Competency Standards for Bachelor of Industrial Technology Graduates for the Construction Industry in Region IV-A: Inputs For Curriculum Enhancement

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Abstract –*The main objective of this study was to develop competency standards for Industrial Technology graduates for employment in the construction industry in Region IV-A, Philippines. It specifically identified the basic and core competency standards for industrial technology and determined the degree of importance of competencies needed in the construction industry sector. The study identified 28 common competencies for three areas of specializations in industrial technology namely: electrical, civil and drafting technology. There were 39 core competencies for electrical, 31 for drafting and 38 items for civil technology. A total of 50 panel of experts were carefully selected using the purposive sampling as respondents in the study. Experts are selected based on their technical know-how or proficiency and currently practicing their line of profession in the construction industry. The study used the descriptive-developmental method of research. The Delphi technique was applied to determine if the competency under investigation reached the general agreement of opinions by the panel of experts involved. The findings implied that the newly developed competency standards were good input for curriculum enhancement in the area of civil, drafting and electrical technology. The study recommended the newly developed competencies may be followed by the faculty in the course they teach and the new competency items suggested by the panel of experts for inclusion in the curriculum for the three areas of specializations may be considered during the curriculum revision.*

Keywords –*competency, competency standards, construction industry, industrial technology*

INTRODUCTION

The construction industry plays a major part in the development of the country and this industry needs to be sustained and developed because of its high labor absorption capacity. This sector has been identified as a priority by almost all regions in the country because it employs millions of workers made up of products and related workers, labors, and the like. Because of the continuous technological innovation and the constant upgrading of construction equipment and methods, the upgrading of skills and possibly retraining of the available workforce in the industry are also required.

With the rapid growth in population and the increasing demand for modern household conveniences, it is imperative that more technologists be produced in the construction-related industry who have acquired knowledge and skills needed in the real world of work. "Today, nearly two million Filipino construction workers are ready for deployment abroad as reported by the Department of Labor and Employment [1]. The construction sector shows promising employment prospects for Filipino students of construction-related courses who are set to graduate from technical schools and colleges. The Philippine Association of Service Exporters, Inc. [2] said that at least 50,000 jobs await Filipino construction workers with the impending transfer of the US military facilities from Okinawa, Japan to Guam. Aside from Guam, many other countries including Australia, Japan, and Poland also stressed their need for engineers and other construction workers" [3].

Philippines might fail to take advantage of the growing global demand for construction workers if there is no concrete training program for generating enough highly skilled workers in this sector. There

might have an oversupply of workers but they may not be qualified or they may fail to meet international standards. As Angara [4] pointed out that "our educational system is not comparable with the more developed countries, our graduates are sometimes unable to become competitive".

In the emergence of varied changes and technological advancement nowadays, the skills training institution requires new directions and radical curricular changes in order to meet the demands of the time. As education shares in the process of development, its aim and focus must be geared towards providing quality education to everyone. It is proven that producing quality educated manpower will serve as a prime mover of the economic growth and sustainable development of the nation.

Education and training provided by the training institutions is cognizant of the Strategic Plan for 2011-2016 of the Commission on Higher Education[5]. The vision is for tertiary education to move towards playing a pivotal role in the integral formation of professionally competent, service-oriented, principled as well as productive citizens who will propel economic growth and sustainable development of the country.

In a situationer presented in the Medium-Term Philippine Development Plan by the Congressional Commission on Education [6], the Technical Vocational Education and Training (TVET) is faced with several challenges that need careful scrutiny and attention. Some of the issues that the sector must look into are the existence of labor market demand-supply mismatches. A large number of trained graduates are left unemployed or underemployed because they do not fit the requirements of the job market. It is quite ironic that a number of job vacancies could not be filled up because the available manpower supply would not fit into the job.

The National Economic Development Authority [7] cites jobs skills mismatch as a labor quality growing concern in the country. The quality of jobs that Filipinos have in the country remains a concern despite a fall in the unemployment rate. The government needs to implement continually aggressive policies and programs that would improve the quality of employment and address skills mismatch.

"The mismatch of manpower in both quantity and types of skills cannot be wholly attributed to the effectiveness of the educational and training system. The mismatch is the result of the economic structures which do not give proper signals to training institutions on how many and what kind of manpower to produce"[8].

