Development of Competency Standards for Automotive Technology Program

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Abstract

This study was conducted to find out the degree of significance of competencies in knowledge domain, skills and work attitude in automotive technology and developed competency standards for Automotive Technology program. Conducted from January 6 to February 25, 2020, the data were gathered from 60 respondents composed of 20 recognized automotive technicians from industry or the well-known automotive companies; 20 famous automotive entrepreneurs who run a small automotive service shops, skilled and well-known for their expertise on this specific field; and 20 automotive instructors/professors from the academe and training centers in Iloilo City and province. The PMDEE process in competency standards development was utilized that includes Profiling, Mapping, Designing and Development, Expert Validation and Evaluation.

The results revealed that the entire competencies in knowledge domain, skills and work attitude of the proposed competency standards for Automotive Technology program were rated as "very significant" as evaluated by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe since the respondents found all the items of the developed competency standards to be "very significant", it implies that each competency in knowledge domain, skills and work attitude of the proposed competency standards were very important and must be included in the competency standards for Automotive Technology program. Furthermore, findings led to the conclusion that perceptions in knowledge domain, skills and work attitude of automotive technicians from the industry, automotive entrepreneurs and automotive instructors/professors from the academe were almost the same as to the degree of significance of the underpinning competencies.

As an offshoot of the study, a competency standards for Automotive Technology program was crafted and developed and was "very acceptable" in terms of physical aspects, contents, learning competencies and evaluative measures. The developed competency standards for Automotive Technology program may be used in order to ensure the congruency and to avoid the "mismatch" and skills gap of competencies being taught in the academe to what are practiced in the automotive industry.

Keywords: Competency standards, automotive technology, knowledge domain, skills and work attitude

Introduction

This millennium has seen rapid advancements in technology as well as other significant technical changes. The use of robotics and sophisticated technology in place of human hands has caused knowledge to quickly become outdated and the requirement for unskilled labor to decline.

These are the typical barriers that technology graduates face while trying to obtain a job in an industry where the majority of people must rely on current technology to get by comfortably. The ever-changing requirements of society must therefore be met by sectors of the economy engaged in the development of technology and by skilled workers.

Employers choose personnel based on their competences, as well as their knowledge of the industry's required knowledge and skills, specialized training, and certain fields. In order to identify how these prospective employees will be trained with their knowledge and abilities in order to achieve market share and produce profits for the company, employers conduct the selection process based on their criteria. Graduates of today are expected to possess the skills needed to compete in the rapidly expanding sector.

All technical institutions in the nation that offer courses in automotive technology recognize the value of receiving a high-quality education and strive to offer excellent educational opportunities that will help students reach their potential in this area of concentration. They also continuously work to improve the range of instructional quality and to raise students' academic performance and skills in the automotive industry. Education must be of a standard that enables students to think critically about concepts in industrial technology and learn how to address these concepts based on their understanding of the subject over time. This will enable citizens to create, act morally, think critically, and support the nation's economic growth.

The rate of unemployment, underemployment, and misemployment, as well as the proportion of graduates who land vertically with their course, are important issues in higher education institutions since they have an impact on the effectiveness of the college or university. One of the main problems is the quality of graduates who possess the necessary skills that the industries need for their workforce, which is in addition to the issue of the labor market and industry's poor capacity to absorb current and prior graduates (Habalo, 2016).

It is surprising that no government organization has given significant attention to the creation, administration, and management of these initiatives. Usually, schools that offer these programs are given responsibilities, which frequently leads to training institutes producing graduates that are of poor quality.

The Philippines' higher education institutions graduate far too many people in the field of technology, according to an analysis of the country's educational system. A "mismatch" of capabilities is seen between the knowledge, skills, and work attitude that program graduates have gained and what the industry requires, in addition to the issue of the labor market's limited absorption capacity and the quality of graduates.

The problem for higher education institutions, according to Yorke (2013) as referenced by Habalo (2016), is to design upgrading programs that are relevant to curriculum, their potential job marketability, and how industry saw the graduates in terms of skills and knowledge aptitude. To help students develop the competencies and values that will drive employment and their work ethics as personal qualities that will increase their likelihood of obtaining employment and succeeding in their chosen occupations, which benefits themselves, the workforce, the community, and the economy, competency-based approaches and strategies should be established.

The concern to create highly innovative competency standards in automotive technology to improve students' performance and enable them to keep up with industry demands is brought about by trends, the working environment in the industries of skilled automotive technicians, and the teaching-learning process in academia. The curriculum must be created to keep up with and not fall behind the expectations of the industry since we believe that technical advancement must be ahead of the curve

Program outcomes are the sets of competences (related knowledge, abilities, and attitudes) that all learners are expected to exhibit, according to the CHED Handbook on Typology (2012). Indicators for institutions or programs may also place a focus on lifelong learning. For instance, HEIs could outline the qualities they want to see in graduates five years after graduation.

