

Refrigeration and Air Conditioning: Breaking Barriers among Practitioners Proficiency

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ABSTRACT

This research assessed the barriers among practitioners proficiency in meeting the global needs in this digital age and industry 4.0. The researcher utilized the descriptive method of research to gather the data needed in this study. The data revealed that refrigeration and air conditioning practitioners were moderately knowledgeable in terms the knowledge, skills and attitudes to safely install the main packaged-type air-conditioning unit (PACU) components and units as well as accessories based on manufacturer's recommendations. Further, issues and concerns were identified, inclusion of HVAC/R in the curriculum was the most addressed concerned. Thus, this implied that there is a need to revisit the RAC curriculum.

KEYWORDS: Refrigeration and Air Conditioning, Practitioners Proficiency, Barriers

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INTRODUCTION

Career is almost impossible without skills whether it is technical skills or soft skills or life skills. Increasing changes in technology and required matching skills was the most often-cited cause of the skills gap (37%), followed by the lack of skilled talent capable of moving into positions with more responsibilities (31%) and lack of qualified candidates (30%) (Writer, 2019). The skills gap is growing, becoming a larger and more serious drag on business efficiency," said Jeremy Walsh, VP of Enterprise Learning Solutions at Wiley Education Services. Research shows that, for the second year in a row, companies are grasping for solutions to improve their ability to find basic talent needs and one thing that is becoming very clear, companies that are willing to build talent versus simply buying talent will be the winners over the next few years.

SGT (2019) stated that skills gap is a term commonly used to outline the gap between the skills which employers require for a position and the skills which employees offer. In Canada, the Skills Gap exists at varying levels of severity for the different sectors, but it is especially pronounced in the industrial and technological sectors. Looking back a few years, as part of social guidance, parental guidance, career education and counselling process available to secondary and post-secondary students, many students were advised to pursue the education which they envisioned would be their passion and which would fulfil their dreams. Students were advised, that pursuing one's own passion, and realizing that in terms of a completion of a post-secondary credential in

their area of interest, would be a sufficient and adequate condition for employment further on in life. According to the article of Talentlyft (2020) identifying skill gaps benefits as it ensures that the workforce is well trained, knowledgeable and better equipped to perform the job. Skill gaps are identified through the process of skill gap analysis.

Refrigeration and Air Conditioning

Moreover, one of the greatest engineering achievements of the 20th century was the development of air conditioning and refrigeration. Air conditioning is the heating, cooling, dehumidification, humidification, ventilation, and sterilization of air. The refrigeration process removes heat from an enclosed space to reduce and maintain the temperature for the contents of that space. While air conditioning regulates the air in a large building, refrigeration solely cools and is generally used in a smaller space. Air conditioning and refrigeration definitely belong in the most important engineering achievements of the 20th century. The comfort, ease, and happiness they bring to our everyday lives is immeasurable. Food preservation, medicine, and industry would not be what they are today without refrigeration. Air conditioning brings a comfort and environmental flexibility that has impacted people more than they realize. Both technologies make the lives of others (Mutter,2009).

Refrigeration is the process of removing heat from a substance under controlled conditions. It also includes the

process of reducing and maintaining the temperature of a body below the general temperature of its surroundings. In other words, the refrigeration means a continued extraction of heat from a body whose temperature already below the temperature of its surrounding (Sobamowo, 2019). While, air Conditioning on the other hand according to Shah (2012) It is the treatment of air so as to simultaneously control its temperature, moisture content, quality and circulation as required. The largest application of refrigeration which is the process of cooling is for air-conditioning.

Moreover, refrigeration and air conditioning servicing is one of the most sought jobs both local and abroad. This is the reason why TESDA have been offering a short course known as RAC Servicing NC II to help interested individuals who want to find a job even without a degree. In the Philippines, Technical Education and Skills Development Authority (TESDA) is the national government agency managing and supervising the TVET system. It provides national leadership for developing a skilled workforce. It is particularly focused on middle-level skills development (semi-skills, skills, craft, and technician training). Further, the Technical Education and Skills Development Authority provides national leadership for the TVET system by implementing competency-based curriculum standards, training regulations, and assessment and certification processes to ensure a high-quality TVET delivery throughout the country. With the country's recent shift to K-12 compulsory education, TVET education is integrated into senior high school. Thus, it is very fundamental to identify the barriers that hinder refrigeration and air conditioning practitioners to identify their current state of knowledge and skills that promote globally competitive graduates.