In answer to the growing manpower requirements of various industries and organizations, several specialized industrial technology under the Bachelor of Industrial Technology as a degree program are offered in school of arts and trades, technical colleges and universities throughout the country. The purpose of this program is to prepare well-trained industrial technicians and technologist who, after some experience, can be promoted to function as foreman, supervisor and other management roles in industry [9].

Thus, the process of closing the gap between education and training and the rapid technological change must be given important emphasis in any educational innovation and development. The distance between education and technology continues to widen as witnessed by the stakeholders in education, and might put the industrial technology graduates in danger of being under-educated or inappropriately trained. Hence, the production of world-class manpower to a large extent relies on the analysis of the current status of the training being offered in the different training institutions in the country. The appreciation of the training institutions about the current state, problems, and issues and its role in developing technical and vocational education and training is a manifestation of their renewed commitment toward the development of globally competitive middle-level manpower and entrepreneurs. Strengthening the potentials of the government agencies used to undertake skills development programs in the country is one way of assuring the twin goal for global competitiveness and people empowerment.

The development of competency standards will help ensure the industrial technology graduates to acquire the desired skills and knowledge competencies required by business and industry. Competency-Based Curriculum is a framework or guide for the subsequent detailed development of competencies, associated methodologies, training and assessment resources[10].It is an approach to teaching and learning more often used in learning concrete skills than abstract learning. It differs from other non-related approaches in that the unit of learning is extremely fine grained. Competency-based curriculum

will result in a clear performance criteria evaluation of the outcomes of the courses and programs being offered by any training institution.

OBJECTIVES OF THE STUDY

The main objective of this study is to develop competency standards for Industrial Technology graduates for employment in the construction industry in Region IV-A. Specifically, this study aims to: identify the basic and core competency standards for industrial technology graduates; determine the degree of importance of competencies that are needed in the construction service industry or sector; determine the curriculum changes that can be effected to improve further the competencies of the industrial technology graduates; and propose competency standards for utilization in the industrial technology institutions in the region.

MATERIALS AND METHODS

This study used the descriptive-developmental method of research. The Delphi technique is applied to determine if the competency under investigation reached the general agreement of opinions by the panel of experts involved.

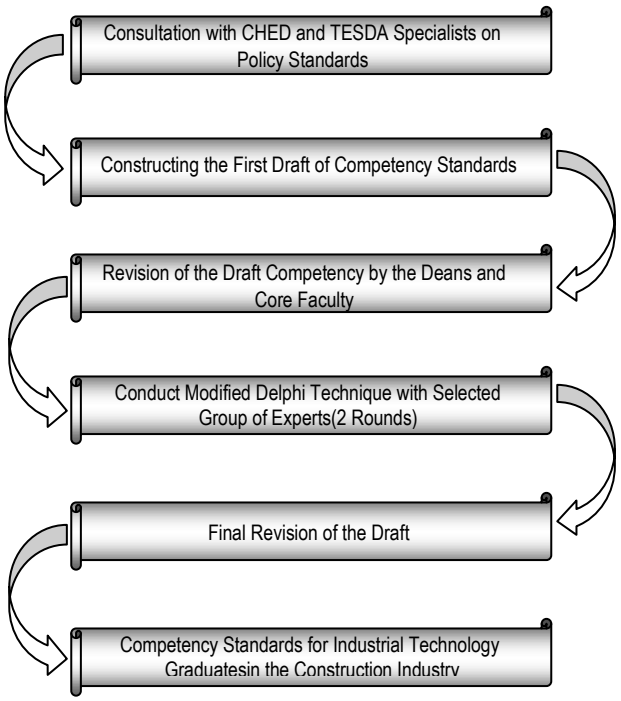

Figure 1. Flowchart on the Development of Competency Standards for Industrial Technology Graduates for the Construction Industry

The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts[11]The experts answer questionnaires in two or more rounds. After each round, a facilitator or change agent provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel[12].

To gather pertinent data and information, a self-made questionnaire were used. The questionnaire was validated by the dean and associate deans in the college offering industrial technology courses; selected core faculty in each specialization in civil, drafting, and electrical technology; and experts in each field of specialization. Consultation with the CHED and TESDA specialists on policy standards in industrial technology competencies was also made. In order to assure the validity of the instrument, the questionnaires were given to at least five (5) academic experts not involved in the study for critique on content, comprehensiveness and quality of items. They were also interviewed for more inputs on their assessment on the questionnaire. Their comments and suggestions were taken into consideration to improve the questionnaire.

