

A Conceptual Framework for the Development of Twenty-First Century Vocational Teachers' Professional Competencies

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[Abstract] The success of the economic change of a country is determined by science and technological education in graduating students who are competitive in the global market and equipped with skills relevant to the industry. Not only does the provision of the graduates depend on systems and policies, but it is also determined by teachers' roles as figures in charge of the transferring of knowledge, skills, and attitudes to students. Therefore, vocational teachers should be equipped with professional competencies to always be ready to spread their knowledge in accordance with the demand of technological development in the industrial world. The considered solution to continuously enhance the quality of vocational teachers' professional competencies is setting a framework for developing twenty-first century vocational teachers' professional competencies as a concept to prepare professional teachers for vocational education.

[Keywords] professional competencies, fields of professional competencies, roles of professional teachers, requirements of professional competencies, professional competency standard, professional teachers

Introduction

The successful career of graduates is the most reliable indicator of the more rapid economic development of a nation, which is generally stimulated by graduates' ability to compete in the global market and their work competence relevant to the labor market (Volmari, Helakorpi, & Frimodt, 2009). Therein, professional teachers play key roles in education (Ball & Forzani, 2009). In addition to systems and policies, teachers, as figures in charge of transferring knowledge, skills, and attitudes to students, are highly influential in the provision of qualified graduates (Tomlinson, 2012). To complete this mission, vocational teachers should be equipped with professional competence to share knowledge relevant to growing demands of science and technology in the industrial world. Besides, educational policies should focus on the quality of the early education of teachers, careers of new teachers, and professional, continuing quality improvement programs for vocational teachers (de Vries, Jansen, & van de Grift, 2013).

Each nation has its own requirements for qualification and training to prepare professional vocational teachers. A framework for professional competence coherent with vocational teachers may help enhance the quality of learning and training processes in their institutions. Grollman (2008) stated that the quality enhancement of vocational teachers' performance theoretically and practically needs to take into consideration institutional backgrounds in which they are developed by knowing the real condition of vocational teachers and their cultures' needs. This will make the enhancement program optimal. Additionally, the program should be based on professional standards of teachers so that their quality can meet the need of the labor market (Jackson, 2012).

Meanwhile, setting a framework is aimed at creating a structure in which professional standards for vocational teachers are defined, promoted, and applied to stimulate quality learning processes. It can be established by a number of ways, including creating of explicit knowledge, developing skills and attributes reflecting good teaching practices, and providing teachers with tools and devices that can explore competencies and responsibilities continuously.

The main purpose of this program is to build the center of professional superiority, identify knowledge, skills, and attitudes needed, help teachers try to perform their jobs throughout their chosen careers, assure the quality of vocational education, and offer suggestions to vocational educational institutions and development providers of professional vocational teachers in order to develop programs ensuring the quality improvement of academic activities (Department of Education and Training, 2004). The Human Resources Professionals Association (2014) explained that the framework for vocational teachers' professional competencies is the broad framework for integrating, organizing, and harmonizing a number of competency models for qualified vocational teachers in accordance with the growing demand of work competencies industry requires. The framework for competencies is a term for a complete collection of clusters of teachers' professional competencies, including knowledge, skills, and attitudes (Cedefop, 2006).

Through this paper, the author aimed to offer a conceptual framework for the development of twenty-first century vocational teachers' competencies. This paper aims to describe areas of competencies for vocational teachers, redefine new roles for competencies' requirements of vocational teachers, and establish competency standards that should be applied by the government for vocational teachers. This way, it is expected that vocational teachers have standardized professional competencies relevant to the development of science and technology of industry which they can, thereby, transfer their skills to prepare vocational students for professional careers in the future.

