemingly very strong and very overwhelming. The Agriculture and Fisheries cluster seemed to be meeting its extinction very soon. As to the magnitude of graduates, Science and Mathematics as well as Engineering and Technology clusters were leading at 74.8% and 73.0%, respectively. Despite the huge magnitude of Business and Commerce enrollees, barely 3/5 of 4th year enrolment graduated. Rise in its magnitude of graduates. With the use of the geometric growth rate model, it is projected that enrolment in Information Technology can double its current size in 2.02 years while Science and Mathematics in 18.33 years. Engineering and Technology is showing a rapid negative dive in its magnitude of graduates. Science and Mathematics maintains an average

survival rate of 46.7%. On the otherhand, Engineering and Technology had topped the race with 78.1% cohort survival. The Business and Commerce and the Agriculture and Fisheries clusters did not even hit the 40% margin. Information Technology had the highest mortality rate of 76.6%. It had barely a fifth of its 1st year enrolment who were able to survive in the course. This is in contrast with the booming rise of enrolment in this cluster.

On the Incurred Expenditures in the Program. In Region 11, Engineering and Technology cluster was the most expensive program (P 33,974.92) while Agriculture and Fisheries cluster (P 22,283.50) was the cheapest. In the national level considering the 5 clusters of disciplines, Science and Mathematics cluster (P 51,305.10) was the most expensive program while Agriculture and Fisheries cluster (P 29,056.29) was the cheapest.

The Demand Sector

On the Labor Market-Scenario. Half of the workers in agriculture were in the Business and Commerce cluster while almost 3/5 in the Service industry were from the Engineering and Technology cluster. A high percentage of Information Technology workers (69.2%) were absorbed by the manufacturing industries. Three-fifths of the workers in the Trading industry were coming from the Business and Commerce and Information Technology clusters.

Manufacturing as an industry had accounted for about 57% of the total hired workers in Davao City while combining service and agriculture together had accounted barely a third of the total number of hired workers.

Among the industry types, Agriculture had the highest average intake rate of 86.9 while Trading (6.6) was at the tail-end. As to the attrition rate, Business and Commerce cluster had

an average of 62.75^{percent} with Agriculture gripping the highest turnover.

Among the tools used by the industries for the promotion of their employees, Performance and Work Attitude were the most typical choices; Professional Advancement and Seniority was considered their secondary choice.

The industries in Davao City could only afford a 10-14% increment from the basic pay of promoted employees.

On the Endorsed Programs. The most endorsed disciplines in the IT cluster were BS in Computer Science and BS in Information and Computer Science while BS in Accountancy and BS in Marketing were the most highly endorsed among the disciplines in the Business and Commerce cluster.

The disciplines in the Engineering and Technology cluster which were highly endorsed by industries were BS in Electrical Engineering and BS in Mechanical Engineering.

For the Agriculture and Fisheries cluster, the industries were endorsing the following courses: BS in Agriculture; BS in Agronomy and BS in Agricultural Husbandry/Agricultural Science. On the Demand for Higher Education Graduates. There was an overwhelming surplus of stocks of graduates from the Engineering cluster which was leading the race ($\bar{x} = 6,181$) which in turn was closely followed by Business and Commerce and the Science and Mathematics clusters ($\bar{x} = 5,606$ and $\bar{x} = 2,672$, respectively).

As to chances of employment, the Information technology cluster signaled the highest chance of employment (Ratio: 1:16) in the years to come as compared with the other cluster^{of} disciplines (Engineering = 1:67; Technology = 1:42; Business and Commerce = 7:100; Science and Mathematics = 3:1,000). The findings revealed that the graduates of the Business and Commerce and the Science and Mathematics clusters had the slimmest chance of employment. There was a decreasing

absorption of engineering graduates in Davao City in contrast with its increasing stocks of graduates ($S_r = 1.95\%$; $F_r = -7.1\%$).

In the Technology cluster, there was almost of the same rate of stocks and flow of graduates in the labor market ($S_r = 13.7\%$; $F_r = 13.9\%$). However, in terms of magnitude, there were enormous and uncontrollable stocks of graduates ready to be deployed in the labor market (1990-1994 = 129; 1995-1999 = 464).

The rate of stocks of graduates in the Business and Commerce cluster was 8 times faster than its rate of flow in the labor market ($S_r = 8.59\%$; $F_r = 1.05\%$).

The findings on the rate of flow of graduates in the labor market from the Science and Mathematics cluster was 3 times faster than its rate of stocks of graduates. This scenario was not supported by the 1994 UN Human Development Report which revealed that there were 1.3 R & D scientists and technicians in the Philippines per 10,000 individuals.

The rate of flow of graduates in Information Technology to the labor market was more than 3 times slower than its rate of stocks of graduates. This is not a robust sign of growth for both the labor market and HEIs.

Conclusions

The Supply Sector

On the Quality of HEI Outputs. A huge number of HEIs in Davao City had to be accredited by a recognized accrediting agency. The low passing mark in government licensure examinations is indicative of the graduates' unreadiness to respond to the demands of industries, especially in terms of the quality of the HEIs. The BS Degree holders dominated the stock of HEI faculty. If we desire quality, faculty development should be given a prime consideration. Although, all the HEIs adopted the giving of college entrance examination to college entrants, the following admission requirements were still undersubscribed:

Mathematics Qualifying Examination; Personality Test; English Qualifying Examination and Panel Interview.

Upgraded educational qualification and license/civil service eligibility were not the prime focus of HEIs in hiring their faculty.

On the Quantity of HEI Outputs. The Business and Commerce cluster was always loaded with enrollees. This is a reversal scenario with the Engineering and Technology cluster.

The Business and Commerce cluster graduated barely 3/5 of their 4th year enrolment in a 9-year period of observation. The Science and Mathematics and the Engineering and Technology clusters dominated the highest percentage of graduates from their 4th/5th year enrolment although the latter had shown a rapid negative dive on the magnitude of their graduates.

Engineering and Technology enrollees were able to survive in the program with a very gratifying cohort survival result. This result is in contrary to the Information Technology cluster.

On the Incurred Expenditures in the Program. In the national scene, the Science and Mathematics cluster was the most

expensive while the Agriculture and Fisheries was the cheapest. In the regional level, Engineering and Technology was the most expensive while Agriculture and Fisheries maintained its status as the cheapest program.

THE DEMAND SECTOR

On the Labor Market Scenario. A huge percentage of workers flocked in manufacturing industry. Agriculture, as an industry had been also responding to the deployment of HEI graduates. Quite a significant percentage of Information Technology graduates were absorbed by the manufacturing industries.

Fluidity in the Labor Market. Among the industries considered, agriculture had the highest average intake and attrition rates.

Adopted Quality Control to Employees. Performance and Work Attitude dominated the tools to be considered in the promotion of employees. The industries in Davao City could only afford a 10%-14% increment from the basic pay of promoted employees.

On the Endorsed Programs. Despite the low performance in the government licensure examinations, industries in Davao City still have the courage to endorse the following disciplines: a) Engineering and Technology cluster = BS Electrical Engineering and BS Mechanical Engineering; b) Agriculture and Fisheries cluster = BS Agriculture, BS Agronomy, and BS Agricultural Husbandry/Agricultural Science; c) Business and Commerce = BS Accountancy and BS Marketing; d) Information Technology cluster = BS Computer Science and BS Information and Computer Science.

On the Demand for Higher Education Graduates. There was an enormous magnitude of stocks of graduates which led to an overwhelming surplus of manpower resources. The Information Technology cluster had the highest chance of employment while the Science and Mathematics experienced the reverse. Engineering was the only cluster with a negative rate of flow in the labor market. The Technology cluster had almost of the

same rate of stock with its rate of flow of graduates although the flow magnitude was very minimal.

RECOMMENDATIONS

1. Since only a small magnitude of HEI programs were accredited, CHED can undergo a massive awareness campaign on the benefits and obligations of HEIs on program accreditation.