The respondents of this study were several groups of stakeholders in industrial technology education in Region IV-A. These included the consultants/specialists from the Commission on Higher Education (CHED) and from the Technical Education and Skills Development Authority (TESDA) who are experts in policy standard making and development in their respective agency. The academic officials were the school administrators, deans, associate deans, faculty and designated officials particularly involved in curriculum development and policy makers. Experts, such as project engineers, supervisors, and field technicians in the field of construction industry/sectors were requested to validate the competency rating scale.

Profile of the Group of Experts

As presented in figure 2, the experts were carefully selected based on their educational qualification, position/designation, their number of years of practice in their profession, and their present company or organization. With those criteria in selecting the panel

of experts, it is believed that they could give reliable opinions on the subject being investigated.

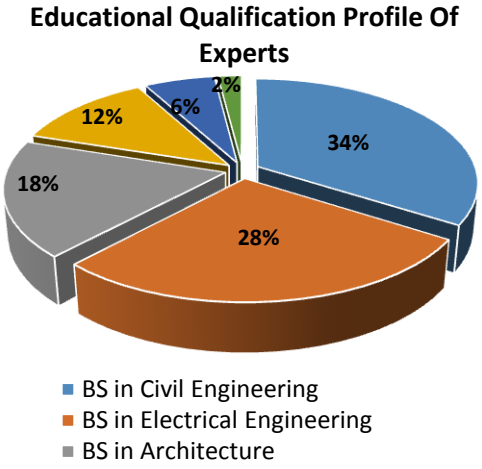

Figure 2.Profile of Panel of Experts 'Educational Qualification

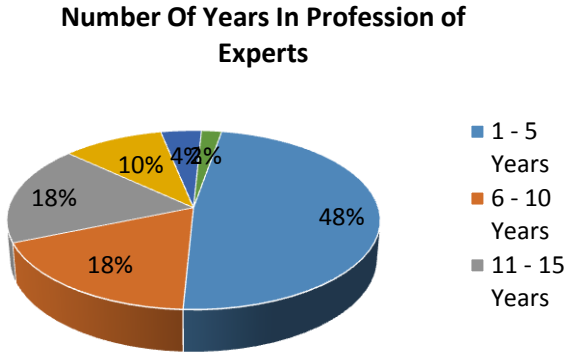

Figure 3.Profile of Experts as to the Number of Years of Experience in the Profession

In the process of identification and selection of the panel of experts, the number of years of experience in their profession was carefully considered as it may influence their judgments on the degree of importance for the competencies presented. As shown in Figure 3, 24 or 48% of the experts are engaged in their specific area of specialization for one to five years, 9 or 18% for six to ten years, 9 or 18% for eleven to fifteen years, 5 or 10% for sixteen to twenty years, 2 or 4% for twenty-one to twenty five years and 1 or 2% for twenty-six to thirty years bracket of years of practice in their line of profession.

Different statistical tools were utilized in this study such as frequency, percentage, median and interquartile difference.

For purposes of interpretation as to the degree of importance on the respondents' assessment in each competency, the mean score ranges and verbal interpretation are specified below.

Options	Scale Range	Verbal Interpretation
1 (1-2)	1.00 – 2.66	Most Important
2 (3-4)	2.67 – 4.33	Important
3 (5-6)	4.34 – 6.00	Least Important

Based on the figures shown above, the competency that garners the lesser mean is the most preferred competency in the construction industry sector that a graduate must possess.

RESULTS AND DISCUSSION

A. Common and Core Competency in the Three Areas of Specialization.

There are 28 competency items common in the three areas of specialization, 39 core competency items for electrical technology, 38 items for civil technology, and 31 for drafting technology were presented to the panel of experts for their consensus approval. (Pls. see Annex Table for Complete Competency Items)

B. Expert Consensus Level on Competency in Three Area of Specialization

Figure 4 exhibits the graphical representation of the consensus level of improvement during the round 1 and round 2 process. In the first round, the competencies presented to the experts for their evaluation did not reach the consensus level of importance set initially at 80% level. The second draft of competencies were made integrating the new or additional competency items suggested by the panel of expert during the round 1 process. The second draft of competency were again presented to the experts for their second round of evaluation. A dramatic increase in the consensus rating in round 2 has been observed compared to round 1. As presented above, the consensus level for drafting technology increased from 79% to 100% at the end of round 2, from 57% to 94% for civil technology and from 50% to 94% for electrical technology. Since the competency items reach a high level of consensus, then the final standard competency were being developed in this study.

