

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING PROGRAM AT CEBU TECHNOLOGICAL UNIVERSITY – DANAOCITY CAMPUS: PROPOSALS

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ABSTRACT

This study assessed the implementation of Bachelor of Science in Industrial Engineering (BSIE) at Cebu Technological University – Danao City Campus from the year 2004-2009 with the end view of formulating proposals for the improvement of the aforementioned curriculum based on the findings on the analysis done on the profile of the respondents and status of BSIE Program instruction using the questionnaire as the main tool in gathering data.

The implementation of the BSIE Program had the following findings: There were 11 instructors who had not finished Master's Degree; three (3) instructors need retraining in the subjects like CADD/CAM, Management Information System, Systems Engineering and Facilities Planning and Design; Majority of the instructors did not have the work experience in the industry; There were more female than male and they were at the right age in each year level; Female were doing good in their studies compared to male; Majority claimed that it was their own decision in taking up the course; Most of their family belonged to the poverty threshold; Instructors claimed that the BSIE Program Objectives had been fully attained but the students perceived that these were partially attained; Both respondent's group perceived that instructional materials were visible and ready for use sometimes; Lecture method of instruction was always used by the instructors; The students perceived that the instructors had partially delivered the instruction and they had also partially acquired it; The topmost problem was "shop not a replica of the industry" with the topmost solution as "acquiring more equipment / machines through budgetary proposals".

It is recommended that the Action Plan to improve the Implementation of BSIE Program be adopted.

INTRODUCTION

The business world is facing a catastrophe right now due to economy recessions. This is the time wherein BSIE graduate is greatly in demand. It is just proper to have a deeper look into its training status in the CTU - Danao City Campus. Competent and qualified BSIE instructors, adequate instructional materials and facilities for effective teaching and possible solutions to the problems met are the factor's that will improve the student's achievement leading to quality BSIE course.

Cebu Technological University – Danao City Campus offered the Bachelor of Science in Industrial Engineering program since academic year 2004-2005 with 28 enrollees due to the fact that Danao City is the next industrial capital of Cebu with the industrial products like cement, sugar mill, electronics assembly, guns, ice, pottery, ceramics, garments and ship repair .

As per records from the Registrar's office the campus had already produced 32 graduates for the academic years 2008-2009 and 2009-2010. Last March 2010, four (4) students had passed third year, 22 for second year and 29 for first year.

After six (6) years, it is deemed imperative to know how the BSIE program was been implemented and what were the problems met during the implementation.

Review of Related Literature

Burgos, (1990) made a study of the status and problems of Electronics Technology at CSCST System in order to improve their instruction. He stressed five (5) aspects as contributory factors in improving the training

program namely; professional growth of the Electronics instructors, technical growth of the Electronics instructors, course of study updating, accommodation facilities, and instructional facilities. This study served as the benchmark in constructing the questions for problems met by the instructors and students under BSIE program.

Another study conducted by Pilotin (1997) about the Curricular Deficiencies as perceived by the engineering students whether the educational offerings is relevant to their engineering course and whether the skills acquired by the students met the skills requirement of industries while the proponent's study was focused only on BSIE program. Status and implemmentation of the said curriculum were also studied in order to come up with BSIE graduates who are very much needed in different industries both locally and globally.

The study of Levenburg, Burgos and Pilotin were relevant to the present study in the sense that these were all study of the implementation of curriculum in which the aspects being studied were the competencies delivered by the instructors and acquired by the students, problems met by the instructors and students in the implemmentation of the curriculum, and possible solutions to the problems met; in which the same parameters that are considered by the present research work. However, the present study was focused on Bachelor of Science in Industrial Engineering curriculum only while Levenburg was on Operations Management which is only a part of the BSIE program; Pilotin's study was on the whole implementation of the engineering courses as well as Burgos' study on Electronics Technology. All of these studies were technology related which is of the same trend as with BSIE.

MATERIALS AND METHODS

This study was conducted at Cebu Technological University – Danao City Campus, Sabang, Danao City with 97 respondents; 26 instructors who had taught BSIE subjects and 71 BSIE students from 1st year to 5th year. The descriptive method was used and questionnaire was the main tool in gathering the data of the study adapted from the questionnaire of Burgos (1990) with revisions formulated by the researcher. Part of it is taken from internet sources. Facts not covered in the main instrument were taken through formal interview, ocular inspection, and documentary analysis.