2. If performance in government licensure examinations ^{are} are indicative of quality outputs, then, there is a need to assess how valid and reliable the PRC testing materials are.

3. Since educational qualification of faculty was an indicator of quality outputs, then, there is a need to re-examine and assess the magnitude of faculty members who are to be retooled or to upgrade themselves educationally through in-service trainings, seminars, conferences both local and overseas levels.

4. Since a significant number of HEI graduates are mismatches or misfits in the labor market, HEIs should strictly adopt some quality control measures in their admission criteria during enrolment, during the students' incubation period when they are

officially enrolled in the institution and during the post incubation period when the students will have their practicum.

5. Since tertiary education is not accessible to all, there is a need to regulate the increase of tuition and other-related fees.

6. Since the findings revealed a non-equilibrium of the supply of and demand for higher education graduates in the labor market, there is a need to fully strengthen the bond between industrial sector and educational sector.

7. Since HEIs particularly the non-government institutions are diversifying and duplicating course offerings in other institutions, there is a need to redirect the focus of the institutions by reviewing their own vision, mission and goals.

8. Since new program offerings often attract and pull students, there is a need for CHED to identify the oversubscribed and undersubscribed programs to avoid clogging of students thus, possibly reduce the unnecessary wastage of financial resources.

9. Since parents had insufficient know-how on the highly demanded and less demanded programs, there is a need for

CHED and local government units with the cooperation of industrial locators to undergo a massive awareness campaign in the localities.

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Introduction

An oversupply of unwanted manpower does not only manifest a sluggish economic growth but also weakens the stability of wages as payment for labor because the workers are restricted to demand for higher return of their labor. Worst, this type of phenomenon can end up to a painful occurrence – the human wastage which is a dysfunction of development.

Because of the Philippine goal of becoming an industrialized country, there is a need to develop high-level manpower that will run our present and future industries. In 1993, the Cabinet Planning Sub-Committee on Education and Manpower Development noted an increasing mismatch between manpower supply and demand for tertiary education outputs brought about by the shift in skills

demand of the country's new industries and technology (1993 EDCOM Report, Vol. 3:6-7).

Over the years, institutions of higher learning have produced more graduates than the economy could absorb. As early as 1970, the Presidential Commission to Survey Philippine Education (PCSPE) reported that the aggregate output of graduates is much greater than market demand or market needs, thereby resulting in unemployment and underemployment of educated manpower. Thus, PCSPE predicted that given the strong demand for education, the trend will continue unless some measures are adopted for effecting a better balance between inputs of students into training programs and manpower needs for graduates of such programs. This scenario has been supported by the 1990 Employment Report which showed that the number of unemployed college graduates was 15 percent of the total number of unemployed members (2,032,000) of the labor force (Cited in 1993 EDCOM Report).

On the otherhand, an EDPITAF-commissioned study in 1980 claimed that there was an oversupply of engineering graduates. It is estimated that at a constant number of schools, the total number of graduates would grow approximately eight percent annually and that demand for engineers would grow at a lower rate of six percent annually. The said study concluded that there would be an increasing cumulative excess of engineering graduates over the years.

Similarly, in 1985 Mancebo, et al. (as cited in EDCOM Report, 1993) showed that for the period 1973-1982, there was a huge surplus of four-year degree graduates of agriculture and related sciences. They claimed that there was an oversupply of 70 percent over the demand. It was also noted in the said study that graduates ^{the} in field of ₁ agriculture and related sciences lacked both skills for and orientation towards production and development jobs in the rural areas.

The mismatch between manpower supply and the demands of industries is not limited to the number of graduates. There is also a mismatch of the competencies of the products of the education sector and the expectations of employers in the business/industry sector. From the experience of Sycip, Gorres and Velayo and company in 1990, they claimed that such mismatch has resulted in a training gap between the actual attributes of new graduates and the expectations of employers.

In 1989, Alburo, Paderanga, et al., argued that a great part of the mismatch problem could be a result of distorted structure of the economy. Thus, absorption of graduates by industries as an indicator of relevance of tertiary education could be conjunctural and structural. The former could be eliminated with appropriate monetary and fiscal policies while the latter is the large residual of underutilized labor traceable to the structure of the economy. The Philippine labor market is observed as largely

influenced by the industrial structure, which is described as dualistic and badly distorted.

In the face of conflicting employment policies of the government, as well as the absence of an employment plan, educational institutions aggravate^d the mismatch problem through indiscriminate acceptance of students into college. For example, private tertiary institutions might either expand their course offerings (demand-driven or merely a funding resource-generation course) or duplicate courses which are already offered by other tertiary institutions in the region just to continue their operation.

Is it possible to be experiencing the same trend on the supply of and demand for higher education graduates 2 or 3 decades ago? This can be responded in this study.

The Research Locale

Davao City, being a catchment area in this study has a land area of 2,211 km.² which registered .74% of the country's total land area. It has a population density of 455.3 persons/km.² with a sex ratio of 104.3 and a human development index of .613. It has a population growth rate of 2.72% with 44.6% incidence of poor population and an annual per capita poverty threshold of P 10,489.00 in 1997. In the same year, the unemployment rate was 6.6% (Singapore = 2.3%) with a registered 34.0% underemployment rate (1998 Phil. Statistical Yearbook).

The Davao Investment Promotion Center (DIPC) in Davao City was created to provide assistance to potential and actual investors. The center has a data banking facilities and services which provided potential investors information like socio-economic profile, industry studies and market information. With this package, potential joint

venture partners from Davao City and other areas of the EAGA polygon can be identified.

In 1995, exports from Davao city accounted for 65% of total exports in Region XI.

In this micro level presentation of catchment area, the focus was in line with the thrust of the macro level presentation which focused on the supply-demand situation of graduates in the following disciplines: Engineering and Technology; Agriculture and Fisheries; Sciences and Mathematics; Business and Commerce; and Information Technology.

Objectives

The study has the following objectives:

1. To determine the magnitude and flow of the supply of graduates from higher education institutions in Davao City in the following cluster of disciplines: Engineering and Technology; Agriculture and Fisheries; Sciences and

Mathematics; Business and Commerce; and Information Technology;

2. To assess the quality of the supply of graduates provided by the country's higher education institutions (HEIs) in these clusters of disciplines through indirect measures such as: accreditation of institutions providing the training, licensure examination results, educational qualification of faculty, admission requirements of students and criteria in hiring faculty;

3. To project the supply of graduates in these clusters of disciplines over a five-year period given past trends and data of graduates;

4. To determine demands for these graduates through indirect measures such as employment and labor statistics over the period;

5. To project these demands over a five-year period given the past trends and data of demand figures from establishments and industries;

6. To assess the gaps between the supply of and demand for higher education graduates in these disciplines through stock and flow analysis of graduates and supply-demand equilibrium.

Research Design and Methodology

Research Design. This study made use of the survey and trend analysis types of descriptive research design.

Sampling Design. This study considered a two-tier sampling cohorts: the supply sector and the demand sector.

1. **Supply Sector** - The unit of analysis in this sector was collectively the HEIs, each with an enrolment of 2,000 or more on the assumption that their contribution to the labor market would be very substantial. The frame of reference was the collective HEIs located within the catchment area regardless of the type of institution. The identified program offerings considered to be the

focal point of analyses in this study were the following: Engineering and Technology; Agriculture and Fishery; Business and Commerce; Science and Mathematics; and Information Technology.

2. Demand Sector. The unit of analysis in this sector was the collective establishments or industries each with 100 or more employees during the period of investigation.

The frame of reference was the collective establishments and industries located within the catchment area regardless of the type of industries. The types of industries considered to be the focal point of analyses in this study were the following: manufacturing, service, trading and agriculture.

The Statistical Tools

Frequency and percentage were typically used in the analysis of data. The AR Model (Auto-Regressive) and the Geometric Growth Rate Model were used in the forecasting

activity. Ratio was used in the Cohort Survival Analysis and the Stock-Demand Analysis of graduates in the labor market.