Areas of Professional Competencies on Twenty-First-Century Vocational Teachers

Prospective vocational teachers need to know and understand the areas of professional competence that must be mastered in their work. In general, the Seameo Innotech Regional Education Project Series (2010) mentioned that areas of competencies of twenty-first century teachers in Southeastern Asia were to facilitate the development of students' skills and careers, create a pleasant learning environment, facilitate learning processes, get the lesson plans relevant to vision and mission of schools, develop better analytical skills, use learning and references, raise ethical and moral values, assess and evaluate students' performance, participate in professional development, establish a good network with stakeholders and, especially, with students' parents, manage students' welfare, and other jobs. Meanwhile, Paaso and Korento (2010) indicated that the scope of vocational teachers' competencies included teachers' knowledge, students' knowledge, curricular knowledge, teachers' vision, substantive competencies, provision of advice for students, skills to provide supervision, assessment, improvement in services, pedagogical competencies, knowledge about working life, and skills to do teamwork and to train instructors in workplaces. Those having all competencies mentioned will be considered professional vocational teachers.

They are demanded to continuously broaden their knowledge and improve their practices (Hirsh, 2009). To be professional, a teacher should understand the areas of competencies relevant to the development of science and technology in industries. The understanding can be gained from periodic training programs, periodic internship programs in industries, and advanced education. The areas of professional teachers' competencies that should be learned by prospective vocational teachers, including administrative stuff, learning and teaching activities, program development and

quality assurance in the school, and having a network with teachers and industrial communities.

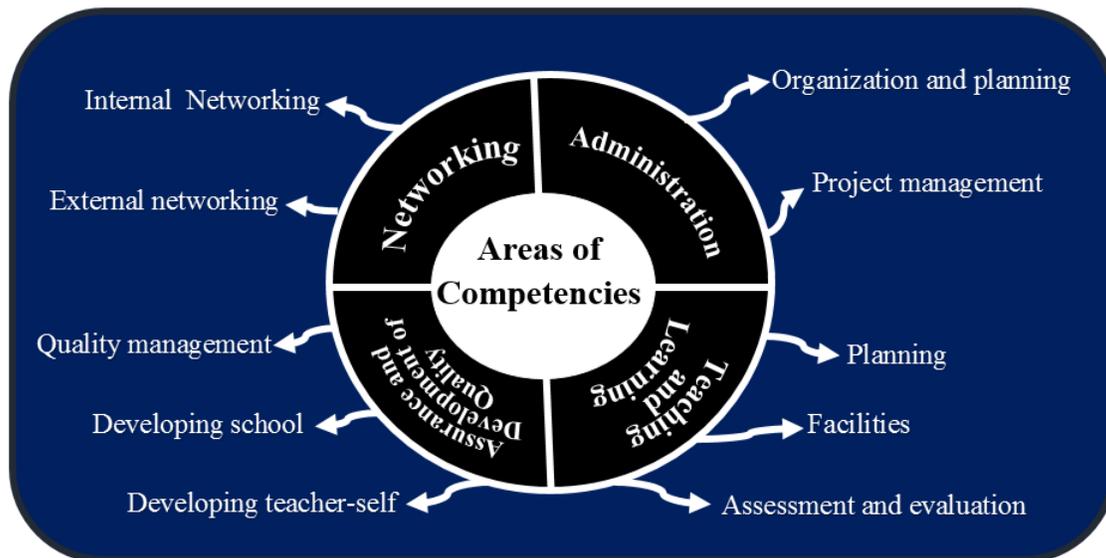


Figure 1. Areas of Competencies for Vocational Teachers in the 21st Century
(Developed from Volmari, Helakorpi, & Frimodt, 2009)

Figure 1 shows that a vocational teacher in the twenty-first century should have competencies in (1) administration, (2) teaching and learning, (3) development and assurance of quality, and (4) networking. The four components are integrated with one another to build up vocational teachers' competencies so that they can cope with scientific and technological changes in the global market. They will provide a good academic atmosphere for students in their school environment. Further exploration of such competencies' areas is discussed below.