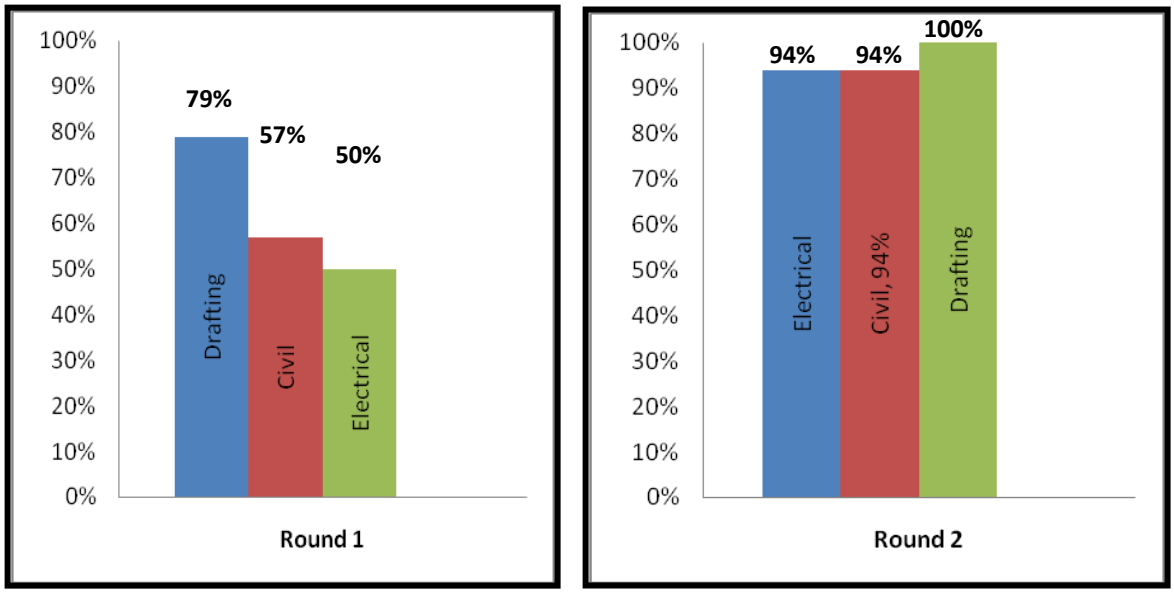

Figure 4.Consensus Level of Improvement from Round 1 to Round 2

C. Needed Curriculum Changes

The panel of experts suggested new competency items for inclusion in the curriculum as follows: 6 items for electrical technology, 5 items for civil technology, and 6 items for drafting technology. The suggested new items were presented to the panel for evaluation and it got the consensus of the experts as most important competency for the graduates. The new suggested competencies were included in the final list of competencies in each area of specialization.

D. Final Standards Competency in Three Areas of Specialization

The data analysis procedure included two primary components. Through the Delphi process, each item was first analyzed for consensus. In this study, consensus was considered achieved when an Inter-quartile range score of less than 1.2 is obtained [13]. Next, the analysis on the perceived importance of each item was done using the six-point scale evenly divided into most important, important, and least important. For purposes of verbal interpretation, the inter-quartile deviation (IQD) was computed to determine if each competency obtained a score of <1.20.

IQD = 7^{th} percentile (3^{rd} quartile) – 25^{th} percentile (1^{st} quartile)

Where:
3^{rd} quartile : the median of the top 50% of data
1^{st} quartile : the median of the bottom 50% of data

Presented in Table 1 is the complete listing of the common competencies. There are 28 identified items common for the three area of specialization, namely: Drafting Technology; Civil Technology; and Electrical Technology.

Tables 2, 3, and 4 show the list of core competency items for the three areas of specialization. After the round two process, there are 39 core competencies items identified for electrical technology, 38 core competencies for civil technology and 31 core competencies for drafting technology. Majority of these items passed the concordance of the panel of experts after treated by an appropriate statistical tool. All of the competencies presented were rated as most important by the experts that graduates of industrial technology have to possess.