After the questionnaires distribution and collection, the data were tallied, tabulated, collated by using Microsoft Excel Database and subjected to the following statistical treatment: like the simple percentage, weighted mean. The ensuing responses were categorized for both students and teachers in order to quantify the degree of the responses in accomplished BSIE Program Objectives, accommodation facilities, instructional materials and facilities, method of instruction used by BSIE instructors, competencies delivered by the instructors and acquired by the students.

RESULTS AND DISCUSION

Instructors' Profile

In stru ctors' Ed u catio n al Attainment		
Highest Educational Attainment	Frequency	Percentage (%)
1.Doctoral Degree	5	19
2.Master's Degree w/ Doctoral units	5	19
3.Master's Degree	5	19
4. College Graduate w/ Master's units	8	31
5.College Graduate	3	12
TOTAL	26	100

Length of Teaching Experience by the Instructors

Length of Teaching Experience (yrs)	Frequency	Percentage (%)
21- above	9	35
16-20 years	4	15
11-15 years	5	19
6-10 years	7	27
0-5 years	1	4
Total	26	100

Total Number of Hours Attendance in Training and Seminars

No. of Hours Attendance in BSIE Related Training and Seminars	Frequency	Percentage (%)
	60 hrs – above	16
46-59 hrs	3	12
31-45 hrs	2	8
16-30 hrs	3	12
1-15 hrs	2	8
Total	26	100

Total Number of Work Experience in Industry

Total Number of Work Experience in Industry (yrs)	Frequency	Percentage (%)
13	1	4
9	1	4
2	3	12
1	1	4
0	20	76
Total	26	100
Mean	1.12	

The profiles of the instructors in terms of highest educational attainment were as follows: doctoral degree, master's degree and master's degree with doctoral units had five (5) instructors each; eight (8) instructors were college graduate with doctoral units; and three (3) instructors who were just college graduate. Only one (1) had a teaching experience of the range 0-5 years which was the newly hired BSIE instructor in which she had 13 years of working experience in industry as an Industrial Engineer and Production Manager, seven (7) instructors had 6-10 years experience, five (5) instructors had 11-15 years experience, and four (4) instructors had an experience ranging from 16-20 years. Majority of the instructors (16) had attended trainings and seminars for 60 hours and above, three (3) had 46-59 hours, two (2) had 31-45 hours, three (3) had 16-30 hours and two (2) had 1-15 hours for training and seminars attended. Majority or 20 of the instructors did not have work experience in the industry, four (4) had 1-2 years, and two (2) had 9-13 years of work experience in the industry.

Students' Profile

Distribution of Students as to Age and Gender

Age Bracket (years)	Gender				Total	
	Male		Female		f	%
	f	%	f	%		
20-above	7	10	11	15	18	25
18-19	10	14	8	11	18	25
16-17	12	17	23	33	35	50
Total	29	41	42	59	71	100

Distribution of Students High School General Mean

High School General Mean	Gender				Total	
	Male		Female		f	%
	f	%	f	%		
90-93	4	6	16	23	20	29
85-89	20	28	25	35	45	63
82-84	5	7	1	1	6	8
Total	29	41	42	59	71	100
Mean	87		89			

Distribution of the Collegiate Scholastic Performance of the Students

Collegiate Scholastic Performance General Mean	Gender				Total	
	Male		Female		f	%
	f	%	f	%		
1.7-1.5	3	4	9	13	12	17
2.0-1.8	21	30	25	35	46	65
2.3-2.1	5	7	8	11	13	18
Total	29	41	42	59	71	100

Distribution of Reasons for Taking-up BSIE

Reasons for Taking up BSIE	Gender				Total	
	Male		Female		f	%
	F	%	f	%		
(1) Own decision	19	27	23	32	42	59
(2) Family	3	4	12	17	15	21
(5) Guidance Counselor	7	10	5	7	12	17
(3) Friend	0	0	1	1.5	1	1.5
(4) Teacher	0	0	1	1.5	1	1.5
Total	29	41	42	59	71	100

Monthly Income of Parents

Monthly Income of Parents (pesos)	Gender				Total	
	Male		Female		f	%
	F	%	f	%		
25,001 - above	1	1.5	1	1.5	2	3
15,001-25,000	0	0	0	0	0	0
10,001-15,000	3	4	2	2	5	6
5,001-10,000	12	17	26	37	38	54
5,000 - below	13	18.5	13	18.5	26	37
Total	29	41	42	59	71	100