THE FINDINGS

The Supply Sector

1. On the Quality of HEI Output.

Accreditation of Schools. (Table 1)

Section 29 of the Education Act of 1982 encourages voluntary accreditation. Accreditation as defined by H. R. Kells means a voluntary, non-governmental process conducted by groups of peers to periodically hold one another accountable to achieve appropriate goals and to determine the extent to which they are meeting established standards. Accreditation is different from recognition in that the latter is a government assurance that minimum standards for institutional operation are met, while the former is a

voluntary process conducted by academic peers to ensure the academic quality of programs being offered.

A large percentage of HEIs (62.5 to 87.5%) which offered the cluster of disciplines in this study were not yet accredited. If accreditation is to be treated as a surrogate measure of quality of HEI outputs as well as an indicator of program offerings among HEIs, then, a good number of them will be advised to improve or worse, to cancel their permit to operate.

Percentage of Passing in Government Licensure Examinations. (Table 2)

A very low passing percentage in government licensure examinations was observed both in the national and regional levels (Phils.: 34.3%; Region XI: 32.31%). Of the 4 cluster of disciplines (Engineering and Technology, Agriculture and Fisheries, Business and Commerce and Sciences and Mathematics), the

highest percentage of passers in a 3-year period of observation in the national level was siphoned by Sciences and Mathematics (43.90%) while the lowest percentage was captured by the Business and Commerce cluster (15.36%). The same observation had been observed in the regional level (Science and Math.: 47.39%; Business and Commerce: 11.55%). Among the type of schools in the regional level, SUC had the highest passing rate (52.4%) while the non-sectarian had almost half the size of passers in state-owned schools. The said findings registered a negative atmosphere to the quality of HEI outputs. If percentage of passing in the licensure examinations is to be considered as an indicator of the quality of HEI outputs, then, a lot of these institutions will be advised to improve or worse to cancel their permit to offer such courses.

Educational Qualifications of Faculty. (Table 3)

More than half of the faculty were BS degree holders while a very negligible percentage (8.75%) were Doctorate degree holders. If this is to be equated with the quality of HEI outputs, then, there is a need to look into the educational qualifications of would-be applicants in the teaching positions of these institutions.

Admission Requirements of Students. (Table 4)

All of the HEIs had considered the giving of college entrance examination to college entrants as one of their criteria in accepting students. Quite a number of these HEIs also included grade point average in HS and medico-dental examination in their admission criteria. This result is an indication that the HEIs in Davao City are actually trimming down their college entrants perhaps to conform with quality of outputs. However, there were tertiary institutions, particularly the private institutions who were honest enough to

divulge to the research team that some of these criteria were not always followed.

Criteria in Hiring Faculty. (Table 5)

Hand in hand with the adoption of safety nets to quality education, the HEIs in Davao City had also set criteria in hiring their faculty. From the result of the study, it could be seen that they were more concerned on the teaching demonstration skills and proficiency in written and oral communication of would-be faculty than on their upgraded educational qualification or their being holders of license/civil service eligibility.

2. On the Quantity of HEI Outputs.

Magnitude of Enrolment. (Tables 6 & 7)

The Business and Commerce cluster had consistently topped the enrolment of students despite its non-offering in SUCs. This was closely followed by the Science and Mathematics cluster. Although Information Technology started with a very limited enrolment, its attraction to students was seemingly

very strong and very overwhelming. This is quite alarming because it might siphon a high percentage of students who are enrolled in other disciplines, thus, producing an enrolment vacuum to some of the disciplines. Agriculture and Fisheries cluster seemed to be meeting its extinction very soon. It is high time for the HEIs offering this cluster of discipline to be gearing towards a paradigm shift such as overhauling the curriculum or retooling of faculty to respond to the needs of time.

Magnitude of HEI Graduates. (Table 8)

The magnitude of graduates is considered a very significant indicator in any supply-demand study. This indicator can be used to measure the amount of stock of graduates to be deployed ^{inv} to the labor market.

In this study, the highest percentage of graduates in relation to 4th or 5th year enrolment was topped by Science and Mathematics and Engineering and

Technology clusters (74.8% and 73.0%, respectively).

The Business and Commerce cluster graduated barely 3/5 of their 4th year enrolment in a 9-year period of observation. Information Technology cluster, though very neophyte in the field had shown a positive rise in its number of graduates.

With the use of the geometric growth rate model, it is projected that it can double its current size in 2.02 years. With regards to Science and Mathematics cluster, it was showing a sluggish trend. It can double its size in 18.33 years. Something has to be done also to Engineering and Technology because it was showing a rapid negative dive in their number of graduates. It is suspected that some of their enrollees might have ^{been} siphoned by other clusters of disciplines. Hence, it might be producing a vacuum in the future. This observation has been confirmed by the EDPITAF-commissioned study in the 80s.

Cohort Survival Analysis of Enrolment. (Table 9)

Engineering & Technology has the highest cohort survival rate of 78.1% while Science and Mathematics maintains an average of 46.7%. Business and Commerce cluster is not far from agriculture and fishery cluster (38.2% and 37.4%, respectively).

Information Technology, on the otherhand had the highest mortality (76.6%). It had barely a fifth of its first year enrolment who survived in the course which is in contrast with the rising trend of enrolment in this cluster.

3. On the Incurred Expenditures in the Program.

The average program tuition fee simply means the total program tuition or matriculation paid by the student to the institution from the moment of initial enrolment until completion or graduation from the program (CHED Statistical Bulletin, AY1996-1997).

Regional Average Program Tuition Fee. (Tables 10 & 11)

In Davao City, the Engineering and Technology cluster registered the most expensive program (P33,974.91 for 1996-1997). This is in contrast with the national data in the same year which considered Science and Mathematics cluster as the most expensive program (P 51,305.10).

On the otherhand, Information Technology in the regional level was pegged at P 33,888.00. However, in the national level, the same cluster had registered an average program tuition fee of P 44,942.56.

Business and Commerce cluster and Science and Mathematics cluster had almost of the same amount in the regional level (P 27,732.00 and P 27,852.00, respectively).

In AY1996-1997, the third most expensive program in Region 11 was Business and Commerce. The same cluster of discipline was ranked number 4 in the

national level with P 36,594.67 average program tuition fee.

With the aforementioned results, it is suspected that tertiary education is not accessible to all. In this scenario, access to tertiary education seemed prohibitive to some pockets of the population. Hence, appropriate decision making had to be considered not only by parents who are to shoulder the financial burdens but also to educational policy makers who take charge on the needed policies to curtail unnecessary increases of tuition fees by owners or corporate stakeholders of private tertiary institutions.

THE DEMAND SECTOR

1. On the Labor Market Scenario.

The following indicators were considered to indicate a scenario in the labor market: magnitude of workers in industries and establishments; fluidity in the labor market; adopted quality control to employees; percentage

increment from basic pay; and company policies in filling-up vacancies.

Magnitude of Workers in Industries/Establishments. (Table 12). In 1999, the Engineering and Technology cluster had the most number of workers (3,471) which was followed closely by Information Technology (2,506). With almost twice the size of Information Technology was Business and Commerce.

Of the 4 industry types, the manufacturing type had registered the most number of workers which was shared by Engineering and Technology, Business and Commerce and Information Technology clusters (2,000, 428 and 1,733, respectively). Agriculture as an industry had responded 40% of the Business and Commerce cluster. On the otherhand, almost a third of the total size of the workers in the Business and Commerce cluster were in the manufacturing type.

From this result, it can be gleaned that manufacturing as an industry has accounted about 57% of

the hired workers in Davao City while combining service and agriculture together had accounted barely a third of the total number of hired workers in 1999 in the said catchment area.

The Engineering and Technology cluster had the highest magnitude of hired workers (47.33%) with less than half of this size generated from Business and Commerce (1,346 or 18.36%).