Administration

The first task that will be undertaken by vocational teachers is administrative work. The administrative system of education should be provided more efficiently and more effectively by developing on-line administrative devices. This aims to make it easy for teachers to record students' performances, follow up their progress, proceed with teacher data, and devise schedules for teachers and students. Vocational teachers also need to devote more attention to accountability when working. Besides, they should carry out some project to develop their activities, including the financial management, administrative jobs, and the improvement of required knowledge and skills in support of external funding (Volmari, Helakorpi, & Frimodt, 2009).

There are a lot of administrative and professional jobs of vocational teachers, which are generally defined as teaching hours, administrative stuff, and additional jobs. As shown in Figure 1, their administrative works are project management and organization and planning. These two activities are related to the participation by students, recruitment and marketing, participation in student selection, recording of students' progress and that of teachers, division of schedules for learning processes, involvement in a teamwork with all staffs, and supervision of new teachers. To do these jobs, they have to understand interview techniques, recruitment procedures, and basic management of human resources. Also, they have to possess negotiating skills, understand

strategies for organizing learning activities, have procedures for identifying and recording the development of students, have skills in using ICT (information and communication technologies), as well as able to communicate within a teamwork and be familiar with the established procedures. Meanwhile, the project management that becomes responsible for vocational teachers is related to planning project application of teacher activities, the creation of relationships with parents and industries, identifying opportunities for funding for the increase of teacher projects, teacher project management, planning and follow-up of funding of teacher projects, and reporting on the projects. To perform these jobs successfully, they have to understand national and international development projects related to teacher projects and the conditions of teachers and the environment. In addition, they have to possess knowledge of project and skill management, knowledge of managing budgets, communication skills for teamwork, and cross-cultural skills.

Teaching and Learning

In earlier days, teaching and learning in vocational schools was merely about giving students knowledge of everything and showing them how to do something. Recently, there have been some issues identified as influential in teaching and learning activities. Those issues include the new objectives of vocational education, a paradigm shift in educational theories, diversification of learning environments, rapid changes of educational structures, and demands and priorities of the labor market (Ministry of Education in Finland, 2006).

Figure 1 above shows that teaching and learning activities of vocational teachers relate to making plans and preparations, facilitating teaching and learning processes, and carrying out assessment and evaluation of teaching. These are necessary for achieving optimum results of teaching and learning activities for students.

Making plans and doing preparatory work give benefits to recognize needs of students and industry, prepare workplaces for students, make individual lesson plans, and use various methods for teaching and learning activities. To succeed in these activities, vocational teachers should understand curriculum, learning goals, teaching results, teaching theories and strategies, learning methods, learning designs, and learning and teaching principles. Besides, they should understand the need of practical devices, analysis of methodologies and processes, and renewal of scientific and technological development in their professional fields.

Facilitating teaching and learning processes is related to making students familiar with an organization, developing devices, procedures, and routine activities, forming groups to foster teamwork, and stimulating student-oriented learning processes. Also, vocational teachers should facilitate the individualization and personalization in teaching and learning activities, assume a role as mentors, teachers, advisors, and coaches, and stimulate mediation processes to solve conflicts in the workplace and support, motivate, and develop students' behaviors and attitudes. The success of these activities highly depends on vocational teachers' understanding of curriculum learning goals and results, theories, teaching strategies, and learning methods, having skills in combining study and work, and applying various methods of teaching and learning effectively. In addition, they should understand the class management (theoretically and practically), know work fields, renew lessons in accordance with the development of their professional field, have skills in motivating and supervising students to be autonomous learners, have expertise in giving specific instructions, have expertise in stimulating mediation processes to solve conflicts and various management methods, employ methods of supervising and educating, and have good social and communication skills.

Meanwhile, assessment and evaluation processes of vocational teachers are used to assess

students' academic achievement, to organize tests for students, and to give feedback to support constant learning processes. To be successful in these activities, they should understand their work field, the related acts and rules, and know assessment principles, tools, and techniques. This means that they are expected to use and develop evaluation and assessment tools and to have good communicative and interpersonal skills.