In this way, academia may offer students the crucial and pertinent competencies they require. To ensure that graduates of automotive technology programs will be successful in the workforce, these competences should be in line with the requirements of the sector. As a result, SUC's should alter their curricula and programs by expanding or improving their capabilities.

Based on the identified competencies in knowledge, skills, and work attitude as evaluated by reputable automotive technicians from the industry, automotive entrepreneurs, and automotive instructors/professors from the academe, this study aims to develop competency standards for Automotive Technology programs. According to their judgments based on their everyday experiences in the automotive industry, the competences under the many domains that are highly important and necessary for a student to learn, should be designed and included in the curriculum.

Statement of the Problem

The purpose of this study was to ascertain the level of significance of the underlying competencies in knowledge domain, skills, and work attitude in automotive technology as evaluated by recognized automotive technicians from the industry, automotive entrepreneurs, and automotive instructors/professors from the academe. It also sought to determine whether these competencies are significant enough to be included in the development of competency standards for Automotive Technology program.

This research specifically attempted to provide answers to the following questions:

1. What level of significance, as determined by reputable automotive technicians from business, automotive entrepreneurs, and automotive instructors/professors from academia, is each competency under the knowledge domain in automotive technology?

2. Which competencies are under the skills domain in automotive technology, and how important are them according to the industry-recognized technicians, business owners, and professors of automotive technology?

3. Which competencies fall within the work attitude domain in automotive technology, and how important are they according to industry-recognized automotive technicians, business owners, and academic automotive instructors/professors?

4. Based on the study's findings, what competency standards for the Automotive Technology program can be created?

5. What amount of acceptance do the automotive instructors/professors and the deans of the College of Industrial Technology from academia provide the competency criteria created for the Automotive Technology program?

Significance of the Study

As the study's beneficiaries, the students will gain from the improved Automotive Technology Programs and gain knowledge that will help them understand the need of curriculum improvement. They might benefit from the improve program/curriculum for their next employment. The findings of this study will provide information regarding student performance to professors and instructors of automotive technology, offering them insight into areas where classroom training needs to be changed and improved. Additionally, it will provide them with the precise abilities they can include in the creation of their major shop course syllabus. This will help prospective employers choose and hire skilled professionals and technicians who have received higher education in an appropriate manner. The administrators and supervisors of industrial and technical education programs would also benefit from this research as they revise and implement their schools' automotive technology curricula. Finally, the study's findings will give policymakers a foundation for improving how automotive technology programs are implemented, give students access to the best benchmarking data and training methods available in the industry, and offer students updated, realistic courses that are based on their careers and meet the rapidly changing needs of the automotive industry.

Review of Literature

Education 4.0: Challenges, Issues, and Opportunities

In order to update and implement the automotive technology curricula in their schools, the administrators and supervisors of industrial and technical education programs would also gain from knowing the results of this study. Finally, the study's results will provide policymakers with a basis for enhancing the way automotive technology programs are put into practice, give students access to the best benchmarking information and training techniques available in the sector, and provide students with up-to-date, practical courses that are based on their careers and satisfy the rapidly changing needs of the automotive industry. Elders then face a hurdle in

dealing with today's youth because they were raised in the modern period. Even a three-year-old child is capable of effective communication and multilingualism. They are adept at using computers, smartphones, and other technology. Those from the secondary and tertiary levels, how much more.

How to manage the teaching and learning process is one of the biggest issues facing educators. Today's students dislike reading books, particularly when they are asked to remember a poem or other reading material. They are constantly seeking quick and simple learning methods.

Education 4.0 was termed the new buzzword in a July 28, 2019, story in The Philippine Star because it was upending our conventional ideas of education, teaching, and learning. Generation Z or the Internet Generation (iGen) students, who are not only computer knowledgeable but also technology dependent, practically born with a smartphone in their hands, and who view technology as important as oxygen and water, have replaced the millennials in our classrooms. Since they have never seen a world without the internet, they are unable to envision a world without connectivity. They represent the ideal digital native. They are technology addicts. Growing up with many devices that are connected to the internet allows children to process and take in a lot of information. They are dependent on social media. Their hyper-connected upbringing gave them not only the skills, but—more intriguingly—the habits needed to switch tasks with ease. Their thoughts are continuously bouncing around and diverging. In 4D virtual or augmented reality settings, they can flourish.