With this scenario, there seemed to have a contrast on the findings relating to the magnitude of graduates in HEIs. There are more Business and Commerce graduates as compared to Engineering and Technology graduates.

With this findings, there is a need for a more in-depth study on the occurring imbalances in the labor market and the HEI demand-driven or funding-generation programs.

Fluidity in the Labor Market. (Tables 13 & 14)

In this study, the intake and attrition rate in the labor market were treated as indicators of fluidity. For more than a decade of observation, the Business and Commerce

cluster registered an average intake rate of 84.6 with agriculture getting the highest record of 245.7. For Information Technology cluster, it claimed an average of 5.88 with agriculture topping the industry types.

Among the industry types, agriculture had the highest average intake rate of 86.9 while trading (6.6) is at the tail-end. This is not surprising because of the presence of many labor-intensive agri-business and agriculture-related industries in the area.

As to the attrition rate, Business and Commerce cluster had an average of 62.75 with Agriculture getting the highest turn-over. Information Technology registered a very negligible figure. This is possible because this cluster of discipline is still very young and fragile in the labor market.

Adopted Quality Control to Employees. (Table 15)

Tools for promotion, company policies in filling-up vacancies, and percentage increment in the basic pay of

promoted employees were used in the study to measure quality control.

Among the tools used by the industries/establishments in Davao City for the promotion of their employees, Performance and Work Attitude were the most typical choices. Professional Advancement and Seniority were their secondary choices. These findings simply justify the need for establishments or industries to shell out some motivational remunerations to their employees who were showing a strong and convincing commitment on their assigned tasks.

Company Policies in Filling-up Vacancies. (Table 16)

Almost all of the industries considered the "next-in-rank" policy to fill up vacancies. Best qualified candidate and preference of insiders were the next choice. These policies can motivate ordinary employees to be always at their best.

Percentage Increment from Basic Pay. (Table 18)

A 10-14% increment from the basic pay of promoted employees was the most typical response of the establishments/industries. This is rather a very dismal scenario in the labor market. The country's economic fiasco paralleled with the unstable peace and order situation in Region 11 could possibly account for the marginal remunerations afforded by industries to their employees.

2. On the Endorsed Programs from Industries. (Table 17)

The most endorsed courses in the Information Technology cluster were BS in Computer Science and BS in Information and Computer Science. In the Business and Commerce cluster, the industries in Davao City were more convinced to allow the offering of BS in Accountancy and BS in Marketing. Among the courses in the Engineering and Technology cluster which were highly endorsed by industries were BS in Electrical Engineering and BS in

Mechanical Engineering. For the Agriculture and Fishery cluster, the industries were endorsing the following courses: BS in Agriculture, BS in Agronomy and BS in Agricultural Husbandry/Agricultural Science.

3. On the Demand for Higher Education Graduates

Stock and Flow Analysis of Graduates. (Table 18)

For a 20-year period of observation, the findings showed an overwhelming surplus of stocks of graduates with Engineering cluster leading the race ($\bar{x} = 6,181$). This trend was closely followed by Business and Commerce cluster and Science and Mathematics ($\bar{x} = 5,606$ and $\bar{x} = 2,672$, respectively).

As to chances of employment, the Information Technology cluster signaled a highest chance of employment (Ratio: 1:16) in the years to come as compared with the other clusters of disciplines (Engineering - 1:67; Technology - 1:42; Business and Commerce - 7:100; Science and Mathematics - 3:1,000). The findings revealed that graduates in the clusters Business and Commerce and

Science and Mathematics had the slimmest chance to be employed.

Supply-Demand Equilibrium. (Table 18)

The supply-demand equilibrium analysis can also be considered an indicator to measure the mobility of graduates in the labor market.

Comparing the rate of stocks of graduates and their rate of flow in the labor market can somehow satisfy the argument relating to the supply-demand equilibrium analysis. The following findings were noted:

Engineering Cluster. In a 10-year period of observation (1990-1999), it was revealed that there was a decreasing absorption of Engineering graduates in Davao City in contrast with its increasing stocks of graduates in the said cluster of disciplines ($S_r = 1.95\%$; $F_r = -7.1\%$).

Technology Cluster. There was almost of the same rate of stocks and flow of graduates in Technology in the labor market ($S_r = 13.7\%$; $F_r = 13.9\%$). However, in terms of magnitude, there was an overwhelming and uncontrollable

stocks of graduates ready to be deployed in the labor market.

Business & Commerce. The findings showed that the rate of stocks of graduates was 8 times faster than the rate of flow in the labor market ($S_r = 8.59\%$; $F_r = 1.05\%$). This scenario supports the idea that there is a need to scrutinize and assess the disciplines in this cluster. The rise in the stocks of graduates was much faster than their rate of absorption in the labor market.

Sciences & Mathematics. The findings showed that the rate of flow of graduates in the labor market was 3 times faster than the rate of stocks of graduates. However, the chance to be employed is very nil (3:1000). This scenario seemed to give a reversal picture with the findings in the 1994 UN Human Development Report. The said report revealed that there were 1.3 R & D scientists and technicians in the Philippines per 10,000 individuals (1994 UN Human Development Report). It is also possible that a great bulk of the science and mathematics graduates in

Region 11 were not so dependent on the domestic labor market.

Information Technology. The rate of flow of graduates in information technology in the labor market was more than 3 times lesser than the rate of stocks of graduates ($S_r = 14.02\%$; $F_r = 4.3\%$). This findings simply implied that the rate of absorption of graduates were more sluggish than the rate of increase in the magnitude of graduates. If this trend will not be responded early, it is suspected that there might be more unemployed and underemployed graduates in the years to come. This is not a robust sign of growth for both the labor market and HEIs.

SUMMARY OF FINDINGS

The Supply Sector

On the Quality of HEI Outputs

- 1. Most of the HEIs in Davao (62.5% to 87.5%) were not yet accredited.**
- 2. In both the national and regional (Region 11) levels, there was an over-all low passing percentage in government licensure examinations (34.3% and 32.31%, respectively). Among the types of institutions, SUCs had the highest board examination performance (52.4%).**
- 3. Barely a third of the total HEI faculty in Davao City were graduates of a Masteral Degree while a very negligible percentage (8.75%) were Doctoral Degree holders.**
- 4. Mathematics Qualifying Examinations and Personality Test as admission requirements for students in the higher education institutions in Davao City were not well subscribed by the cluster of disciplines in the study. However, all of the HEIs considered College Entrance**

Examination as an admission requirement for students seeking tertiary education.

5. As to the hiring of faculty in the educational system, Teaching Demonstration Skills and Proficiency in Written and Oral Communication were the most subscribed among the HEIs.

On the Quantity of HEI Outputs

1. The Business and Commerce cluster had consistently topped the enrolment of students despite its not being offered in SUCs. The attraction to Information Technology as a cluster, was seemingly very strong and very overwhelming. The Agriculture and Fisheries cluster seemed to be meeting its extinction very soon.

2. As to the magnitude of graduates, Science and Mathematics as well as Engineering and Technology clusters were leading at 74.8% and 73.0%, respectively. Despite the huge magnitude of Business and Commerce enrollees, barely 3/5 of 4th year enrolment graduated.

Information Technology had shown a positive rise in its magnitude of graduates.

3. With the use of the geometric growth rate model, it is projected that enrolment in Information Technology can double its current size in 2.02 years while Science and Mathematics in 18.33 years.

4. Engineering and Technology is showing a rapid negative dive in its magnitude of graduates.

4. Science and Mathematics maintains an average survival rate of 46.7%. On the otherhand, Engineering and Technology had topped the race with 78.1% cohort survival. The Business and Commerce and the Agriculture and Fisheries clusters did not even hit the 40% margin.

6. Information Technology had the highest mortality rate of 76.6%. It had barely a fifth of its 1st year enrolment who were able to survive in the course. This is in contrast with the booming rise of enrolment in this cluster.