Assurance and Development of Quality

Generally, quality assurance has a significant influence on all teachers' activities and overall teaching and learning processes. Vocational teachers need to take a part in the quality assurance program in their workplace. Therefore, they need thorough knowledge about evaluation, assessment, and competencies to put quality assurance into practice. Subsequently, all vocational teachers have to apply principles and procedures of quality assurance, one of which is that vocational teachers are supposed to make changes needed in teaching and learning processes based upon feedback and assessment either of students or of internal or external institutions. This is aimed at developing approaches leading to teachers' professionalism, thereby fulfilling requirements and developing other professional fields of vocational education. By the same token, constant professional development of individual teachers is also needed, considering that it is one of the determining factors of the enhancement of teachers' quality and professionalism.

As shown in Figure 1, the development and assurance of quality constitute the development of vocational teachers' professionalism by developing their personality, schools, and quality management (Attaochu, 2013) through which the quality of teachers' professionalism can ensure the development of the vocational graduates' competencies relevant to the national or even international labor market.

To make themselves developed, vocational teachers must follow the development in their professional fields, make plans for a long-term professional development of teachers, participate in routines of gradual development programs, and detect and follow trends in learning processes of the international vocational education. Thus, they should realize the importance of the professional development for individual works and acknowledge the need of developing teachers' professionalism and personality, which include technical skills, pedagogical and didactic competencies, and personal competencies and adapt to new knowledge and skills related to activities of teaching and learning.

Meanwhile, the quality development is for vocational teachers to be involved in the development of vocational competencies by undertaking training and internship programs according to their fields. To receive desired results, they have to know the process of the school development programs and routine school administration, realize the importance of developing schools and of training and internship programs in industries to update quality, the relevance of teachers' teaching and learning, and to improve communicative and interpersonal skills.

Networking

For networking, vocational teachers have to build up, maintain, and manage relationships with partners and other external stakeholders, like schools, parents, and industries. Also, they need to keep themselves close to their own professional fields to continuously renew their field-based competencies and take a part in developing curriculum (Wang, 2010). In internal networks, they should be able to make social interaction with their colleagues and direct teaching and learning activities relevant to the need of the global market using management. Such interaction is highly

important to the enhancement of their performance and the quality of learning programs in vocational education (Frimodt, Marsh, & Volmari, 2006; Grollmann, 2008).

Figure 1 shows that forming a network is important to vocational teachers' professionalism. The network is built up to know the global market development and gain quality assurance of their professionalism to ensure the qualified graduates are equipped with knowledge, skills, and attitudes industry requires. The network is divided into internal networks and external ones. The former is formed by establishing and participating in internal networks, teamwork in the school, internal meetings, and developing teaching and learning activities within a team with their colleagues. To succeed in these activities, they need to know techniques for teamwork and effective networks, to have good communication and interpersonal skills, to support their partners, and to participate in routine meetings efficiently.

The external network can be created by establishing a partnership with local and national stakeholders and vocational institutions, participating in external educational networks, professional networks, working partnerships, and international projects. To succeed in creating the external network, they must be able to identify and find institutions and networks to have national and international communication. They must also promote integration of international perspectives to stimulate teaching and learning activities, understand foreign languages and languages, know vocational programs in European countries and the United States, understand frameworks related to vocational education, such as the European Qualifications Framework (EQF), European Credit System for Vocational Education and Training (ECSVET), and Certificate Supplement and European Mobility (CSEM), and have good communication and interpersonal skills and the ability to actively and effectively participate in educational meetings.