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Table 1.Common Competency Consensus Item

Unit No.	Unit of Basic and Common Competency	IQD	Consensus	Median	Importance
	Industrial Technology Graduates should				
1	Participate in workplace communication by showing ability to communicate with people in the organization (peers, subordinates, supervisors)	1.00	Passed	1.00	Most Important
2	Communicate important theories and principles that are related to his work.	1.00	Passed	1.00	Most Important
3	Understand basic concepts related to organizational procedure and work operation in the company.	1.00	Passed	1.00	Most Important
4	Suggest effective solutions to problem arising from work activities.	1.00	Passed	2.00	Most Important
5	Knowledge in organization policies, strategic plans, company's position, mission, vision and other priorities.	1.00	Passed	2.00	Most Important
6	Apply problem solving techniques in the workplace.	1.00	Passed	2.00	Most Important
7	Receive and respond to workplace communication.	1.00	Passed	2.00	Most Important
8	Demonstrate leadership ability by giving a strong positive direction to ensure efficient functioning of the organization.	1.00	Passed	2.00	Most Important
9	Be able to work effectively with team members and maintain effective relationship.	1.00	Passed	2.00	Most Important
10	Apply mathematical concept and techniques in solving problems related to work activities.	2.00	Not Passed	2.00	Most Important
11	Give feedbacks on accomplishment and needed work adjustment.	1.00	Passed	2.00	Most Important
12	Practice career professionalism.	1.00	Passed	1.00	Most Important
13	Observe occupational health and safety practices.	1.00	Passed	1.00	Most Important
14	Develop and practice negotiation skills with team members.	1.00	Passed	2.00	Most Important
15	Can share his skills and ideas when asked to provide support to his peers in the workplace.	1.00	Passed	2.00	Most Important
16	Lead as model by working efficiently, professionally and with respect to all in the organization.	1.00	Passed	1.00	Most Important
17	Practice basic housekeeping procedures.	1.00	Passed	2.00	Most Important
18	Work in a team environment.	2.00	Not Passed	2.00	Most Important
19	Use relevant technologies applicable to assigned work.	1.00	Passed	2.00	Most Important
20	Observe safety precaution in doing his work.	1.00	Passed	1.00	Most Important
21	Prepare construction materials and tools.	1.00	Passed	2.00	Most Important
22	Ensure compliance with standard procedures, specifications and manuals of instructions.	1.00	Passed	1.00	Most Important
23	Interpret and follow technical drawings and plans.	1.00	Passed	2.00	Most Important
24	Perform mensuration and calculations in jobs related problems.	1.00	Passed	2.00	Most Important
25	Supervise proper use and maintenance of tools and equipment.	1.00	Passed	2.00	Most Important
26	Supervise preparation of construction materials, tools and equipment for assigned tasks.	1.00	Passed	1.00	Most Important
27	Follow the policies and regulations of the company.	1.00	Passed	1.00	Most Important
28	Have basic knowledge of company policy for environment, health, safety and security.	1.00	Passed	1.00	Most Important

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Table 2. Core Competency for Electrical Technology