Objective of the Study

This research assessed the current state of knowledge and skills of Refrigeration and Air-Conditioning practitioners. Specifically, this answered the level of Refrigeration and Air Conditioning competencies and issues and concerns of the respondents as to basic, common and core competencies. The researcher used descriptive research method to gather the information about the level of refrigeration and air-conditioning (RAC) technicians' competencies together with sets of questionnaires as data gathering instruments.

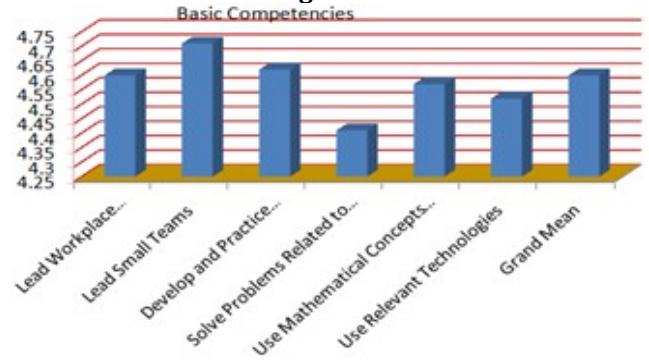
RESULTS and DISCUSSIONS

The results and discussions present the data that had been gathered from the respondents of this study through a questionnaire. The results were analyzed and interpreted. Refrigeration and Air Conditioning competencies of the Practitioners as to Common, basic and core competencies.

Basic Competencies

The basic competencies refer to non-technical skills (knowledge, skills and attitudes) that everybody will need in order to perform satisfactorily at work and in society and are considered portable and transferable irrespective of jobs and industrial settings. These competencies are integrated with 21st century skills, referring to a broad set of knowledge, skills, work habits, and character traits believed to be critically important to success in today's world, particularly in contemporary careers and workplaces. Table 6 presents the basic competencies of the respondents group.

Figure 1.



Data shows the basic competencies of the respondents. Based on the results gathered, item 1 refers to lead workplace communication, got the highest weighted mean of 4.6 which verbally described as well knowledgeable, and while item 4 refers to solving problems related to work activities got the lowest weighted mean of 4.41, which verbally described as knowledgeable. Overall, the respondents got the overall weighted mean of 4.6 which verbally described as well knowledgeable. This entails that the respondents group were well knowledgeable of the basic competencies that includes the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

Common Competencies

Common competencies covers the knowledge, skills and attitudes in identifying, requesting and receiving construction materials and tools based on the required performance standards.

Figure 2.

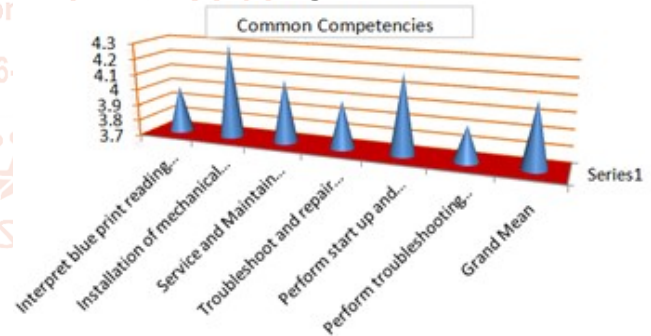


Figure2 shows the common competencies of the respondents group. Based on the data gathered, item 2 refers to installation of mechanical and electrical components, got the highest weighted mean of 4.3 which verbally described as knowledgeable, and while item 7 refers to heating, ventilating and air conditioning/Refrigeration (HVAC/R) Course got the lowest weighted mean of 3.5, which verbally described as knowledgeable. Overall, the respondents got the overall weighted mean of 4.0 which verbally described as knowledgeable. This entails that the respondents group were knowledgeable of the common competencies that includes the knowledge, skills and attitudes in identifying, requesting and receiving construction materials and tools based on the required performance standards. However, the data is alarming because the respondents group were not well knowledgeable on the common competency which is considered important in the teaching and learning process and this might be the reason why there are some students who took RAC assessment failed on their examination.

Core Competencies

Core competencies cover the knowledge, skills and attitudes to safely install the main packaged-type air-conditioning unit (PACU) components and units as well as accessories based on manufacturer's recommendations. It also includes site survey, installation of electrical and piping systems.