Having the four professional competencies, pedagogic, professional, personal, and social, vocational teachers not only develop their competencies at the school but also establish a relationship with the industrial and business world. This can subsequently strengthen the system of vocational education through partnerships and strong relationship with the labor market. The most important change in developing vocational teachers' professionalism is having internal and external networks and the adoption of new approaches to teaching and learning processes. At last, this will make teachers used to working in a team and network. For this purpose, they must set up a partnership with other teachers, their students, students' parents, leaders, and stakeholders. In addition, they must have remarkable skills in mentoring, supervising, and teaching in various environments. In conclusion, teachers play significant roles in transferring tacit knowledge and professional ethics in their environment through practical pedagogic skills they possess.

The Redefinition of New Roles for Competency Requirements of Vocational Teachers

Vocational teachers include teachers of electronics, construction, mechanics, and vocational. In general, they are considered experts in their own fields, which are connected with any other vocational fields. They are responsible for the overall advancement of students and themselves. In some developed countries, teachers serve as coaches in training centers. In European countries and in the United States, they are required to have some formal, professional, and pedagogic qualifications. Especially for full-time teachers, the pedagogic qualification becomes the main requirement. They may enjoy the status of as qualified vocational teachers through mechanisms of pedagogic training undergone before practicing the profession in vocational institutions.

Becoming a vocational teacher is an extremely challenging profession. Good vocational teachers must have wide and thorough knowledge and about professional fields, the growth and

development of human beings, and how to direct the development by means of vocational facilities in schools. Besides, they must have adopted the responsibility to professional ethics. In applying their professionalism, they must operate in multidimensional contexts and understand dialogs and interlinkage among vocational education, the labor market, and general publics to promote their students' advances in their lives. The redefinition of new roles for professional competencies' requirements of vocational teachers is illustrated in Figure 2.

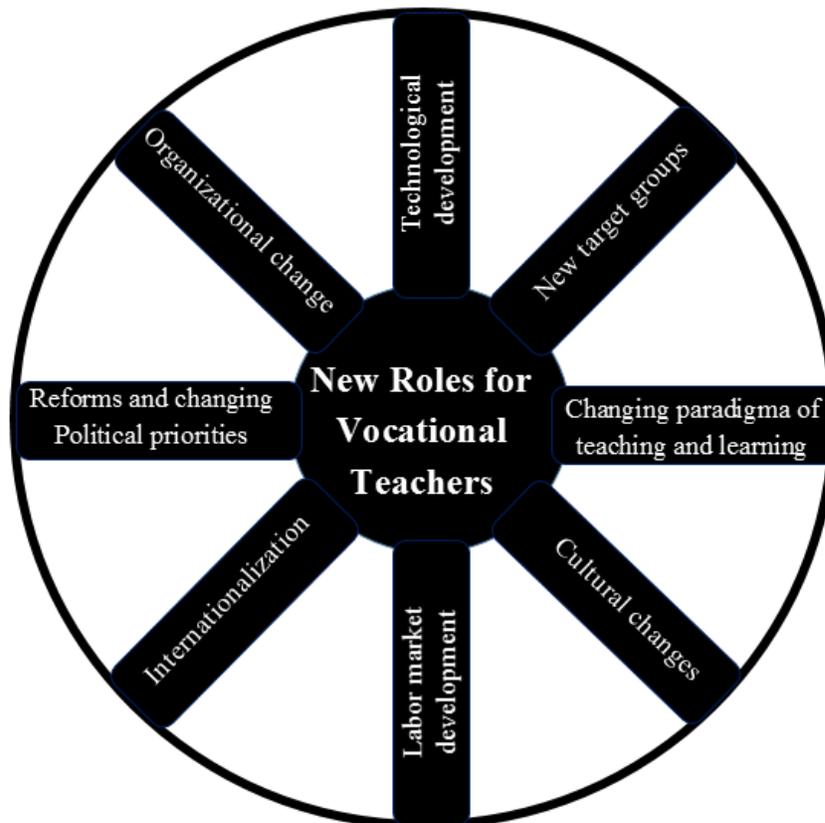


Figure 2. New Roles for Competencies' Requirements of Vocational Teachers in 21st Century

As shown in Figure 2, the new roles for professional competencies' requirements for twenty-first century vocational teachers consist of eight elements, constituting challenges they must respond to. The elements are the technological advances in the industrial world, new generations of students, the paradigm shift in teaching and learning processes, the cultural change, the development of the labor market, internationalization, the form and change of political priorities, and the organizational change. Those elements support teachers to learn and teach more professionally, given their responsibility to train students to have professional skills in their professional fields. Hence, in addition to their mastery of everything about teaching stuff, they have to possess skills in predicting competencies required for their students' futures.