The students composed of 41 percent male and 59% female. Their age brackets were as follows; 35 students belonged to the age range of 16-17, 18 from 18-19 range and 21 belonged to 20-up age bracket. The distributions of high school general average was as follows; for grade of 82-84 there were six (6); had a grade of 85-89 there were 45, and for a grade of 90-93 there were 20. The collegiate scholastic performance of the students were as follows; For the range 1.5-1.7, only four (4) percent from the male while 13 percent were female; for the range of 1.8-2.0, male were 30 percent and 35% were female; and for the range 2.1-2.3, only seven (7) percent were male and 11 percent were female. Reasons for taking up BSIE that were perceived by the students were as follows; 42 claimed that it were their own decision, 15 asserted that the reason were their families, 12 claimed that it was due to the guidance counselor, and one (1) student claimed that it was his friend. The incomes of their parents were as follows; 26 claimed that Php 5000 – below, 38 was within the range Php 5001-10000, five (5) for Php 10001-15000, and two (2) for Php 25001 and above.

Status of BSIE Program as Perceived by the Respondents

Summary of Competencies Acquired by the Students as Perceived by Students Themselves				
Competencies Acquired			Students	
Level	Term		\bar{x}	VD
First Year	1 st Sem		2.16	PA
	2 nd Sem		2.11	PA
Second Year	1 st Sem		2.13	PA
	2 nd Sem		2.21	PA
Third Year	1 st Sem		2.29	PA
	2 nd Sem		2.23	PA
Fourth Year	1 st Sem		2.09	PA
	2 nd Sem		2.26	PA
Fifth Year	1 st Sem		2.02	PA
Grand Mean			2.17	PA

The Table shows the overall picture of the competencies acquired by the students in which the grand mean was **2.17** described as **partially acquired**. The respondents had different opinions but in the end, it can be deduced that the implementation of the BSIE program in terms of competencies were being achieved. The instructors had tried their very best in providing students with the desired technical skills as well as the needed technical information. Anyway, the instructors were more or less expert in the subject that they were teaching based on the Instructors' Profile. The students' perceptions were based on what they felt that they had already learnt and it shows that they had acquired the competencies but not to the fullest. However, actions should be made on the less delivered and less acquired competencies by specific year level for that's where the problem begins.

Problems Met in BSIE Instruction as Perceived by the Instructors and Students

Final Ranking of Problems Met in BSIE Instruction and Their Preferred Solutions as Perceived by Both Respondents

Rank	Problems	Preferred Solutions
1	Shop not a replica of the industry	Acquire more equipment / machines through budgetary proposals.
2	Multi-subject loading of instructors	Assign related subjects per instructor.
3	Inadequate books	Have an Internet Connection / E-Library.
4	Instructor have inadequate knowledge in the particular BSIE subject taught	Instructors should be retrained with the subject they are teaching.
5	Minimal enrollees	Active participation in any technological contest and be recognized.
6	Lack of support from administration	Administration should support the students like research/feasibility study, plant tours.
7	Students poor study habits or lack of interest in the subject	Students shall be motivated well about the course.
8	Lack of effective supervision from Chairman	Listen to suggestions from instructors and bring it to the administrator.
9	Insufficient room ventilation	Have the room air-conditioned.
10	Lack of financial support from parents	Provide scholarship grants to deserving students.

The five (5) topmost problems with their preferred solutions as perceived by both groups of respondents were as follows: Shop not a replica of the school with the preferred solution as acquiring more equipments/machines through budgetary proposals; Multi-subject loading of instructors with the solution as assigning relates subject per instructor; Inadequacy of books and possible solution if having an Internet connection; Instructors have inadequate knowledge with the best solution as retraining the instructors with the subject they were teaching; Minimal enrolees with the topmost solution as students shall have an active participation in any technological contest and be recognized.

CONCLUSION

After careful; analysis of the data and careful consideration of the findings of this study, the following conclusions were drawn.

Bachelor of Science in Industrial Engineering (BSIE) Program at Cebu Technological University – Danao City Campus had been affected by the instructors’ educational attainment, number of years in teaching BSIE, number of hours attendance to BSIE Subject training and seminars and number of years of work experience in an industry as well as the students’ high school average and collegiate scholastic performance. There were problems met in the implementation of BSIE Program like instructor-related problems, student related problems and instructional materials and facilities problem that could be given appropriate action by the administration and the combined efforts of the staff and faculty as being presented in the Proposals for Improvement.