Unit of Core Competency	IQD	Consensus	Median	Importance
An Electrical Technology Graduate should				
1. Identify the various laws and principles related to electron theory and magnetism.	1.00	Passed	1.00	Most Important
2. Compute the voltage, current and resistance and power in the circuit.	0.00	Passed	1.00	Most Important
3. Demonstrate proper handling and maintenance of electrical measuring instruments.	0.00	Passed	1.00	Most Important
4. Interpret different schematic diagram and block diagram for wiring installation.	0.00	Passed	1.00	Most Important
5. Identify electrical supplies and materials appropriate for each job specification order.	0.00	Passed	1.00	Most Important
6. Be familiar with the Philippine Electrical Code (PEC) requirement for wiring installation.	0.00	Passed	1.00	Most Important
7. Implement actual plan for wiring installation, schedule of load, specification, riser diagram and location.	1.00	Passed	1.00	Most Important
8. Draw circuit diagram for single and three phase motors.	1.00	Passed	2.00	Most Important
9. Rewind, trouble shoots and repairs electric motors.	1.00	Passed	1.00	Most Important
10. Perform activities with the application of the different test instruments.	1.00	Passed	2.00	Most Important
11. Install different job for signal and alarm wiring installation.	1.00	Passed	1.00	Most Important
12. Perform an open wiring installation.	3.00	Not Passed	3.00	Most Important
13. Trouble shoots wiring installation.	1.00	Passed	1.00	Most Important
14. Apply principles in electrical power generation and distribution.	1.00	Passed	1.00	Most Important
15. Assemble and install electrical circuit for lighting and power.	1.00	Passed	1.00	Most Important
16. Classify transformers according to uses, installation and phases.	1.00	Passed	1.00	Most Important
17. Illustrate the uses of power distribution substation transformer.	1.00	Passed	1.00	Most Important
18. Identify the polarity and connect banks of transformer into three-phase power system.	1.00	Passed	1.00	Most Important
19. Interpret wiring diagram of refrigerator and room air conditioner.	1.00	Passed	1.00	Most Important
20. Be familiar with the materials, tools and electrical components of refrigerator.	1.00	Passed	1.00	Most Important
21. Perform basic trouble shooting of electrical and mechanical components of domestic refrigerator and room air conditioning.	1.00	Passed	1.00	Most Important
22. Assemble and disassemble air conditioning unit.	1.00	Passed	2.00	Most Important
23. Service and repair air-condition and refrigerators.	2.00	Not Passed	2.00	Most Important
24. Prepare electrical power tools.	1.00	Passed	2.00	Most Important
25. Perform roughing-in activities for communication and distribution systems.	1.00	Passed	2.00	Most Important
26. Install electrical lighting system on auxiliary outlets and lighting fixtures.	1.00	Passed	2.00	Most Important
27. Perform installation of standard electrical protection system for lightning and grounding.	1.00	Passed	2.00	Most Important
28. Supervise/monitor installation and maintenance on electrical systems, auxiliary including control, lighting, power and protection equipment.	1.00	Passed	1.00	Most Important
29. Install wiring devices with ground fault current interrupting outlets.	1.00	Passed	2.00	Most Important
30. Interpret the standard symbols used in pneumatics and electro-pneumatics control technology.	1.00	Passed	1.00	Most Important
31. Solve problem exercises concerning pneumatics and electro-pneumatics.	1.00	Passed	2.00	Most Important
32. Apply pneumatics and electro-pneumatics principles in analyzing the circuit problems.	1.00	Passed	2.00	Most Important
33. Construct project innovation study as final course requirement.	1.00	Passed	2.00	Most Important
34. Know how to troubleshoot and maintenance of electrical system.	1.00	Passed	1.00	Most Important
35. Perform a function testing such as megger and functional testing.	1.00	Passed	1.00	Most Important
36. With updated knowledge related to designing and computation of electric circuit.	1.00	Passed	2.00	Most Important
37. Compute the insulation resistance measurement.	1.00	Passed	2.00	Most Important
38. With background in PLC instrumentation.	1.00	Passed	2.00	Most Important
39. Know how to test earth and ground resistance.	1.00	Passed	2.00	Most Important