According to new roles for competencies' requirements of vocational teachers should follow technological advances and the job market, which is necessary for them. Immediate advantages of the technological advances have a significant influence on resources, such as transportation costs, time, and automation of the existing processes. The advances also affect examination results, students' and staffs' retention, students' and staffs' satisfaction of e-learning, and modification of

reading rooms, such as libraries, wireless networks, and informal classrooms. Such advances may also facilitate social agendas, such as providing easy access to learn, the acceptance of students and staffs, and develop new markets. Such technological advances may affect the management learning assets, such as the intellectual capital of the institution and repository, and the institutional policies of schools, departments, or government. They also impact on teaching and learning methods, on staffs' self-development of skills, performance, and confidence, on educational research, on contexts, models, horizons, and reflective practices of learning, on students' development of skills, performance, and confidence, and on innovation of teaching, learning, and assessment as stimuli for creative approaches (Quentin-Baxter, Kelly, Probert, MacMahon, & Ferrell, 2008).

Meanwhile, the learning target is different from the instructional purposes, either in designs or in objectives. The target is to explain lessons using languages understood by students, to teach students lessons through information, skills, and thought processes that are known and understood thoroughly. From the perspective of students, the target is that teachers share their knowledge and understanding about all lessons as guidance for students' independent learning processes (Moss & Brookhart, 2012). Therein, different results of students' levels of knowledge constitute a new, challenging problem for vocational teachers.

Besides, vocational teachers need to understand the paradigm shift of teaching and learning processes. They must have knowledge about the development and change of learning activities through students' direct experiences in social activities and the utilization of technological equipment and devices of their school (Goodwin & Webb, 2014). The learning activities may be a face-to-face learning in classrooms, online learning, or a blended learning of both. The online learning system enables both teachers and students to do learning activities anywhere at any time.

Timperley (2011) explained that teachers should develop academically orientated cultures under favorable conditions. Herein, leaders of vocational institutions have to support school professional learning activities so that students may study and develop properly. A study found that the cultural change of teachers' teaching and development efforts has a significant influence on students.

Teachers should have basic knowledge and information about the challenging development of the labor market, main resources, and activities that support relevant learning to help prepare students to work in the labor market. Because of the constant change in the labor market, they should improve their skills and broaden their knowledge regularly (DfES, 2007).

The research by Wihlbord (2004) shows vocational teachers should stimulate internationalization, a process in connection with theoretical understanding and awareness of their didactic method globally. The term internationalization refers to similar and clear things in the world's references. The research managed to encourage teachers to make advances in educational internationalization in their countries.

In addition, good vocational teachers need to know about information and reforms and changes of the existing political priorities (Bascia & Osmond, 2012). Chang, Shaeffer, Al-Samarrai, Ragatz, Ree, and Stevenson (2014) stated the development activities of teachers' performances are highly influenced by the political changes and reforms, especially policies related to education.

Vocational teachers are also supposed to know organizational changes, being at levels of the schools, industry, or the whole country. Organizational changes impact their organizational culture (Schein, 2004), and good organizational change may lead to the provision of qualified teachers with relevant competencies to the global job market. Maughan, Teeman, and Wilson (2012)

explained such organizational changes are caused by leadership, planning, and preparation, kinds of practices for developing, monitoring, and evaluation undertaken by school leaders and teachers.

