

The Need for Vocational Taxonomy for Vocational Teachers and Practitioners: An Initial Analysis

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The purpose of this study was to identify the need of vocational taxonomy for vocational instructors and practitioners. Malaysia's new Vision 2030 is for the people to attain quality life as a developed nation focused on relevant knowledge, high-skills, and the well-being of the people through various innovative strategies and transformations. The goal is to reach a balance of psychosocial well-being and economic sustainability of the nation. Taxonomy is an important tool in human civilisation. In an educational context, since 1956, Bloom taxonomy has been used to classify educational goals, objectives, and outcomes. However, the deficiency of the Bloom taxonomy is that it does not focus on the domain of psychomotor – which is the main domain in vocational education and training. Several theories are useful as the basis for vocational taxonomy. The relevant theories are cognitive, behaviourist, and psychomotor theories. Psychomotor theory is assumed relevant to explain psychomotor ability and domain. Furthermore, psychomotor domain is highly relevant to vocational education and training because it involves hands-on skills and tasks. The research design used in this study was the needs analysis based on experts' opinions. Seven vocational experts were selected based on the specific criteria. The key result shows that based on the qualitative interview data – a new vocational taxonomy is needed. The vocational taxonomy is important to classify vocational domains from the lowest level which is the theoretical vocational knowledge to the highest level which is inventive thinking. This vocational taxonomy is crucial for vocational instructors and practitioners. The vocational taxonomy could be used to map the subject content or curriculum, the level of teaching and learning, the practical tasks, and the vocational assessment.

Keywords: *Bloom taxonomy, Needs analysis, Psychomotor domain, Vocational education and training (VET), Vocational taxonomy.*

Introduction

Epistemology of Taxonomy

Taxonomy is important in human civilisation. In the history of human civilisation, taxonomy has been used to classify flora and fauna for decades. Aristotle (384-322 SM) is said to be the first philosopher who classified living things and his classifications have been used until today, such as those for vertebrate and invertebrate animals (Leroi, 2014). Theophrastus (371-287 SM), a student of Plato and Aristotle, had classified plants, and his botany work, known as *De Historia Plantarum*, comprised 480 plant species (Eamonn, 2012; Manktelow, 2010). Theophrastus is also known as the Father of Botany. Caesalpino (1519-1603), an Italian philosopher and botanist, is considered as “the first taxonomist” who classified plants according to their fruits and seeds. He wrote *De Plantis Libri XVI* (1583), considered as the first textbook in botany. The book laid the foundation of the plant morphology and physiology (Isely, 2002).

Etymology of taxonomy comes from the Greek: “taxa”, meaning group or unit, or “tassein” which means classify and “nomos” means the law or regulation (Das & Kholia, 2010). Generally, there are hierarchical structures with rules that clearly define the taxonomic components and how they are organised (Bailey, 1994). In the field of science, taxonomy is the classification system for living things such as flora and fauna. Once taxonomy only referred to the scientific classification of living organisms, but later, the word was used for the broader meaning. Almost all things – living objects, non-living objects, places, and events, can be classified according to a taxonomy. Therefore, a taxonomy is a systematic classification system (Anderson et al., 2001; Bailey, 1994).

According to Gusnetty (2013), taxonomy is a tool to classify domains according to fixed criteria. For example, the taxonomy for physics has grouped things according to liquid, solid, and gas states. As for taxonomy in the botanical field, it has grouped plants according to certain criteria, for example, plants with one cell and plants with many cells. In the psychology and education fields, taxonomy refers to the hierarchy of knowledge and the thinking process, which could map the teaching and learning processes. In the field of education, Bloom taxonomy was created to classify the three domains – cognitive, affective and psychomotor. According to Bloom (1956), cognitive domain involves the development of students’ thinking; affective domain involves the development of students’ attitude and values; and psychomotor domain involves the development of students’ physical skills.

