

# **Refrigeration and air-conditioning technology course: sustainable growth of professional competency**

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**Abstract.** This study was conducted to explore a practical discussion on helping the students' professional competency. More specifically, this study conducted two studies developing a competency analysis profile on refrigeration and air conditioning technology, and examining the essential core competencies for training undergraduate students in Bachelor of Science in Industrial Technology specializing Refrigeration and Air Conditioning Technology at Cebu Technological University. The qualitative and quantitative data were collected through observations, interviews, document analysis, and developing a curriculum job analysis process from six (6) training instructors from Cebu Technological University, two (2) training instructors from Technical Education Skills and Development Authority and three (3) service technicians from well-known Refrigeration and Air Conditioning Service Centers in Metro Cebu. Moreover, the importance of core competencies as rated by respondents and the mean rating were calculated for each competency. The quality of the results had to be applied for a systematic curriculum and instructional development to effective implementation guidelines. Thus, enhance the competencies in Refrigeration and Air Conditioning Technology.

**Key words:** air-conditioning, refrigeration, profesional competency

## **Introduction**

The national skills competency depends upon the quality of its education system and the qualification of teachers. In dealing with the national skills competence, the quality of education must be in accordance to the recent needs in various industries both local and abroad in order to have gainful employment after completion its education course. Chapter 4 Section 22 of the National Education Guidelines described - "Education shall be based on the principle that all learners are capable of learning and self-development, and are regarded as being most important". The teaching-learning process shall aim at enabling the learners to develop themselves at their own pace and to the best of their potentiality.

Moreover, Section 24 described "In organizing the learning process, educational institutions and agencies concerned has to provide training in thinking process, management, how to face various situations and application of knowledge for obviating and solving problems". (National Education Act of B.E. 2542, 1999).

In Philippine government, the educational sectors such as Department of Education (DepEd.), Commission on Higher Education (CHED), and Technical Education and Skills Development Authority (TESDA) were tasked to train on competency-based training in preparation for skillful and productive employment. To attain this goal, all educational sectors must have a full support and coordination with the said authorities in updating the core competencies required in industry. The Cebu Technological University being one of the State Technological Universities offering the Bachelor of Science in Industrial Technology specializing Refrigeration and Air-conditioning Technology has to follow such mandate. Thus, this study was conducted.

## **Statement of the Problem**

The purpose of this study was to develop a competency analysis profile on refrigeration and air conditioning technology. Specifically, the study sought to answer the following:

1. The profile on refrigeration and air conditioning technology.

2. The essential core competencies for training undergraduate students in Bachelor of Science in Industrial Technology specializing Refrigeration and Air Conditioning Technology.
3. The correlation of the university skill competencies to that of the TESDA NC's.

### **Methodology**

Generally, the qualitative and quantitative method of research were being used in treating collected data from observations, interviews, document analysis, and developing a curriculum job analysis process. The qualitative method was used in determining the present profile of refrigeration and air conditioning technology as prescribed in the Cebu Technological University Code while quantitative method was applied in determining the essential core competencies and the correlational analysis between the University's skill competencies and core competencies in National Certificates issued from Technical Education and Skills Development Authority.

### **Discussion of Findings**

#### **Profile on Refrigeration and Air-conditioning Technology**

Pursuant to Section 5 (2), Article XIV of the Constitution of the Philippines , Cebu Technological University shall enjoy academic freedom wherein the teacher has the right to teach the subject of his specialization according to his best lights; to hold, in other subjects, such as ideas as he sincerely believes to be right; and to express his opinions on public questions in a manner that neither interfere with his duties as a faculty member, nor negate his loyalty to the University that employs him.

Under Title I (Declaration of Policies), Article 7 of University Code, the University envisions to be the center of excellence and development of research, instruction, production, and extension services for progressive leadership transcending global technological, business and industry-driven education. In Article 8, the mission of the University aims to provide advanced professional and technical instruction for special programs across the areas of specialization for global empowerment and the goals of the University is to produce knowledged-based and globally competent human resources who are reasonably flexible and attuned to the latest technology needs.

#### **Core of Competencies**

<b>Practices/Competencies</b>	<b>Instructors</b>		<b>TESD Specialists</b>		<b>Service Technicians</b>	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Practice basic housekeeping procedures	6	100	0	0	2	66.67
Prepare materials and tools	6	100	2	100	3	100
Observe procedures, specifications, and manuals of instruction	3	50	0	0	1	33.33
Perform mensuration and calculation	2	33.33	0	0	1	33.33
Perform basic electrical work	4	66.67	2	100	1	33.33
Maintain tools and equipment	3	50	1	50	1	33.33
Perform housekeeping and safety practices	6	100	2	100	2	66.67
Install window type airconditioning and domestic refrigeration units	2	33.33	1	50	2	66.67

Service and maintain window type airconditioning and domestic refrigeration units	2	33.33	0	0	2	66.67
Troubleshoot window type airconditioning units and domestic refrigeration units	3	33.33	1	50	2	66.67
Practice occupational health and safety procedures	1	16.67	0	0	0	0
Perform basic electrical tools	6	100	2	100	3	100
Survey site for installation	2	33.33	0	0	0	0
Install PACU and CRE	1	16.67	0	0	0	0
Service and maintain PACU and CRE units	1	16.67	0	0	0	0
Troubleshoot PACU and CRE systems	1	16.67	0	0	0	0

The above core competencies were the ones validated by the respondents to have existed in school, while five (5) were said to have been practiced in the school but the TESD Specialist and the Service Technicians agreed that it is non-existent.

**Core Competencies (continued)**

Practices/Competencies	Instructors		TESD Specialists		Service Technicians	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Recover and recycle refrigerant in PACU and CRE systems	0	0	0	0	0	0
Repair and retrofit PACU and CRE systems and its accessories	0	0	0	0	0	0
Perform basic bench work	0	0	0	0	0	0
Perform start-up and commissioning for PACU and CRE systems	0	0	0	0	0	0
Recover and recycle refrigerants	0	0	0	0	0	0
Repair and retrofit window airconditioning and domestic refrigeration systems and accessories	0	0	0	0	0	0
Perform testing and commissioning for window type airconditioning and domestic refrigeration systems	0	0	0	0	0	0
Install PACU and CRE piping systems	0	0	0	0	0	0
Install PACU and CRE electrical systems	0	0	0	0	0	0
Document work accomplished	0	0	0	0	0	0

These practices were never been put into reality as observed by the three groups of respondents.

### Correlation of Skills Competencies

<b>Data</b>	
<b>Level of Significance</b>	<b>0.05</b>
Number of Rows	16
Number of Columns	3
Degrees of Freedom	30
<b>Results</b>	
<b>Critical Value</b>	<b>43.77297</b>
<b>Chi-Square Test Statistic</b>	<b>11.8078</b>
<b>p-Value</b>	<b>0.998801</b>
<b>Do not reject the null hypothesis</b>	

The chi-square test statistic in homogeneity of responses between the University professors and Instructors and that of the TESD Specialists showed no preferences. This would mean that the competencies offered by the school were in consonance with that of the TESDA National Competencies.

### Conclusions and Recommendations

The University's vision as a university of tomorrow wants to train highly competent individuals in preparation for future and profitable employment. However, the core of competencies needs to be enhanced for better and more manipulative skills development. With regard to the core of competencies that need improvement, the institution has to look into the curriculum and review course syllabi that give better results as far as content and competency are concerned for future job satisfaction in industry. This can be done through solicitation of TESD Specialists and Service Technicians' technical know-how and practices in industries.

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