On the Incurred Expenditures in the Program

1. In Region 11, Engineering and Technology cluster was the most expensive program (P 33,974.92) while Agriculture and Fisheries cluster (P 22,283.50) was the cheapest.
2. In the national level considering the 5 clusters of disciplines, Science and Mathematics cluster (P 51,305.10) was the most expensive program while Agriculture and Fisheries cluster (P 29,056.29) was the cheapest.

The Demand Sector

On the Labor Market Scenario

1. In 1999, the Engineering and Technology and the Information Technology clusters had the most number of workers in the manufacturing industry (3,471 and 2,506, respectively).

2. Almost a third of the total size of the workers in the Business and Commerce cluster were in the manufacturing type.

3. Agriculture as an industry had responded 40% to the Business and Commerce cluster's graduates.

4. Almost a third of the total size of the workers in the Business and Commerce cluster were in the manufacturing industry.

5. Half of the workers in agriculture were in the Business and Commerce cluster while almost 3/5 in the Service industry were from the Engineering and Technology cluster.

6. A high percentage of Information Technology workers (69.2%) were absorbed by the manufacturing industries.

7. Three-fifths of the workers in the Trading industry were coming from the Business and Commerce and Information Technology clusters.

8. Manufacturing as an industry had accounted for about 57% of the total hired workers in Davao City while

combining service and agriculture together had accounted barely a third of the total number of hired workers.

9. Among the industry types, Agriculture had the highest average intake rate of 86.9 while Trading (6.6) was at the tail-end.

10. As to the attrition rate, Business and Commerce cluster had an average of 62.75 with Agriculture gripping the highest turn-over.

11. Among the tools used by the industries for the promotion of their employees, Performance and Work Attitude were the most typical choices; Professional Advancement and Seniority was considered their secondary choice.

12. The industries in Davao City could only afford a 10-14% increment from the basic pay of promoted employees.

On the Endorsed Programs

1. The most endorsed disciplines in the IT cluster were BS in Computer Science and BS in Information and Computer Science while BS in Accountancy and BS in Marketing were the most highly endorsed among the disciplines in the Business and Commerce cluster.
 2. The disciplines in the Engineering and Technology cluster which were highly endorsed by industries were BS in Electrical Engineering and BS in Mechanical Engineering.
 3. For the Agriculture and Fisheries cluster, the industries were endorsing the following courses: BS in Agriculture; BS in Agronomy and BS in Agricultural Husbandry/Agricultural Science.
3. **On the Demand for Higher Education Graduates**
1. There was an overwhelming surplus of stocks of graduates from the Engineering cluster which was leading the race ($\bar{x}= 6,181$) which in turn was closely followed by Business and Commerce and the Science and Mathematics clusters ($\bar{x}=5,606$ and $\bar{x}= 2,672$, respectively).

2. As to chances of employment, the Information technology cluster signaled the highest chance of employment (Ratio: 1:16) in the years to come as compared with the other cluster of disciplines (Engineering = 1:67; Technology = 1:42; Business and Commerce = 7:100; Science and Mathematics = 3:1,000).

3. The findings revealed that the graduates of the Business and Commerce and the Science and Mathematics clusters had the slimmest chance of employment.

4. There was a decreasing absorption of engineering graduates in Davao City in contrast with its increasing stocks of graduates ($S_r = 1.95\%$; $F_r = -7.1\%$).

5. In the Technology cluster, there was almost of the same rate of stocks and flow of graduates in the labor market ($S_r = 13.7\%$; $F_r = 13.9\%$). However, in terms of magnitude, there were enormous and uncontrollable stocks of graduates ready to be deployed in the labor market (1990-1994 = 129; 1995-1999 = 464) .

6. The rate of stocks of graduates in the Business and Commerce cluster was 8 times faster than its rate of flow in the labor market ($S_r = 8.59\%$; $F_r = 1.05\%$).

7. The findings on the rate of flow of graduates in the labor market from the Science and Mathematics cluster was 3 times faster than its rate of stocks of graduates. This scenario was not supported by the 1994 UN Human Development Report which revealed that there were 1.3 R & D scientists and technicians in the Philippines per 10,000 individuals.

8. The rate of flow of graduates in Information Technology to the labor market was more than 3 times slower than its rate of stocks of graduates. This is not a robust sign of growth for both the labor market and HEIs.

Conclusions

The Supply Sector

1. On the Quality of HEI Outputs

Accreditation of Schools. A huge number of HEIs in Davao City had to be accredited by a recognized accrediting agency.

Percentage of Passing in Government Licensure Examinations. The low passing mark in government licensure examinations is indicative of the graduates' unreadiness to respond to the demands of industries, especially in terms of the quality of the HEIs.

Educational Qualification of Faculty. The BS Degree holders dominated the stock of HEI faculty. If we desire quality, faculty development should be given a prime consideration.

Admission Requirements of Students. Although, all the HEIs adopted the giving of college entrance examination to

college entrants, the following admission requirements were still undersubscribed: Mathematics Qualifying Examination; Personality Test; English Qualifying Examination and Panel Interview.

Criteria in Hiring Faculty. Upgraded educational qualification and license/civil service eligibility were not the prime focus of HEIs in hiring their faculty.

2. On the Quantity of HEI Outputs

Magnitude of Enrolment. The Business and Commerce cluster was always loaded with enrollees. This is a reversal scenario with the Engineering and Technology cluster.

Magnitude of Graduates. The Business and Commerce cluster graduated barely 3/5 of their 4th year enrolment in a 9-year period of observation. The Science and Mathematics and the Engineering and Technology clusters dominated the highest percentage of graduates from their 4th/5th year enrolment although the latter had shown a rapid negative dive on the magnitude of their graduates.

Cohort Survival Analysis of Enrolment. **Engineering and Technology** enrolees were able to survive in the program with a very gratifying cohort survival result. This result is in contrary to the Information Technology cluster.

3. **On the Incurred Expenditures in the Program.** In the national scene, the Science and Mathematics cluster was the most expensive while the Agriculture and Fisheries was the cheapest. In the regional level, Engineering and Technology was the most expensive while Agriculture and Fisheries maintained its status as the cheapest program.

THE DEMAND SECTOR

1. **On the Labor Market Scenario.** A huge percentage of workers flocked in manufacturing industry. Agriculture, as an industry had been also responding to the deployment of HEI graduates. Quite a significant percentage of Information Technology graduates were absorbed by the manufacturing industries.

2. Fluidity in the Labor Market. Among the industries considered, agriculture had the highest average intake and attrition rates.

3. Adopted Quality Control to Employees. Performance and Work Attitude dominated the tools to be considered in the promotion of employees. The industries in Davao City could only afford a 10%-14% increment from the basic pay of promoted employees.

4. On the Endorsed Programs. Despite the low performance in the government licensure examinations, industries in Davao City still have the courage to endorse the following disciplines: a) Engineering and Technology cluster = BS Electrical Engineering and BS Mechanical Engineering; b) Agriculture and Fisheries cluster = BS Agriculture, BS Agronomy, and BS Agricultural Husbandry/Agricultural Science; c) Business and Commerce = BS Accountancy and BS Marketing; d) Information Technology cluster = BS Computer Science and BS Information and Computer Science.

5. On the Demand for Higher Education Graduates. There was an enormous magnitude of stocks of graduates which led to an overwhelming surplus of manpower resources. The Information Technology cluster had the highest chance of employment while the Science and Mathematics experienced the reverse. Engineering was the only cluster with a negative rate of flow in the labor market. The Technology cluster had almost of the same rate of stock with its rate of flow of graduates although the flow magnitude was very minimal.

RECOMMENDATIONS

1. Since only a small magnitude of HEI programs were accredited, CHED can undergo a massive awareness campaign on the benefits and obligations of program accreditation.
2. If performance in government licensure examinations are indicative of quality outputs, then, there is a need

to assess how valid and reliable the PRC testing materials are.