Table 3. Core Competencies for Civil Technology

Unit No.	Unit of Core Competency	IQD	Consensus	Median	Importance
	A Civil Technology Graduate should				
1	Sketch and make estimate the desired project to be constructed.	1.00	Passed	1.00	Most Important
2	Cut materials and panels into desired sizes.	0.00	Passed	1.00	Most Important
3	Manipulate hand and power tools in woodwork process.	0.00	Passed	1.00	Most Important
4	Perform different wood joint construction.	0.00	Passed	1.00	Most Important
5	Sharpen, repair, and fix woodworking tools and machines.	0.00	Passed	1.00	Most Important
6	Estimate and prepare supplies and materials in carpentry projects.	0.00	Passed	1.00	Most Important
7	Prepare and apply finishing materials on wood, concrete and metal surfaces.	1.00	Passed	1.00	Most Important
8	Fix panels, door jambs, balusters and railings.	1.00	Passed	2.00	Most Important
9	Install moldings, hinges, locks, cabinet drawers and other accessories.	1.00	Passed	1.00	Most Important
10	Interpret detailed plan of ceilings and wall frames and panels, door and window jambs, stairs and built-in cabinets.	1.00	Passed	2.00	Most Important
11	Layout and construct ceiling frames and board.	1.00	Passed	1.00	Most Important
12	Fabricate and install jambs, door and cabinet panels and wooden stair.	3.00	Not Passed	3.00	Important
13	Prepare materials needed in staking out building lines.	1.00	Passed	1.00	Most Important
14	Fabricate and install formworks and scaffoldings.	1.00	Passed	1.00	Most Important
15	Assemble reinforcement bars for columns, beams, slabs and walls.	1.00	Passed	1.00	Most Important
16	Laying concrete block for structure.	1.00	Passed	1.00	Most Important
17	Mix appropriate concrete proportion for mortar and plastering.	1.00	Passed	1.00	Most Important
18	Plaster concrete wall surface.	1.00	Passed	1.00	Most Important
19	Install pre-cast baluster and handrail on concrete stairs.	1.00	Passed	1.00	Most Important
20	Set ceramics tiles on kitchen sink, concrete floor and wall surface.	1.00	Passed	1.00	Most Important
21	Read and implement blueprint and specifications of building plans.	1.00	Passed	1.00	Most Important
22	Sketch plan using an auto CAD application.	1.00	Passed	2.00	Most Important
23	Estimate the materials and labor cost of the building plan.	2.00	Not Passed	2.00	Most Important
24	Implement the building plan and supervise the project.	1.00	Passed	2.00	Most Important
25	Compute components of forces on a truss diagram.	1.00	Passed	2.00	Most Important
26	Know how in determining the moment of a beam.	1.00	Passed	2.00	Most Important
27	Have knowledge in hydraulic application in construction.	1.00	Passed	2.00	Most Important
28	Use conventional transit in leveling, transverse and tachometric survey.	1.00	Passed	1.00	Most Important
29	Compute and determine the volume of a reservoir.	1.00	Passed	2.00	Most Important
30	Know the characteristic and types of soil.	1.00	Passed	1.00	Most Important
31	Perform shieve analysis.	1.00	Passed	2.00	Most Important
32	Design concrete beams and columns.	1.00	Passed	2.00	Most Important
33	Construct a project innovation as final requirement in the course.	1.00	Passed	2.00	Most Important
34	Have knowledge in testing materials like rebars and concrete.	1.00		1.00	Most Important
35	Know how to prepare the necessary materials to be used during the days work.	1.00	Passed	1.00	Most Important
36	Apply alternative methods for economic purposes during the project construction.	1.00	Passed	2.00	Most Important
37	Display unique ideas and techniques in project implementation.	1.00	Passed	2.00	Most Important
38	Be familiar with standard techniques, requirements, specifications, and codes for construction.	1.00	Passed	2.00	Most Important

Table 4. Core Competencies for Drafting Technology

Unit No.	Unit of Core Competency	IQD	Consensus	Median	Importance
	A Drafting Technology Graduate should				
1	Apply the fundamental practices of drafting, proper techniques, and good habits of drawing.	0.00	Passed	1.00	Most Important
2	Perform mensuration and calculation in drawing.	1.00	Passed	1.00	Most Important
3	Prepare and set up tools and materials for drawing.	0.00	Passed	1.00	Most Important
4	Manipulate drafting tools and instruments.	0.00	Passed	1.00	Most Important
5	Make letters with emphasis to single stroke gothic using various lettering pens and devices.	1.00	Passed	1.00	Most Important
6	Acquire skills in technical sketching and blueprint reading and elements of mechanical drawing.	0.00	Passed	1.00	Most Important
7	Interpret technical drawings and plans.	0.00	Passed	1.00	Most Important
8	Apply architectural symbols used in architectural drawing.	0.00	Passed	1.00	Most Important
9	Draw site development plan, floor plan, elevations, sections and schedule of doors and windows.	0.00	Passed	1.00	Most Important
10	Draft architectural layouts and details.	0.00	Passed	1.00	Most Important
11	Follow restriction concerning standards structural designs and construction features covered by building codes.	1.00	Passed	1.00	Most Important
12	Draw various plans using the computer aided design drafting.	1.00	Passed	1.00	Most Important
13	Draw machine drawing consisting of machine elements, shop processes, fastenings and welding.	1.00	Passed	1.00	Most Important
14	Draft forging, shop patterns, pipe fittings, machine details, detail assembly drawing of simple tools and machines.	1.00	Passed	2.00	Most Important
15	Learn sheet metal drafting, development of surfaces, intersections, transitions and patent office drawing.	1.00	Passed	1.00	Most Important
16	Construct a scale model using simulated materials used in architectural construction.	0.00	Passed	1.00	Most Important
17	Draw foundation plan, details of post/column, footings, concrete hollow block and reinforced concrete walls.	0.00	Passed	1.00	Most Important
18	Draft floor framing plans, details of beams, girders and reinforced concrete slab.	0.00	Passed	1.00	Most Important
19	Draw roof framing plan, diagram and details of septic vault, catch basins, etc.	0.00	Passed	1.00	Most Important
20	Draft structural layouts and details.	0.00	Passed	1.00	Most Important
21	Draft electrical and electronics layout and details.	1.00	Passed	1.00	Most Important
22	Draw sanitary and plumbing layouts and details.	0.00	Passed	1.00	Most Important
23	Draft water distribution and storm drainage systems.	1.00	Passed	1.00	Most Important
24	Draft mechanical layout and details.	0.00	Passed	1.00	Most Important
25	Operate and prepare computer aided drawings.	1.00	Passed	1.00	Most Important
26	Transfer data using Auto Cadd application to total station.	0.00	Passed	1.00	Most Important
27	Prepare drawing in civil 3D design scheme.	1.00	Passed	1.00	Most Important
28	Draw site contouring using Auto Cadd 3D.	1.00	Passed	1.00	Most Important
29	Operate design enhancer for design presentation like photo shop and corel.	1.00	Passed	1.00	Most Important
30	Draw perspective presentation in both manual and AutoCAD with pen and ink and color rendering.	0.00	Passed	1.00	Most Important
31	Print design from AutoCAD software's.	0.00	Passed	1.00	Most Important