Dr. Darla Rothman, who was cited by the article's author, Ma. According to Antoinette C. Montealegre, D.A., officer-in-charge at the Philippine Normal University's Office of the President, this generation's brains are designed to process information visually because they are constantly exposed to a fast-paced, sensory-rich environment that emphasizes multimedia. Their attention span is limited by the way their brains are wired, which causes them to anticipate information in bite-sized portions. According to Rothman, the typical attention span of this generation is eight seconds for online platforms and seven to ten minutes for classroom settings. The iGen learners embrace storytelling, explainer videos, interactive games, collaborative projects, experiential learning and other forms of visualization. They excel at video blogging and are aware that becoming a social media influencer will provide them the chance to become financially independent of their parents.

According to the Global Connectivity Index for 2018, the Philippines was ranked 57th out of 79 participating nations (GCI). With 63 percent of the people using the internet and using it an average of 10 hours a day, we have the fastest-growing digital population in the entire globe. Filipinos are the world's top internet users, according to Digital 2019, with social media accounting for 47% of our online time. The choices of today's learners have also undergone an equally fascinating transition in tandem with this drastically altering environment.

Then, how can we approach the difficulties of instructing these newcomers, in particular the Filipino iGen learners? A national discussion is now required to contextualize the Industrial Revolution (IR) 4.0, which is the digitization of the economy's production and exchange of products and services utilizing intelligent and autonomous systems powered by data and

machine learning. In IR 4.0, the human-machine relationship is strengthened through creating an innovation society, which may make the existing Philippine educational system obsolete because it was created to meet the needs of a mass economy.

Now let's turn our focus to education 4.0, which prioritizes mobile learning, personalized learning playlists, flexible and tailored curricula, and hands-on and real-world knowledge application. We require educators who are both learning facilitators and catalysts for innovation. Therefore, we need to perform a significant reboot right away to improve our educational ecosystem.

As the process shifts from a traditional learning paradigm to a transformative one, Rothman emphasized that teachers need to be given relevant, tech-focused professional development.

In order to give our pre-service teachers the skills they need to create digital solutions to their teaching-learning problems, the teacher education curriculum should be sufficiently cutting-edge to include, for example, a) coding and application development; b) design thinking for innovation; and c) teaching applications that would be most effective in handling the "content of the future" using software, hardware, digital, technological, and social media. For inclusive education to be effective, the nation's technological infrastructure must be improved so that it can reach even the most remote barangay. Education 4.0 must be advantageous to students from these geographically difficult places as well. Nobody ought to be forgotten.

On the other hand, during the 2018 Philippine Society for Public Administration (PSPA) International Conference held on November 13, 2018, Department of Education (DepEd) Secretary Leonor Magtolis Briones emphasized the developments brought about by the Fourth Industrial Revolution and their relevance to Philippine public administration. We are currently immersed in the fourth industrial revolution, said Secretary Briones. The changes in digital drivers include, among other things, the development of technology and the Internet. The drivers of this are physical, digital, and biological, which brought developments to our lives. It should be emphasized that DepEd is attempting to provide Filipino students with access to various technology breakthroughs and equipment as part of their learning process in collaboration with partner agencies and organizations.

The field of automotive technology likewise benefits greatly from this technological breakthrough. The development of high-end cars, which are driven by computers, electronics, and digital technologies, presents difficulties for the technical education provided by the several SUCs in the nation that provide these programs. In recent years, the automotive industry has collaborated closely with leading technology firms to provide the most cutting-edge, secure, and comfortable vehicles available. Automobiles are evolving into enormous smart gadgets with improved emergency braking, mapping technology for autonomous driving, higher fuel efficiency, and more pleasant interiors.

There are countless ways that cars make our lives better in terms of safety, navigating from point A to point B with less fuss, and providing entertainment while doing so. The automobile sector is anticipated to go even more in the upcoming years, bringing us one step closer to a more connected and computerized environment.

Bok (2006) covers the set of competences that should be developed by the individual and its needs that should be addressed in order to keep up with the demands of the industry in his famous book, A Candid Look at How Much Students Learn and Why They Should Be Learning More. Bok (2006) emphasizes that learning should be put into practice in order to give it purpose. He also emphasizes the importance of evaluating the abilities that higher education institutions are teaching so that they might be in line with those of the industry.

In order to ensure congruency and prevent a mismatch and skills gap between the competencies of the graduates and what are actually performed in the industry, instructional strategies and educational approaches should be in consideration of these technological advancements, particularly in the automotive field. This is to guarantee that graduates of the aforementioned programs may find employment.

Perhaps it is now more important than ever to re-adopt improvements to competency-based approaches in the field of automotive technology education-competencies that take into account the various learning domains, the knowledge, skills, and work attitude of students, as well as competencies being put into a standard as evaluated and validated not only by recognized experts in the industry and academe but also by those small automotive businesses run and operated by recognized entrepreneurs. In order to achieve the standards set by the Technical Education and Skills Development Authority (TESDA) and the Commission on Higher Education in regards to automotive technology programs and trainings, it is challenging to offer competency standards for these programs at this time.