3. Since educational qualification of faculty was an indicator of quality outputs, then, there is a need to re-examine and assess the magnitude of faculty members who are to be retooled or to upgrade themselves educationally through in-service trainings, seminars, conferences both local and overseas levels.
4. Since a significant number of HEI graduates are mismatches or misfits in the labor market, HEIs should strictly adopt some quality control measures in their admission criteria during enrolment, during the students' incubation period when they are officially enrolled in the institution and during the post incubation period when the students will have their practicum.
5. Since tertiary education is not accessible to all, there is a need to regulate the increase of tuition and other-related fees.

6. Since the findings revealed a non-equilibrium of the supply of and demand for higher education graduates in the labor market, there is a need to fully strengthen the bond between industrial sector and educational sector.
7. Since HEIs particularly the non-government institutions are diversifying and duplicating course offerings in other institutions, there is a need to redirect the focus of the institutions by reviewing their own vision, mission and goals.
8. Since new program offerings often attract and pull students, there is a need for CHED to identify the oversubscribed and undersubscribed programs to avoid clogging of students thus, possibly reduce the unnecessary wastage of financial resources.
9. Since parents had insufficient know-how on the highly demanded and less demanded programs, there is a need for CHED and local government units with the cooperation of industrial locators to undergo a massive awareness campaign.

APPENDICES

1. On the Quality of Higher Education Outputs
 - 1.1 Accreditation of Schools
 - 1.2 Percentage of Passing in Government Licensure Examination
 - 1.3 Educational Qualification of Faculty
 - 1.4 Admission Requirements in Higher Education
 - 1.5 Criteria in Hiring Faculty

Table 1. Level of Program Accreditation by School Classification and by Accrediting Body

Indicators	Total	Sectarian	Non-Sectarian	SUC
Engineering & Technology				
Level of Program Accreditation				
Level 4				
Level 3	1	1		
Level 2				
Level 1				
None				
Accrediting Body				
AACUP				
PACUCOA				
ASCSC				
PAASCU	1	1		
Agriculture & Fisheries				
Level of Program Accreditation				
Level 4				
Level 3				
Level 2	2		2	
Level 1	1			1
None	1			1
Accrediting Body				
AACUP	1			1
PACUCOA				
ASCSC				
PAASCU	2		2	
Business & Commerce				
Level of Program Accreditation				
Level 4				
Level 3				
Level 2	1		1	
Level 1	1	1		
None	4	1	3	
Accrediting Body				
AACUP				
PACUCOA	1		1	
ASCSC				
PAASCU				
Science & Mathematics				
Level of Program Accreditation				
Level 4				
Level 3	1	1		
Level 2				
Level 1				
None	5	1	3	1
Accrediting Body				
AACUP				
PACUCOA	1	1		
ASCSC				
PAASCU				
Information Technology				
Level of Program Accreditation				
Level 4				
Level 3	2	1		1
Level 2	1	1		
Level 1				
None				
Accrediting Body				
AACUP	1			1
PACUCOA	1		1	
ASCSC				
PAASCU	1	1		

Table 2. National Percentage Passing in Gov't. Licensure Examination by Cluster of Disciplines

Year	Total		Engineering & Technology		Agriculture & Fisheries		Business & Commerce		Science & Mathematics	
	Examinees	Passers	Passers	%	Passers	%	Passers	%	Passers	%
1994	54,909	18,909	8,380	36.9	9,025	40.92	1,371	14.76%	133	50.19%
1995	65,014	22,995	10,263	35.5	11,513	40.91	1,083	14.15%	136	40.24%
1996	65,638	21,560	10,343	35.0	9,639	35.11	1,427	17.18%	151	41.26%
Over-All Average	61,655	21,154.7 (34.3%)	9,662	35.8	10,059	38.98	1,293.7	15.36%	140	43.90%

Table 2-A. Regional Percentage Passing in Government licensure Examination by Cluster of Disciplines

School Classification	Total		Eng'g. & Technology		Agr. & Fisheries		Bus. & Commerce		Science & Math.	
	Examinees	Passers	Passers	%	Passers	%	Passers	%	Passers	%
SUC	848	444	318	62.23	117	54.93	9	7.26	0	0
Sectarian	3,447	1,304	554	47.39	0	0	205	14.46	545	63.37
Non-Sectarian	5,460	1,404	1,155	28.15	63	35.00	50	6.72	136	31.41
Average	3,251.7	1,050.7	675.67	45.92	90	44.97	88	11.55	340.5	47.39

Table 3. Educational Qualification of Faculty by Cluster of Disciplines

Educational Qualification	Total		Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology
	n	%				
Doctorate Degree Holder	28	8.75	20	0	8	0
Master's Degree Holder	113	35.31	12	50	38	13
BS Degree Holder	179	55.94	7	102	45	25
Total	320	100%	49	152	91	38

Table 4. Admission Requirements by Cluster of Disciplines

Admission Requirements	Eng'g. & Technology	Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Total	Rank
College Entrance Examination	2	4	6	5	3	20	1
IQ Test	5	1	3	3	2	14	5
Mathematics Qualifying Examination	1	0	1	1	1	4	8.5
English Qualifying Examination	2	0	3	1	2	8	7
Aptitude Test	6	0	4	4	1	15	4
Grade Point Average in HS	3	5	5	3	2	18	2.5
Panel Interview	4	3	1	3	0	11	6
Medico-Dental Examination	3	3	2	10	0	18	2.5
Personality Test	1	0	1	2	0	4	8.5

Table 5. Adopted Criteria for Hiring Faculty by Cluster of Disciplines

Criteria for Hiring	Eng'g. & Technology	Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Total	Rank
At least a master's degree holder	2	1	6	2	2	13	7
Proficient in written & oral communication	6	4	6	5	3	24	2
Teaching Demonstration Skills	7	6	5	5	3	26	1
Psychological/Personality Profile	2	4	4	4	3	17	6
BS with master's units in the discipline	4	3	5	4	3	19	4
License/Civil Service Eligibility	4	5	4	2	1	21	3
Teaching Aptitude	5	1	6	5	3	20	5

2. On the Quantity of Higher Education Outputs

2.1 Enrolment of Students

2.2 Magnitude of Higher Education Graduates

2.3 Cohort Survival Analysis of Enrolment

Table 6. Student Population by School Classification and by Cluster of Disciplines (1998-1999)

School Classification	Total		Engineering & Tech.		Agriculture & Fisheries		Business & Commerce		Science & Mathematics		Information Technology	
	n	%	n	%	n	%	n	%	n	%	n	%
SUC	3,214	7.3	1,279	17.6	1,038	83.4	0	0	758	25.2	232	2.0
Sectarian	8,232	18.7	1,754	24.0	0	0	1,553	7.7	1,059	35.2	3,866	33.3
Non-Sectarian	32,508	74.0	4,249	58.4	206	16.6	18,609	92.3	1,190	39.6	7,520	64.7
Total	43,954	100.0	7,282	100.0	1,244	100.0	20,162	100.0	3,007	100.0	11,618	100.0

Table 7. Enrolment of Students by Cluster of Disciplines

Academic Year	Engineering & Technology	Agriculture & Fisheries	Business & Commerce	Science & Mathematics	Information Technology
1990-1991	274	1,212	8,466	3,028	324
1991-1992	273	1,401	8,421	2,994	524
1992-1993	320	1,723	8,571	3,828	502
1993-1994	461	1,555	9,639	4,143	682
1994-1995	552	1,772	11,247	3,954	931
1995-1996	653	1,708	15,018	3,195	1,341
1996-1997	694	1,683	16,824	3,221	1,853
1997-1998	680	1,691	18,224	3,022	2,446
1998-1999	603	1,690	20,207	2,847	2,564
1999-2000*	592	1,116	22,622	3,065	2,981
2000-2001*	592	1,077	25,317	3,192	3,436
2001-2002*	589	1,072	28,325	3,266	3,933
2002-2003*	599	1,082	31,682	3,309	4,475
2003-2004*	605	1,088	35,429	3,334	5,067
2004-2005*	610	1,093	39,611	3,349	5,713