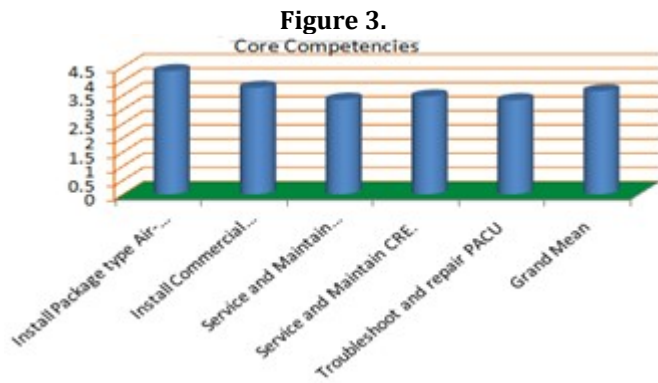
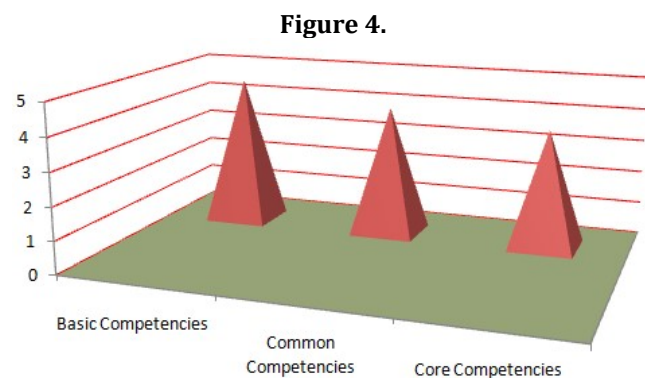


Table 8 shows the core competencies of the respondents group. Based on the results gathered, item 1 refers to Install package type air-conditioning Unit (PACU), got the highest weighted mean of 4.35 which verbally described as knowledgeable, and while item 5 refers to troubleshoot and repair (PACU) got the lowest weighted mean of 3.32, which verbally described as moderately knowledgeable. Overall, the respondents got the overall weighted mean of 3.64 which verbally described as knowledgeable. This entails that the respondents group were knowledgeable of the knowledge, skills and attitudes required to safely install and test domestic refrigeration and air-conditioning (DomRAC) units. It includes conducting survey for installation, installing DomRAC unit and its electrical circuit as well as conducting performance testing. Consequently, if we look deeply on the data we can see that the group respondents were only moderately aware on other competencies. Hence, their knowledge and skills regarding on those matter are limited. Therefore, they cannot perform their task with moderate knowledge.

Refrigeration and Air Conditioning Competencies of the RAC Practitioners



Data gathered shows the Competencies of the RAC practitioners. It entails that the they were well knowledgeable in terms of basic competencies while, knowledge in terms of common and core competencies were tracked as knowledgeable. The data suggest that there's a need to elevate the respondents engagement of the said competencies.

Issues and Concerns

Table 1 shows the issues and concerns related to refrigeration and air-conditioning competencies of the respondents.

Indicators	Frequency f	Percentage %
Inclusion of HVAC/R in the curriculum	34	85
Increase the number of hours in the practicum.	32	80
Skills enhancement for electronic components.	36	90
Upgrading of RAC technicians in the new technology.	30	75
Enhancement of RAC technicians regarding inverter units.	38	95

Conclusions

The Findings have shown that the overall knowledge of the group respondents in relation to basic competencies got the overall weighted mean of 4.6 which verbally described as well knowledgeable. This implies that the respondents group were well knowledgeable of the basic competencies that include the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements. On the other hand, common competencies got an overall weighted mean of 4.0 which verbally described as knowledgeable. This entails that the respondents group were knowledgeable of the common competencies that includes the knowledge, skills and attitudes in identifying, requesting and receiving construction materials and tools based on the required performance standards. Core competencies on the one hand got an overall weighted mean of 3.64 which verbally described as knowledgeable. This entails that the respondents group were knowledgeable of the knowledge, skills and attitudes required to safely install and test domestic refrigeration and air-conditioning (DomRAC) units. Consequently, if we look deeply on the data we can see that the group respondents were only moderately aware on other competencies. Hence, their knowledge and skills regarding on those matter are limited. Therefore, they cannot perform their task with moderate knowledge. Moreover, the issues and concerns of the group respondents were divided into number of reasons. The data shows that enhancement of RAC technicians regarding inverter units was considered as the topmost issue in terms of technicians' development which garnered 95 percent of 38 out of 40 respondents. Moreover, item 3 was the second highest percentage in terms of issues and concerns of the respondents. This entails that technicians have insufficient knowledge about electronic components and need to improve their knowledge on this area to fully equip with the skills that industry 4.0 required.

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