Defining a Competency

The definition of a competency is the capacity to perform an action successfully or effectively (Oxford Dictionary, 2019). When acquired, it is a mix of knowledge, skills, and abilities that enables an individual to carry out a task or function at a particular level of competency. Under the pertinent level of complexity, it is mentioned what level of skill is required for that specific competency.

Competency is described by the Australian Department of Mines, Industry Registration and Safety as the capacity to apply or employ a collection of relevant knowledge, skills, and abilities necessary to successfully complete "critical job functions" or tasks in a specific work environment. Competencies are frequently used as the foundation for skill standards, which outline the degree of knowledge, skills, and abilities necessary for success in the workplace. Competencies can also be used as prospective assessment criteria for judging the attainment of competency standards. Competence is a measurement of both shown knowledge and demonstrated skills.

According to the Technical Education Skills and Development Authority (TESDA), those competences are a specific combination of knowledge, skills, and abilities that an individual develops while actually carrying out a work. It involves a person's personality qualities, such as their work ethic, motivations, traits, abilities, components of their self-image or social role, or a body of knowledge applied to a particular task (TESDA Competency Standards, 2013).

According to Bueno & Tubbs, a person's competencies are their performance abilities that enable them to carry out a certain work or employment (2004). The study underlined that competencies are the personal qualities that can be consistently tallied or quantified and that have been found to significantly differentiate levels of knowledge and abilities learned and executed.

E.M. also defines competency in a similar manner. According to UNEVOC, a person's ability to use, apply, and demonstrate a group of related awareness, knowledge, skills, and attitudes is what qualifies them for employment. This ability can be measured against industry-accepted standards (levels) and evaluated against materials that are made available on the job site. The competencies often fall into two categories: technical and behavioral, and they have an impact on both the person's job responsibilities and his performance on the job.

And according to the definition of a competent person, this is a person who has been appointed or designated by the employer to carry out particular tasks based on their education, training, and experience.

Competency can also be monitored and evaluated (International Labour Organization, 2002). Competency is therefore more than just the sum of one's knowledge, talents, and work ethic; it is also a dynamic idea of putting action into practice. It specifically refers to achieving a learning outcome's goal within a defined necessity. The substance of the competencies in education and training must first be studied so that the items and standards for the measurement competencies can be defined in order to effectively accomplish the aims of automotive technology training.

According to Pukelis (2009), competency is defined as a person's ability to act and to do a certain legal and trustworthy aspect of a job that is attested by a document as proof. According to Moon, competencies are components of occupational standards that are stated in rigorous terms (2002). The ability to address a portion of a professional challenge in an unpredicted work environment is referred to as competence. The development of a person's abilities in accordance with the competencies specified in a certain occupational standard occurs during the education and training process, but not the competencies themselves.

Additionally, Teodorescu (2006) discusses the significance of competencies in carrying out particular jobs as being very important in securing a good job. Competencies are particular personal qualities that are causally related to effective and superior performance, are typical across many settings and situations, and last for a while. He concludes by defining the context of competencies in the workplace as a combination of cognitive skills, personal or behavioral traits that are a function of a person's personality.

For each specific requirement that a given study program is thought to satisfy, there is an entire spectrum of competencies to cover. The vast array of competencies can be divided into two categories: those that can be successfully applied across the greatest number of activities, and those that can be appropriately organized in adaptive and flexible ways, as described by Weinert (2001).

While learning outcomes are tied to the teaching and learning environment, i.e. an effort to imitate genuine job circumstances, competencies are linked to job practice in the labor market. Due to this, stakeholders in higher education institutions, such as graduates' employers, are able to assess whether study programs were composed of pertinent learning outcomes and so offered the abilities needed in the labor market. Strategies of study process realization must be based on certain principles of students' self-organization if they are to aim towards the development of competencies in higher education institutions. A competency-based curriculum changes how educational activities are approached and how learning is organized such that it is driven by the goals of the learner.

The study on competency models by Delamare Le Deist and Winterton (2005) emphasizes that competencies are specific in nature and that there are functional or jobs-related skills with underlying behavioral competencies in relation to those that have already been suggested. The competency domains in these models are divided into competency groups, which are then further divided into sub-competencies.

There are various perspectives on competency, which simply means that it could be viewed as a set of standards in various fields, including knowledge, skills, and work ethics, which define a person's level of attainment or expertise at various levels, necessary to carry out a task successfully and effectively.