Table 8. Number of Graduates by Cluster of Disciplines

Academic Year	Total	Eng'g. & Tech. ²		Agr. & Fisheries ¹		Business & Commerce ¹		Science & Mathematics ¹		Information Technology ¹	
1990-1991	2,549	1,350	67.5	38	32.8	688	48.0	467	71.8	6	46.2
1991-1992	3,328	1,465	62.2	20	17.2	1,181	76.6	653	86.5	9	47.4
1992-1993	3,759	2,198	73.4	55	49.5	1,019	64.7	476	71.4	11	36.7
1993-1994	4,060	2,641	76.7	43	32.2	908	45.2	434	68.6	34	38.2
1994-1995	4,408	2,863	83.1	75	43.6	959	51.8	471	64.2	40	32.0
1995-1996	4,498	2,632	82.7	93	45.8	1,153	57.0	558	86.4	62	36.3
1996-1997	4,767	1,869	69.7	120	65.6	2,108	67.3	563	70.9	107	48.0
1997-1998	4,139	1,392	67.5	107	67.7	2,011	63.4	521	69.5	108	30.6
1998-1999	4,719	1,460	74.3	95	51.9	2,422	56.9	567	83.5	175	32.1
1999-2000*	4,671	1,347	83.2	90	52.0	2,526	65.8	525	81.5	183	47.3
2000-2007*	4,445	1,004	82.3	84	60.0	2,620	73.0	502	77.6	235	47.3
2001-2002*	4,376	998	91.8	63	50.0	2,705	78.9	423	66.7	187	47.1
2002-2003*	4,316	785	76.2	54	42.2	2,782	84.0	497	72.9	198	47.4
2003-2004*	4,637	1,017	91.0	55	43.0	2,852	88.4	506	73.7	207	47.3
2004-2005*	4,663	952	85.2	55	42.6	2,915	92.2	524	74.6	216	47.2

Legend: 1 = % from 4th year enrolment2 = % from 5th year enrolment

Table 9. Cohort Survival Analysis of Enrolment by Cluster of Discipline

Academic Year	Engineering & Technology			Agriculture & Fisheries			Business & Commerce			Science & Mathematics			Information Technology		
	1 st Yr	Grad	%	1 st Yr	Grad	%	1 st Yr	Grad	%	1 st Yr	Grad	%	1 st Yr	Grad	%
1986 - 1990	334	320	95.8	180	117	65.0	882	642	72.8	709	245	34.6	35	5	14.3
1987 - 1991	321	297	92.5	172	170	98.8	760	688	90.5	924	332	35.9	66	6	9.1
1988 - 1992	305	299	98.0	257	217	84.4	863	781	90.5	866	235	27.1	60	9	15.0
1989 - 1993	302	290	96.0	255	252	98.8	2,933	1,019	34.7	906	314	34.7	103	11	10.7
1990 - 1994	2,573	2,200	85.5	444	63	14.2	2,674	908	31.6	996	467	46.9	122	34	27.9
1991 - 1995	3,540	2,950	83.3	545	105	19.3	2,986	959	32.1	969	653	67.4	210	40	19.0
1992 - 1996	3,378	2,860	84.7	559	204	36.5	3,124	1,153	36.9	1,448	476	32.9	201	62	30.8
1993 - 1997	3,598	2,792	77.6	345	16	4.6	3,526	2,108	59.8	1,541	434	28.2	262	107	40.8
1994 - 1998	2,701	1,632	60.4	469	162	34.5	4,604	2,011	43.7	1,129	471	41.7	467	108	23.1
1995 - 1999	2,412	1,512	62.7	443	116	26.2	6,008	2,422	40.3	864	558	64.6	616	175	28.4
1996 - 2000	2,306	1,851	80.3	450	115	25.6	6,125	1,536	25.1	793	563	71.0	830	183	22.0
1997 - 2001*	3,660	2,534	69.2	368	89	24.2	6,741	1,545	22.9	771	521	67.6	1,078	235	21.8
1998 - 2002*	2,811	2,000	71.1	351	136	38.7	6,210	1,551	25.0	817	567	69.4	823	187	22.7
1999 - 2003*	2,394	1,762	73.6	387	133	34.4	6,149	1,556	25.3	916	525	57.3	868	198	22.8
2000 - 2004*	2,042	1,410	69.0	396	131	33.1	6,087	1,559	25.6	962	502	52.2	911	207	22.7
2001 - 2005*	1,756	982	55.9	399	129	32.3	6,023	1,561	25.9	993	423	42.6	953	216	22.7
Ave. Survival Rate**	1,979	1,546	78.1	374	140	37.4	3,931	1,101	38.2	975	455	46.7	475	111	23.4

Legend: * - Projected (Auto-Regression Model)

** - 1986 - 1990 to 1996 - 2000 cohorts

3. On the Incurred **Expenditures** in Higher Education
 - 3.1 National Average Program Tuition Fee
 - 3.2 Regional Average Program Tuition Fee

Table 10. National Average Program Tuition Fee by Cluster of Disciplines

Cluster of Disciplines	1996-97		1999-2000*	
Engineering & Tech.	P	39,360.74	P	59,041.11
Agriculture & Fisheries		29,056.29		43,584.44
Business & Commerce		36,594.67		54,897.62
Science & Mathematics		51,305.10		76,957.65
Information Technology		44,942.56		67,413.84
Over-all Average	P	40,103.35	P	60,155.96

Legend: * = Basis for Computation (Foreign Exchange Rate) 1996: \$1 = P 26.00
 1999: \$1 = P 39.00

Source: CHED Statistical Bulletin, AY1996-1997

Table 11. Regional Average Program Tuition Fee by Cluster of Disciplines

Cluster of Disciplines	1996-97		1999-2000*	
Engineering & Tech.	P	33,974.92	P	50,962.38
Agriculture & Fisheries		22,283.50		33,425.25
Business & Commerce		27,732.00		41,598.00
Science & Mathematics		27,852.00		41,778.00
Information Technology		33,888.00		50,832.00
Over-all Average	P	29,950.89	P	44,926.33

Legend: * = Basis for Computation (Foreign Exchange Rate) 1996: \$1 = P 26.00
 1999: \$1 = P 39.00

4. On the **Labor Market** Scenario
 - 4.1 Number of Employees by Industry type
 - 4.2 Fluidity in the Labor Market
 - 4.2.1 Average Intake Rate by Industry Type
 - 4.2.2 Average Attrition Rate by Industry Type
 - 4.3 Adopted Quality Control to Employees
 - 4.3.1 Tools for Promotion
 - 4.3.2 Company Policies in Filling-Up Vacancies
 - 4.3.3 Percentage Increment from Basic Pay

Table 12. Percentage Distribution of Employees by Industry Type and by Cluster of Disciplines (1999)

Industry Type	Total	Engineering & Tech.	Agriculture & Fisheries	Business & Commerce	Science & Mathematics	Information Technology
Manufacturing	4,171	2,000	8	428	2	1,733
Service	1,297	751	0	246	0	300
Trading	788	300	0	120	0	368
Agriculture	1,077	420	0	552	0	105
Total	7,333	3,471	8	1,346	2	2,506

Table 13. Average Intake Rate by Industry Type and by Cluster of Disciplines (1985-1999)

Industry Type	Eng'g. & Tech.	Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Average
Manufacturing	0	12.75	62	7	3	21.19
Service	0	0	20	0	5	12.5
Trading	0	0	10.7	0	2.5	6.6
Agriculture	0	0	245.7	2	13	86.9
Average	0	12.75	84.6	4.5	5.88	26.93

Table 14. Average Attrition Rate by Industry Type and by Cluster of Disciplines (1985-1999)

Industry Type	Eng'g. & Tech.	Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Average
Manufacturing	0	0	87.3	0	1	44.15
Service	0	0	25.7	0	0	25.7
Trading	0	0	36.7	0	0	36.7
Agriculture	0	0	101.3	0	0	101.3
Average	0	0	62.75	0	1	31.88