RECOMMENDATIONS

PROPOSED PLAN FOR THE IMPROVEMENT OF BSIE PROGRAM IMPLEMENTATION

This section deals on the prospects for the improvement of BSIE program in CTU – Danao City Campus based on the findings of the study.

Based on the results of the study, BSIE program instruction is generally fair. The BSIE program objectives were partially delivered by the instructors and moderately met the students felt needs; the instructional facilities and equipment were visible and ready for use sometimes; and the competencies in the implementation of the BSIE program in every year level had been fairly delivered by the instructors and fairly acquired by the students. However, this needs improvement to have a better or even result best result. Considering this, the proposal for the improvement of BSIE program was made. It was purposely done in order to give ideas, ways and means to provide quality instruction and produce quality output – the skilled BSIE students.

Objectives

Proposals for the improvement of BSIE program were formulated in order to attain the following objectives: to broaden the knowledge of instructors, to arouse interest on BSIE students, to acquire adequate instructional materials, facilities and equipment, to guide instructors in the best method of instruction to use and to improve the BSIE program implementation in every year level.

Scope

The scope for implementing the proposals will be whole year round.

Mechanics of Implementation

Foremost, the administration will be presented about the proposals so that they will spearhead in carrying out the strategies revealed in the proposal. Rectification / adjustment of the strategies will be made during its

implementation.

Proposals for the Improvement of BSIE Program Implementation

There were three (3) areas of concern; instructor related; student related; and accommodation of instructional materials, facilities and equipment.

In the instructor related the following problems were being addressed like; inadequate knowledge of instructors, multi-subject loading of instructors, and using single method of instruction like the lecture method. The student-related problem was only on minimal enrollees.

The prospects for improvement were based on the perceptions of the respondents and as per observation by the author herself. The study made by Burgos was the benchmark of the proposals as well as the different principles and concept discussed in the theoretical framework.

Areas of Concern	Strategies	Persons Involved	Time Frame	Proposed Budget	Expected Outcome
1.Instructor Related: 1.1 Inadequate Knowledge of Instructors	Retooling of instructors teaching CADD, CADD/CAM, Operations Research 2 / Linear Programming, and Facilities Planning & Design by sending them to training or seminars. Require the 11 instructors to finish their Master's degree. Hire another BSIE instructor for A.Y. 2012-2013	Administration Instructors	July- Sept (60 hrs training per subject) 2010-2013	Php 60,000	
1.2 Multi-subject Loading	Directors shall assign related subject per instructor. Instructor should be retrained in the application of different strategies in their instruction.	Directors Administration Instructors	Every enrolment period 1 week /semester	Php 10,000/ training	Instructors will be equipped with all the needed skills & knowledge for BSIE curriculum instruction.
1.3 Use of single method of instruction like the lecture method.	Different methods of instruction shall be used to avoid monotonous of instruction and to arouse the interest of the students. Self-Discovery Method with Reporting is the recommended method for teaching BSIE major subjects.	BSIE Chair. Instructors Instructors	Whole year round		

2. Student Related: 2.1 Minimal enrollees	Active participation of students in any technological contest. BSIE Chairman shall create a link to other schools offering BSIE for plant tours and plant studies. Provision of Instructional Software like ALDEP.	Instructors Students	Whole year round	Php 10,000/yr	Increase in BSIE enrollees.
		BSIE Chair. Instructors Students		Php 3,000/sem	
3. Instructional Materials, Facilities, and Equipment	BLOCPLAN, CORELAP, CRAFT, MULTIPLE, VISIO and Work Measurement & Data Collection Technique	Administration Instructors	Jan. – June, 2012	Php 100,000	
	Purchase Computer Aided Machines w/ CNC Program			Php 1, 000, 000	
	Purchase computer sets so that the computer-student ratio must be (1:1) for the subjects CADD, CADD/CAM, Operations Research 2/ Linear Programming, Facilities Planning & Layouting, and Systems Engineering	Administration BSIE Chair	Jan – June, 2012	Php 250,000	Provision of very sufficient accommodation facilities and equipment and it shall be made available to the students
	Proper scheduling of Computer Laboratories to accommodate BSIE instructors that needed computer hands on for the students.	Directors Instructors	Every enrolment period		
	Internet connection shall be provided that will serve as references	EDP	Whole year	Php 1,500/mo	
	Purchase Overhead/LCD Projector for BSIE Instructors	Administration	2010-2012	Php 120,000	

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