The current study took into account and examined the significance of learner competencies—competencies that could help them develop as a whole person, the knowledge, skills, and work ethic most highly regarded by employers—as well as competencies that are timely and capable of meeting the demands of automotive technology on a global scale.

The previous analysis of relevant articles, research, and projects focuses on the idea of Education 4.0, which poses problems and challenges for the educational sector. The researcher makes sure that papers and material are found that in some way advance the research. The competencies that will be incorporated into the competency standards are ones that are relevant to today's technology and are of utmost importance. The proposed competency standards, which were based on some legislative foundations, TESDA Training Regulations, and VMGO of several State Colleges and Universities around the nation, are subject to the validation and review of the responses. The establishment of competency requirements for the automobile industry included skills deemed to be highly significant by respondents.

Methodology

This descriptive study is limited to the evaluation of the underpinning competencies in knowledge domain, skills and work attitude as to the degree of its significance for the development of competency standards for Automotive Technology program. The different sources of the identified competencies are the existing Training Regulations (TR) of Automotive Servicing NC1, NC2 and NC3 of the Technical Education and Skills Development Authority (TESDA), competencies of Automotive Technology under the Technical-Vocational-Livelihood (TVL) Track of the Senior High Curriculum of the Department of Education (DepEd), existing list of competencies under the Bachelor in Industrial Technology

(BIT) of some State Universities and Colleges (SUC's) in the Philippines, and from the curricular structure of the Bachelor in Technical and Vocational Teacher Education (BTVTED) of the Commission on Higher Education (CHED).

The proposed competency standards for Automotive Technology program was limited to four (4) major shop subject areas that focus mainly on the engine of a car and its accessory systems. These subjects are Electronics Engine Management Control System, Car Care Servicing, Emission Control and Engine Tune Up, Engine Overhauling and Performance Testing and Automotive Electrical, Electronics System.

The sixty (60) respondents of this study were composed of three groups. Twenty (20) recognized automotive technicians from industry or the well-known automotive companies, twenty (20) automotive entrepreneurs who run a small automotive service shop, and twenty (20) automotive instructors/professors from the academe in Iloilo City and Iloilo provinces. They evaluated the identified competencies in knowledge domain, skills and work attitude of each subject as to the degree of their significance in the development of the proposed competency standards for Automotive Technology program.

Survey research method was used in the study, using a list of competencies as a data gathering instrument. There were two data gathering instruments used in the study; the first instrument for the evaluation of the underpinning competencies as to the degree of significance of competencies in knowledge domain, skills and work attitude for the development of proposed competency standards for Automotive Technology program and second instrument is for the acceptability of the proposed competency standards for Automotive Technology program as to the physical aspect, content, learning competencies and evaluative measures. The descriptive statistics used were mean and standard deviation.

Results and Discussion

The overall mean results of competencies in knowledge domain for the proposed competency standards for Automotive Technology program were rated "very significant" by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe.

Likewise, the entire competencies in skills domain for the proposed competency standards for Automotive Technology program were rated "very significant" by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe.

In the same manner, the result of the study shows that the entire competencies in work attitude domain of the proposed competency standards were rated "very significant" by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe.

Based on the above findings, it shows that recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe found all the items in the proposed competency standards to be "very significant". It strongly implies

that each competency in knowledge domain, skills and work attitude of the proposed competency standards is very important and must be included in the final competency standards for Automotive Technology program.

On the other hand, the tables show and lead to a conclusion that perceptions in knowledge domain, skills and work attitude of automotive technicians from the industry, automotive entrepreneurs and instructors/professors from the academe were almost the same as to the degree of significance of the underpinning competencies to be included in the development of a competency standards for automotive technology program. Their perception with regard to competencies in different domains that a student should learn in the academe is almost the same with other automotive technicians despite of their different functions and practice in line with this field of specialization. Although there are few items that were evaluated by automotive technicians as "significant" only but the overall mean showed that the entire competencies were "very significant".

The results conform to the study of Mucas, (2010), Development and Validation of Competency Standards for Electronics Technology Program, wherein the academic sector found all items in the competency standards to be "very important", and they strongly indicate that the proposed competency standards are valid and should be included in the preparation of the final list of competencies for electronics technology program. But this study showed that some items were not considered as "very important" by the industry sector and needs reassessment by the proponent. The differences in the evaluation of some items by the academe and industry sectors suggest that indeed theory may not always be consistent with practice.

The result of evaluation made by respondents to the proposed competency standards for Automotive Technology program which include the knowledge domain, skills and work attitude conform to the pertinent provisions pursuant to the Republic Act (RA) No. 7722 otherwise known as the "Higher Education Act of 1994" and for the purpose of articulating the industrial technology program for global competitiveness by improving the quality of instruction.