Table 15. Basis for Employee Promotion by Industry Type and by Cluster of Disciplines

Basis for Promotion	Engineering & Technology	Agriculture & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Total	Rank
Manufacturing							
Performance	5	2	5	5	5	22	1
Prof. Advancement	1	1	3	1	1	7	4
Seniority	2	0	2	2	2	8	3
Work Attitude	5	1	5	5	5	21	2
Discovery/Invention	0	1	0	1	2	4	5
Service							
Performance	1	0	2	0	1	4	1
Prof. Advancement	1	0	2	0	0	3	2
Seniority	1	0	1	0	0	2	3.5
Work Attitude	0	0	2	0	0	2	3.5
Discovery/Invention	0	0	0	0	0	0	5
Trading							
Performance	2	0	1	1	1	5	1
Prof. Advancement	2	0	1	0	1	4	2
Seniority	1	0	1	0	1	3	3
Work Attitude	0	0	1	0	0	1	4
Discovery/Invention	0	0	0	0	0	0	5
Agriculture							
Performance	2	0	1	1	2	6	1
Prof. Advancement	1	0	1	0	1	3	3
Seniority	1	0	1	1	1	4	2
Work Attitude	0	0	1	0	0	1	4
Discovery/Invention	0	0	0	0	0	0	5

Table 18. Percentage Increment from Basic Pay of Promoted Employees by Industry Type and by Cluster of Disciplines

Increment	Eng'g & Tech.	Agr. & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Total	Rank
Manufacturing							
Above 19%	0	0	0	0	0	0	4
15 - 19	0	1	1	0	0	2	2
10 - 14	3	1	3	2	4	13	1
Below 10%	0	0	1	0	0	1	3
Service							
Above 19%	0	0	0	0	0	0	3.5
15 - 19	0	0	0	0	0	0	3.5
10 - 14	1	0	1	0	1	3	1
Below 10%	1	0	1	0	0	2	2
Trading							
Above 19%	0	0	0	0	0	0	3.5
15 - 19	0	0	0	0	0	0	3.5
10 - 14	2	0	1	1	0	4	1
Below 10%	2	0	0	0	1	3	2
Agriculture							
Above 19%	0	0	0	0	0	0	3.5
15 - 19	0	0	0	0	0	0	3.5
10 - 14	2	0	1	0	1	4	1
Below 10%	0	0	0	1	0	1	2

Table 16. Company Policies in Filling-Up Vacancies by Industry Type and by Cluster of Disciplines

Company Policies	Engineering & Technology	Agriculture & Fisheries	Business & Commerce	Science & Mathematics	Information Technology	Total	Rank
Manufacturing							
Next-in-Rank	3	2	3	4	3	15	1
Preferred Insiders	2	1	3	3	2	11	2.5
Best Qualified Candidate	2	1	5	1	2	11	2.5
Service							
Next-in-Rank	1	0	1	0	1	3	2
Preferred Insiders	0	0	1	0	1	2	3
Best Qualified Candidate	2	0	2	0	0	4	1
Trading							
Next-in-Rank	2	0	1	1	1	5	1.5
Preferred Insiders	0	0	0	0	0	0	3
Best Qualified Candidate	2	0	1	1	1	5	1.5
Agriculture							
Next-in-Rank	2	0	1	1	2	6	1.5
Preferred Insiders	0	0	1	0	0	1	3
Best Qualified Candidate	2	0	1	1	2	6	1.5

5. On the Endorsed Programs from Industries

Table 17. Preferred Programs of Industries by Cluster of Disciplines

Preferred Programs	Industry Type				Total	Rank
	Manufacturing	Service	Trading	Agriculture		
Information Technology						
BS in Comp. Data Processing & Information Management			1		1	4.5
BS in Comp. Info. System & Mgt.			1		1	4.5
BS in Computer Science	5	1	1	2	9	1
BS in Data Processing Mgt.			1		1	4.5
BS in Info. & Computer Science	1		1		2	2
BS in Software Technology			1		1	4.5
Business & Commerce						
BS in Business Administration		1	1	1	3	5.5
BS in Commerce	3	1	1	1	6	3
BS in Office Management	2		1	1	4	4
BS in Banking & Finance		1		1	2	7
BS in Marketing	3	2	1	1	7	2
BS in Accountancy	5	2	1	1	9	1
BS in Business Data Processing		1			1	8.5
BS in Business Management	2	1			3	5.5
BS in Applied Business Economics		1			1	8.5
Engineering & Technology						
BSECE	0	1	2	1	4	4.5
BSCoE	1	1	1	1	4	4.5
BSIE	2	0	1	1	4	4.5
BSCHE	1	1	1	0	3	7.5
BSCE	0	0	1	2	3	7.5
BSEE	1	1	2	2	6	1
BSME	1	1	2	1	5	2
BSAE	1	0	0	0	1	12
BSIT	0	1	1	2	4	4.5
BS Radiology	0	1	1	0	2	10
BS Food Technology	0	1	1	0	2	10
BS Technology	0	1	1	0	2	10
Agriculture and Fisheries						
BS Agriculture	0	1	2	1	4	2
BS Horticulture	0	0	1	1	2	5.5
BS Agri-Technology	1	0	0	1	2	5.5
B Agri-Technology	0	0	0	1	1	8.5
DVM	0	1	0	0	1	8.5
BS Agro	0	1	2	1	4	2
BS AH/AS	0	1	2	1	4	2
BS Agro-Forestry	0	1	1	0	2	5.5
BS Fishery	0	1	1	0	2	5.5

6. On the Demand for Higher Education Graduates

6.1 Stock and Flow Analysis of Graduates

6.2 Supply-Demand Equilibrium Analysis

Table 19. Stock and Flow Analysis of Graduates by Cluster of Disciplines

Stock & Flow	Before 1990	1990-1994	1995-1999	2000-2005*	Average (<1990-1999)
Engineering					
Stock	340	8,225	9,978	5,808	6,181
Flow	22	167	80	200	90
Surplus/(Deficit)	318	8,058	9,898	5,606	6,091
Ratio	13:200	1:50	1:125	8:250	1:67
Rate of Stock (1990-1999)			1.95%		
Rate of Flow (1990-1999)			-7.1%		
Technology					
Stock	-	129	464	840	296
Flow	-	3	11	20	7
Surplus/(Deficit)	-	126	453	820	289
Ratio	-	1:43	1:42	1:42	1:42
Rate of Stock (1990-1999)			13.7%		
Rate of Flow (1990-1999)			13.9%		
Agriculture & Fisheries					
Stock	480	344	600	634	475
Flow	15	4	32	39	17
Surplus/(Deficit)	465	340	568	595	458
Ratio	3:100	1:100	1:20	3:50	1:25
Rate of Stock			1.12%		
Rate of Flow			3.86%		
Business & Commerce					
Stock	4,370	3,796	8,653	4,930	5,606
Flow	341	389	432	494	387
Surplus/(Deficit)	4,029	3,407	8,221	4,436	5,219
Ratio	2:25	1:10	1:10	1:10	7:100
Rate of Stock			8.59%		
Rate of Flow			1.05%		
Science & Mathematics		(1990-1999)			
Stock	1,737	3,517		5,005	2,627
Flow	2	14		17	8
Surplus/(Deficit)	1,735	3,503		4,988	261.9
Ratio	1:1000	1:250		3:1,000	3:1,000
Rate of Stock		7.30%			
Rate of Flow		21.48%			
Information Technology					
Stock		105	390	1,226	430
Flow		15	23	68	27
Surplus/(Deficit)		90	367	1,158	403
Ratio		1:7	1:17	1:18	1:16
Rate of Stock			14.02%		
Rate of Flow			4.3%		

1. On the Quality of Higher Education Outputs

1.1 Accreditation of Schools

1.2 Percentage of Passing in Government Licensure Examination

1.3 Educational Qualification of Faculty