Professional Competency Standard for Vocational Teachers In The 21st Century

Developing a standard will give direct results if it is applied properly. Therefore, a good standard is absolutely needed to continue the development of performance standards and ensure that job performance is based on standard priorities. Developing professional competency standards is required to support the development of vocational teachers' professionalism and enhancement of the quality of vocational education. Through this system, they may develop share and develop their professional competencies into the better ones (European Commission, 2013).

Gonczi, Hager, and Oliver (1990) stated that the term the competency standard refers to a combination of basic attributes of successful professional performances. The application of the standard needs supports the professional knowledge, professional skills, and professionalism of vocational teachers. Every single competency standard reflects the level of a teacher's level of professional competencies, which shows some dimensions of professional competencies of vocational teachers. Figure 3 will give further and clearer picture of this.

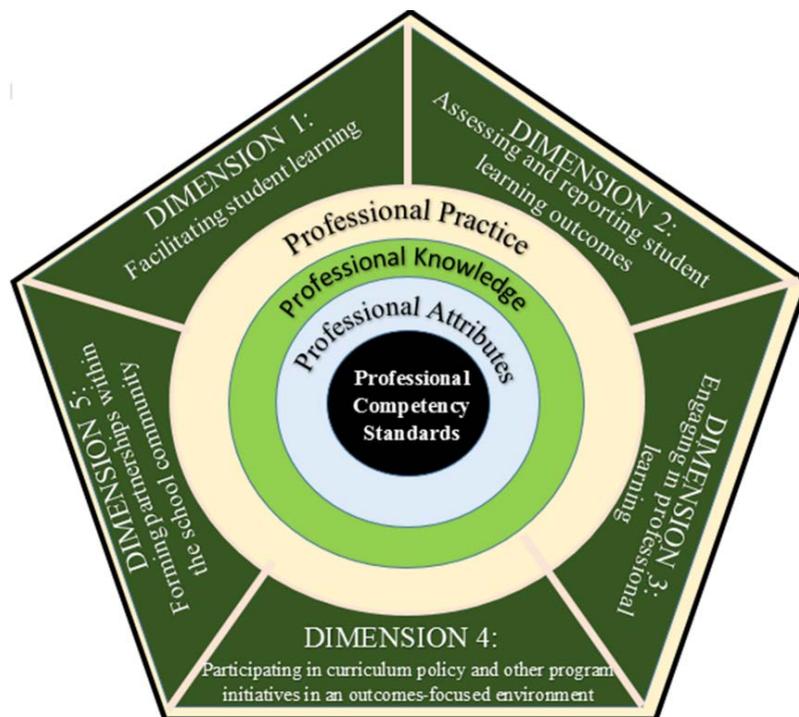


Figure 3. Professional Competency Standard of Twenty-First-Century Vocational Teachers (Developed from Department of Education and Training, 2004)

Figure 3 shows the professional competency standard for twenty-first century vocational teachers and consists of three elements that draw a simple map of teachers' professional attributes, knowledge, and practices in their teaching and learning activities. The three elements of the characteristics are considered to be contributory to the achievement of the overall competency standard (Department of Education and Training, 2004).

Professional attributes depict easily identified characteristics for effective teaching and learning activities. These attributes may ensure that vocational teachers are prepared for challenges, demands, and teaching and learning responsibilities. Herein, they are expected to have collaboration with students, their parents, and fellow teachers. These attributes also provide for fundamental values and beliefs, and they enable teachers to make decisions and perform actions in their daily jobs. They have to demonstrate behaviors and attitudes as well as they can to facilitate learning processes for students. Meanwhile, the descriptor of the professional attitudes of twenty-first-century vocational teachers is of a collaborative, committed, effective communicator, ethical, innovative, inclusive, positive, and reflective (Saffigna, Franklin, Gereja, & Tayler, 2011; Zammit, Sinclair, Cole, Singh, Costley, a'Court, & Rushton, 2007).