The evaluation of these sectors, the automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe, also generates a new idea that the industry need workers who are equipped with relevant knowledge, skills and most of all possess the right work attitude. All these greatly contribute to the efficient workforce of the automotive industry.

In like manner, the proposed Competency Standards for Automotive Technology Program may help achieve the following objectives stated in Article IV (Competency Standards) section 6 considering graduates of the Bachelor of Industrial Technology (BIT) program as technologists who are: (1) Technicians/skilled workers who can perform task independently without supervision and have the mastery of performance standards as required in the Technician Competency Skills Test (TCST), (2) Industry supervisors and managers who can perform management functions in industrial organizations and can contribute to the Total Quality Management (TQM) of industrial organizations, and (3) Industry consultants and technologists

who can conduct research or feasibility studies to solve problems in the industry and can perform skilfully as required by industries.

Inclusion of these modified, validated and evaluated competencies in technical education is necessary and timely for automotive technology programs to meet the required knowledge, skills and work attitude of graduates and the demands of the industry.

The results also conform to the study of Valenciana, (2007) on Vertically Articulated Architectural Drafting Technology Curriculum wherein both the academe and industry experts agreed on the contents, competencies, values and strategies of the entire subject in the articulated architectural drafting curriculum with valuable suggestions to be considered for the improvements of the subjects. The evaluation results of the instructors from the academe and technicians from the industry sector for both knowledge and skills domain simply proved that the knowledge and skills domain required by each industry vary based on their specific area of specialization and on the product and services they offer.

In general perspective, the results of the evaluation showed that recognized automotive technicians from the industry sector, automotive entrepreneurs and automotive instructors/professors from the academe were almost the same in saying that all identified competencies in knowledge domain, skills and work attitude are *very significant*, thus all competencies in the knowledge domain, skills and work attitude are very important and must be included in the development of the proposed competency standards for Automotive Technology program.

The Output of the Study: The Proposed Competency Standards for Automotive Technology Program.

As an offshoot of the study, a Competency Standards for Automotive Technology Program was crafted and developed based on the results of evaluation as to the degree of significance of each underpinning competencies. Competencies that were evaluated as "very significant" and "significant" were included in the development of a competency standards for the said program.

The proposed competency standards for Automotive Technology program was submitted for evaluation of 15 respondents composed of ten technology instructors/professors, and five Deans of the College of Industrial Technology in terms of acceptability of the proposed competency standards in relation to Physical Aspects, Contents, Learning Competencies, and Evaluative Measures.

The developed competency standards were rated as "very acceptable", with an overall mean of ($M= 3.62$) as evaluated by automotive technology instructors/professors and Deans of College of Industrial Technology from the academe, this means that the competency standards for Automotive Technology program is very acceptable and need no changes in terms of its physical aspects, contents, learning competencies, and evaluative measures.

The evaluation of respondents on the developed competency standards for Automotive Technology program showed and lead to a conclusion that the said competency standards is

very acceptable in terms of its physical aspects, contents, learning competencies, and evaluative measures and may be utilized also in order to ensure the congruency and to avoid the skills gap and "mismatch" of competencies being taught in the academe and of what is really practiced in the industry.

The competency standards for Automotive Technology program may be used also by automotive technology instructors/professors on the revision and improvement of their course syllabi especially in the inclusion of the identified competencies for the subject. Perhaps it could serve as basis to provide students with realistic career-based and updated courses to meet the fast-changing needs of the industry. And for other researchers in developing studies that can benefit the industrial programs of every technical/vocational institution in the country.

Summary of Findings

 The findings of the study are the following:

1. The entire competencies in knowledge domain for the proposed competency standards for Automotive Technology program were rated "very significant" as evaluated by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe. The result indicates that the underpinning knowledge competencies were very important and should be included in the development of a competency standards for Automotive Technology program.

2. The entire competencies in skills domain for the proposed competency standards for Automotive Technology program were rated as "Very Significant" as evaluated by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe. It implies that the underpinning skills competencies were very important and should be included in the development of a competency standards for automotive technology program.

3. The entire competencies in work attitude competencies domain for the proposed competency standards for Automotive Technology program were rated as "very Significant" as evaluated by the recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe. The result indicates that the underpinning work attitude competencies were very important and should be included in the development of a competency standards for Automotive Technology program.

4. As an offshoot of the study, a developed competency standards for Automotive Technology program was crafted and developed in order to ensure the congruency, to avoid skills gap and mismatch of competencies being taught in the academe and those competencies that were practiced in the automotive industry.

5. The Developed Competency Standards were "Very Acceptable" as evaluated by automotive technology instructors/professors and Deans of College of Industrial Technology from the academe in terms of physical aspects, contents, learning competencies, and evaluative measures.