Taxonomy of Education

In 1956, a taxonomy of education was developed by a famous educator, Benjamin Bloom. The history of Bloom’s taxonomy started in the early 1950s at the American Psychological

Association Conference, where Bloom and his colleagues suggested a new taxonomy in education. Based on his book *Taxonomy of Educational Objectives*, Bloom (1956) developed a taxonomy to classify learning objectives. Bloom taxonomy mainly focuses on the three domains – cognitive domains, including intellectual abilities and skills; affective domains related to feelings, attitudes, values, and emotions; and psychomotor domains related to manipulation or motor skills (Wayne, 2014). Each of these domains can be divided into several categories and sub-categories or hierarchies (levels) from simple behaviours to more complex behaviours. The main idea of taxonomy in education is to classify educational objectives in such a way that they can be organised sequentially; the basic level must be mastered before the next level (Huitt, 2011).

In the cognitive domains of the original Bloom taxonomy, knowledge is the lowest level of educational objectives followed by comprehension, application, analysis, synthesis and evaluation. Evaluation is the highest level of educational objectives. In order to reach a higher level, the lower levels should be mastered first (Huitt, 2011). However, much of the educational taxonomy focuses on cognitive domains such as the Bloom taxonomy (1956). The lack of a well-established vocational taxonomy framework makes it difficult for vocational teachers to develop and evaluate the objectives and outcomes of vocational tasks (Oriente & Alvarado, 2020).

Taxonomy is also important for assessment. Bloom taxonomy is often used in the design of test questions in education. In formulating quality questions, scholars of measurement and evaluation, such as Bloom (1956) and Sanders (1966), have introduced a taxonomy of questions as a guide to assist educators to formulate questions that fit their learning objectives. In developing assessment tools, taxonomy can be used to develop multi-level cognitive questions, ranging from low to high levels that challenge students' thinking skills. The levels in the Bloom taxonomy could be used to map learning outcomes, preparation of tests and development of a curriculum. This taxonomy enables teachers to evaluate the achievement of their educational objectives.

However, Bloom's taxonomy does not provide criteria to evaluate hands-on practical activities (Ennis, 1985). Activities in VET such as visualising, designing, machining, and problem-solving usually require cognitive and psychomotor competences. By emphasising hands-on and practical skills, the psychomotor domain is important in vocational education and training (Mustapha, 2017; Okwelle, 2013). Therefore, the development of vocational taxonomy is critical.

An alternative taxonomy is needed due to the weakness in the Bloom taxonomy. The taxonomy in education is mainly focused on the cognitive and the affective domains. Psychomotor domain was not highly emphasised due to the nature of the curricula in the



secondary and tertiary education which lacks psychomotor domains (Bloom, 1956). Hence, the deficiency of the Bloom taxonomy is that it does not focus on the realm of psychomotor – which is the main domain in vocational education and training. VET involves the mastery of vocational knowledge and skills and fosters the professional attitudes for obtaining and retaining a technical occupation (Mustapha, 2017; UNESCO, 2011).

Vocational Education and Training

The concept of apprenticeship or “craft occupation” has a long history, dating back to the craft guilds of medieval Europe. Apprenticeship was probably the first organised form of vocational education (Roberts, 1957; Mustapha, 1999). An apprentice was bound by a contract, usually seven years to a master craftsman, whose obligation was to teach the apprentice a vocation (Frasca, 1988; McClure, Chrisman, & Mock, 1985). The master, in addition to teaching a trade, was usually required to teach the apprentice reading, writing, and arithmetic (Bennett, 1926). The idea of using schools to train youth for work was not entirely novel in the early nineteenth century (Kantor, 1988). Colonial America viewed apprenticeship and vocational training as something for the lower socio-economic classes, taught through imitation, not thought processes (Miller, 1993). This was in contrast to European perceptions. In Europe, apprenticeship and vocational training in skilled trades and technical subjects were viewed as vital components in the fierce competition among emerging industrial nations (Law, 1986). Therefore, during the middle 1800s, European states were establishing hundreds of trade and technical schools. However, Americans expended little attention to such a movement as they focused their attention on the establishment of academia and colleges (Law, 1986). Eventually, colonial leaders could no longer romanticise their Renaissance philosophy with the beginning of the Industrial Revolution in Europe during the late 1700s (Miller, 1993). Innovations in farming techniques, mass production processes, and engineering technology led manufacturing to emerge as profitable industries in the United States. The influence of the Industrial Revolution in Europe was also felt in the American education system through the philosophies of two Swiss Educators - Johann Heinrich Pestalozzi (1746- 1827) and Philip Emanuel Von Fellenberg (1771-1844).