The framework of professional knowledge is based on a premise that effective vocational teachers are the body of professional education, so they need to maximize their competencies to increase the results in their students' learning processes as the labor market requires. Students' knowledge, curriculum, lesson subjects, pedagogy, and acts related to education and learning contexts of vocational education constitute the basis of effective teaching activities. This enables them to be responsive to the change of their students' needs. Finally, this framework will support vocational teachers in building up their professional knowledge. This also helps promote continuous professional learning processes integrated with contemporary teaching theories according to the scientific and technological development in industry.

Subsequently, the competency standard requires teachers to understand the core professional knowledge and the structure and function of the curriculum framework and its implications, the purposes, characteristics, and uses of any assessment strategies, and what information is obtained from the assessment process. Also, they are required to understand that there are many determining factors in students' learning processes, including the development, experience, ability, interest, language, parents, culture, and the general public. Therefore, teachers need to know fundamental concepts, contents, and important processes of relevant learning activities, and they must know the legal framework influencing school systems and teachers' jobs, as well as policies of the local and national government and the services of vocational education (Department of Education and Training, 2004).

Figure 3 also points out that vocational teachers' professional performances depict professional responsibilities and actions of teachers in their professional lives. There are dimensions that are interconnected and collectively contribute to the effectiveness of vocational teachers' professionalism. The mentioned dimensions include (1) facilitating students' learning activities, (2) assessing and reporting the result of the learning activities, (3) being involved in professional learning processes, (4) participating in curriculum policies and initiating another program focusing on the result of the learning activities, and (5) creating partnership in the internal and external school communities.

The first shows how teachers observe, assess, record, and report their students' learning processes. The second describes complex jobs of teaching and learning, explaining how teachers plan, develop, manage, and apply teaching strategies to provide quality learning activities for students. The third shows how teachers manage their own professional learning activities and contribute to their partners' professional learning activities. The fourth explains how teachers participate in the developing and managing policies of the curriculum in their schools. The fifth, meanwhile, shows how teachers build up, facilitate, and maintain relationship and partnership with students, colleagues, parents, industry, and general publics in developing the quality students' learning activities. By the professional competency standard, it is expected that vocational teachers

are able to share their work skills with students for their future careers.

Conclusion

The demand of professional competencies of vocational teachers is wide, heterogenic, and complex (Wahlgren, 2016). However, these competencies are urgently suggested to be focused on four fields of twenty-first century vocational teachers, which include administration jobs, teaching and learning activities, assurance and development of vocational teachers' quality, and teachers' networking. These four need the special attention of the decision makers and policy makers if they want vocational teachers to understand fields of professional competencies much better.

Meanwhile, eight elements of new roles and professional competency requirements for twenty-first century vocational teachers are related to the scientific and technological development, a generation of new targets, the paradigm shift of teaching and learning activities, cultural change, the development of the labor market, internationalization, the reform and change of political priorities, and organizational change. The responsibility of these elements falls on vocational teachers who are in charge of training students and preparing them for their careers. Special attention needs to be paid to the international partnership due to its little activity. All of the staffs, leaders, decision-makers, and policy-makers have to understand the importance of the international dimension and skills to compete in the international market. In educational policies, teachers together with leaders are generally considered to be actors carrying out reforms and formulating policies planned at higher administrative levels. Therefore, they should show off how they can be seen as active developers and initiators of changes and innovations in the vocational education world.

Moreover, the professional competency standard for twenty-first century vocational teachers urgently needs to be applied for teachers to understand their jobs and responsibilities. The standard consists of attributes, professional knowledge, and professional practices, which are all necessary for assessing teachers' competencies, either to identify and to support their development or to ensure that their competencies meet accepted standards (Jonsson & Mattson, 2011). Besides, the standard can be identified as characteristics contributing to the achievement of the competency standard overall for schools and better educational systems (Svavarsdóttir, Sigurdardottir, & Steinsbekk 2015).

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