Conclusions

Based on the above findings, this study arrived at the following conclusions:

The fact that recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe found all the items in the proposed competency standards to be "Very Significant". It strongly implied that each competency in knowledge domain, skills and work attitude of the proposed competency standards should be included in the preparation of the final list of competencies in the development of competency standards for Automotive Technology program.

The results of the evaluation of competencies in knowledge domain, skills and work attitude as evaluated by the recognized automotive technicians from the industry, automotive entrepreneurs and instructors/ professors from the academe were almost the same as to the degree of significance of competencies to be included in the development of a competency standards for Automotive Technology program. The findings led to a conclusion that what

the participants of the study perceived and believed as significant competencies in automotive technology were almost the same and these should be included in the development of a competency standards for Automotive Technology program.

As an offshoot of the study, the developed competency standards for Automotive Technology program may be used in order to ensure the congruency, to avoid the "mismatch" and skills gap of competencies being taught in the academe and what the automotive industry demands/practices. It could be used as guide in the preparation of the course syllabi and any form of instructional materials in teaching Automotive Technology major subjects as well.

The developed competency standards for Automotive Technology program was very acceptable as evaluated by automotive instructors/professors and Deans of College of Industrial Technology from the academe in terms of physical aspects, contents, learning competencies and evaluative measures, therefore it could be used by the academe and training centers offering Automotive Technology courses.

Implications

In view of the findings and conclusions, there are certain implications for theories and practices concerning on the development of a competency standards specifically for automotive technology program.

For Theory. The result of this study confirms the viewpoints on the Theory of Congruence by Prosser and Quigley (1987), which states that, "Effective vocational training shall take place only when there is industry required experiences." Vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he must subsequently work.

This theorem dictates that the type, kinds, amount, use and arrangement of space, materials, equipment and supplies for a preparatory program be a replica of those in employment. It has a bearing upon the length of time devoted to skill development necessary to approach industrial

practice. It has implications for quality and quantity of production expected. It has direct implications for teacher learner ratios. It relates directly to the efficiency with which a student transfers from school to employment.

It also implies that effective vocational training can only be given where the training jobs are carried on in the same way with the same operations, the same tools and the same machines as in the occupation itself." The implications of this statement are that instructors and practitioners must have an ample experiences in order to be skilful in the use of the latest equipment and must make use of the same types of tools and equipment as would be currently found in employment; and, must use actual jobs or work identical to that provided in employment for instructional experience rather than pseudo or so-called "project" work. It is emphasized here are that the skills taught should follow the same basic practices as industrial employers would expect, and learners should be able to move from the training situation to employment situation with little need for adjustment.

The result of this study confirms also the viewpoints of Thorndike's primary laws of learning in Stimulus-Response Theory; the Law of Readiness, Law of Effect and the Law of Exercise. Learning is dependent upon the learner's readiness to act, which facilitates the strengthening of the bond between stimulus and response. These response to a situation which are followed by a rewarding state of affairs will be strengthened and become habitual responses to that situation. And when exercised, connections become strengthened and weakened when practice is discontinued.

 Thus, a student who is highly motivated and eager to learn is more likely to be receptive to learning than one who is poorly motivated. Kratochwill, Cook, Travers and Elliot (1999), stresses that learner's readiness are connected in the physical, biological and psychological maturity of an individual before he/she can learn specific skills. The readiness of an individual is based on his/her willingness to learn, and without readiness, no learning can take place. Sharma S. & Choudhary P. (2011), also emphasized that readiness include all those preparatory adjustments both technical competency and work behavior skills.

 These laws relate with the present study which is the development of competency standards in Automotive Technology considering the readiness of students, how it is being exercised and considering its effects to the training of students in order to ensure their employment after graduation.

Likewise this study affirms on the Constructivist Theory by Bruner (1996) that "learning is an active process in which learners construct new ideas or concepts based on their current/past knowledge. Meaning, instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness); instruction must be structured so that it can be easily grasped by the student (spiral organization); and instruction should be designed to facilitate exploration and/or in the gaps (going beyond the information given."

 In consonance with the theory, this study applied the identification of significant competencies in knowledge domain, skills and work attitude and development of a competency standards for Automotive Technology program needed by students in order for

them to be ready, organized, and well-equipped with knowledge, skills and the right attitude after graduation. The study focused on the development of competency standards for Automotive Technology program that would ensure automotive technology students' employability; necessary values to improve students' work attitude; matching and congruency of practices between academe and industry sectors. Furthermore, the constructivist theory guided the researcher in developing and validating the competency standards necessary for the learning of automotive technology students.

Likewise, the development of the competency standards implies the smooth training of students in the Automotive Technology programs. This will guide the automotive instructors and professors in doing very significant trainings in order to ensure the quality of competencies to be acquired by the Automotive Technology students.