It can be gleaned from the table that the panel of experts rated the core competency items as most important for the graduates to possess. This means that the core competency content of the curriculum for the three areas of specialization is in line with the needs of the industry. Similarly, the finding discloses the College of Industrial Technology's commitment in providing quality education by offering courses that

trained graduates necessary to the manpower needs in the construction industry.

The findings revealed also that the curriculum content in technology education offered in most industrial technology is in the right path. The competency items developed in this study maybe the basis for the curriculum developer to further enhance the technology education so that technology graduates in the country can fairly compete from their counterpart in neighboring ASEAN country.

CONCLUSIONS AND RECOMMENDATIONS

The study was undertaken mainly to develop the competency standards in the three areas of specialization in technology as input for curriculum development. As a result, the main objectives set forth have been achieved and the competencies important for graduates of industrial technology have been developed.

On the basis of the result of Delphi Technique and the appropriate statistical treatment of data, the following conclusions are drawn: the common competencies developed in this study are considered very important based on the judgments and consensus of experts in the construction industry; the core competencies developed in this study in the areas of electrical, civil, and drafting technology are considered very important as it is a concrete reference to guide the curriculum developer to make technology education in the country very competitive to the international labor market; the newly developed competency standards are good input as it will guide individual who have the passion to become technologist in the area of civil, drafting, and electrical technology.

For the Philippines to maintain its competitive advantage in manpower resources, it should produce workers who are endowed not only with the requisite skills and knowledge but more so with the right attitudes and work values. To achieve this, the curricula should be regularly reviewed and the training standard and quality should be pursued. This study aimed to strengthen awareness on the reforms initiatives in industrial and technology education. From the result of the study, it is timely for the educators to benchmark and make a model out of the international perspectives so that best practices in education may be adopted. Educational reforms must be based from a shared knowledge through research findings and outputs. Benchmarking on the best practices in education in any of international institution or business through comparing key metrics of their operations to other similar organizations is the main focus of this information.

This study is in support of the government perspective in line with the pursuance of re-evaluating the importance of industrial and technology education in the Philippine Educational System. The competency developed in this study is one of the attempts to a periodic review of the curriculum content to make the course offerings more responsive to the needs of the industry.

In the light of the foregoing findings and conclusions, the following recommendations are offered: that universities and colleges as well as other training institutions offering technology courses re-examine and review the content of curriculum. The newly developed Standard Competencies may be reviewed by concerned practitioners for further suggestions and improvement. It is recommended also that the final competencies developed be considered and given the importance in any attempt to revise and develop the curriculum considering the validity of the process adopted in the conduct of this study; that the newly developed competencies be considered by the faculty in the course they teach as a guide in the choice of teaching strategies and methodologies that can facilitate the development of the important competencies that the graduate of the course should possess. It is highly recommended that the competency standards developed in this study be subjected to further review and validation through the following:

- Circulating the competency standards to a wide group of stakeholders to include workers, employers, academic managers, technical experts, and other training providers.
- Adopting and trying the standards developed in the different colleges in Region IV-A that offer courses hereto investigated.

A similar study can be conducted in other areas of specialization in technology not covered by the present study and a new policy be formulated to consider the new competency items suggested by the panel of experts for inclusion in the curriculum for the three areas of specialization.

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