For practice. The findings of the study revealed the fact that recognized automotive technicians from industry, automotive entrepreneurs and automotive instructors/professors from the academe found all the items in the developed competency standards to be "very significant", and it strongly implied that each competency in knowledge domain, skills and work attitude of the proposed competency standards were very important and should be included in the preparation of the final list of competencies in the development of a competency standards for automotive technology program.

The results of the study likewise showed that the entire competencies were evaluated as "very significant" as evaluated by the respondents but there were few items evaluated only as "significant" by automotive technicians from the industry. Nevertheless, the overall mean results of evaluation shows that the entire proposed competency standards were evaluated as "very significant", as evaluated by automotive technicians from the industry, automotive entrepreneurs and automotive instructors/professors from the academe. This implies that perceptions in knowledge domain, skills and work attitude of automotive technicians from the industry, automotive entrepreneurs and instructors/ professors from the academe were almost the same as to the degree of significance of the underpinning competencies to be included in the development of a competency standards for Automotive Technology program.

This results conform to the study of Mucas, (2010), Development and Validation of Competency Standards for Electronics Technology Program, wherein academic sector found all items in the competency standards to be "very important", and the result of his study showed that the proposed competency standards are valid and should be included in the preparation of the final list of competencies for electronics technology program. In his study, some items were not considered as "very important" by industry sector but only needs reassessment of the proponent.

Likewise, the results conform to the study of Valenciana, (2007), Vertically Articulated Architectural Drafting Technology Curriculum wherein both the academe and industry experts agreed as to the contents, competencies, values and strategies of the entire subject in the articulated architectural drafting curriculum with valuable suggestions to be considered for the improvements of the subjects.

A significant difference in the evaluation of the academe and industry sector for both knowledge and skills simply proved that the knowledge and skills required by each industry varies based on specific area of specialization on product and services they offer.

In view of the findings of the study, the proposed competency standards for automotive technology program could be used as guide in the preparation of the course syllabus and instructional materials in teaching automotive technology identified subjects. The underpinning competencies in knowledge domain, skills and work attitude found to be very significant should be included in the duration of the training. This will guide the instructors and professors in order to ensure the quality of competencies to be acquired by students, to ensure the congruency, and to avoid the "mismatch" and skills gap of competencies being taught in the academe that are really practiced in the automotive industry.

Recommendations

In light of preceding findings, conclusions, and implications set forth in this study, the following recommendations have become imperative.

Although the results of the evaluation of competencies in knowledge domain, skills and work attitude were "significant" and "very significant" to be included in the development of a competency standards for automotive technology program the following recommendations were made in order to strengthen further the Automotive Technology program implementations and to produce quality graduates who are more competent on their chosen field.

Based on results of the study made upon, the research proponent recommends the following:

1. The developed competency standards for Automotive Technology program may be used by Automotive Technology instructors, professors and teachers on the revision and improvement of the course syllabi and other forms of instructional materials especially in the inclusion of the identified competencies for the subject.

2. Automotive Technology students may focus and value the identified competencies in the competency standards to ensure their future employment.

3. Industry owners and supervisors may recruit skilled workers and technicians who are trained in the academe and other training institutions using the developed competency standards to ensure the congruency of training and their future job.

4. School administration may provide support to instructors and professors in attending trainings and seminars to upgrade their knowledge and skills based on the developed competency standards in automotive technology for the students to gain optimum learning.

5. College of industrial technology of State Universities and Colleges (SUC's) offering Automotive Technology programs may conduct curriculum review and make revisions on the competencies to be included based on the developed competency standards.

6. Vocational and technical education curriculum planners perhaps could formulate plans and upgrade the technical and vocational education by utilizing a competency standards, especially

in the inclusion of competencies in knowledge domain, skills and work attitude which is timely for the latest trends and innovations in the automotive industry.

7. The developed competency standards for automotive technology program perhaps could serve as basis for other researchers in developing studies that can benefit the industrial programs of every technical/vocational institution in the country.

8. Education policy makers may improve policies on the implementation of Automotive Technology programs that can provide students with realistic career-based and updated courses in consideration of the developed competency standards to meet the fast-changing needs of the industry.

9. Automotive Technology instructors and professors of the academe and other training institutions may develop or enhance any form of instructional materials based on the developed competency standards for Automotive Technology program in order to provide the best learning of students in their chosen field of specialization.

10. Instructors/professors of the academe and other training institutions may be motivated in attending seminars and workshops with the intension of transferring the knowledge and skills that they have acquired to their students which is timely for the latest trends and demands in the automotive industry.

11. To learn and practice the skills, automotive technology training institutions may provide facilities and equipment to meet the standards as indicated in the study.

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