As an educational thinker, Pestalozzi was inspired by the writings and philosophy of Jean Jacques Rousseau (1712-1778). Pestalozzi believed that children in school should learn to work, not only because of the economic value of skill and the habit of labour, but because this experience gave sense-impressions which, like the study of objects, became the basis of knowledge. He recognised the fact that “doing leads to knowing” (Bennett, 1926). Pestalozzi also insisted that education must be comprehensive and in harmony with nature. Therefore, he recognised three basic aspects of education: intellectual, moral, and practical education (Heafford, 1967; Mustapha, 1999). His methodology emphasised that the subject taught had

to be adapted to the nature of children, their stages of development, and their individual needs. In his experimental schools, educational topics were simplified to their basic elements and then presented in a natural progression from simple to complex relative to the students' capacity to comprehend (Heafford, 1967).

Pestalozzi's influence on vocational education and training (VET) was important from the eighteenth century to the present. He has been referred to as "the father of manual training" and is considered the founder of modern educational methodology. He established a series of schools in which manual work was combined with general education (Bennett, 1926; McClure, Chrisman, & Mock, 1985; Mustapha, 1999). Pestalozzi believed that the way to alleviate poverty was to train the youth of the poor in work skills. His purpose was not only educational reform but also social reform (Heafford, 1967). At the same time, he believed that it was equally important to cultivate students' minds and social consciences. An education that emphasised either vocational or general exclusively, created an individual who was of little value to society.

Pestalozzi's first school known as *Neuhof* was designed to train children, especially those from poor families, in handicrafts, farming, and basic general education (Bennett, 1926). As Pestalozzi developed his methodology, drawing and using real objects became an integral part of the curriculum. He used drawing as a means to sharpen the students' powers of observation and description, but its importance as a factor in industrial education later increased the appeal of Pestalozzian pedagogy (McClure, Chrisman, & Mock, 1985; Mustapha, 1999). Even though Pestalozzi's ideas and methodology were widely recognised, his schools were eventually closed because of mismanagement and financial problems.

Von Fellenberg, although using some of the educational methods of Pestalozzi, differed from him in several ways. Von Fellenberg believed that society represented a natural separation of people according to their abilities (Bennett, 1926). Consequently, individuals could be best educated and trained within their own groups. However, each group should also be taught to understand and respect the position and function of the other groups. Therefore, Von Fellenberg's schools had an academy for sons of the elite, a school of applied science for sons of the middle class, and a farm and trade school for sons of the poor (Roberts, 1957). He carefully selected skills that were necessary to the efficient operation of the school and its farm. As a result, his school was a financial and an educational success.

In the early twentieth century, the influence of these two philosophers on American education was profound. With the growth of mass production, the debate was focused on how schools should respond to the new industrial order which had emerged (Kincheloe, 1995). David Snedden, the former Commissioner of Education for Massachusetts, a proponent for social efficiency, argued that schools should focus on the production of social

and economic efficiency. Similar to Von Fellenberg, Snedden advocated for the establishment of separate vocational schools to train students in specific job skills. According to social efficiency advocates, vocational education would provide practical training for working-class students and assist them in securing their rightful places in society (Labaree, 1997; Prosser & Allen, 1925; Shor, 1988).

However, progressive educators and social reformers, such as John Dewey and Jane Addams, opposed the separation of vocational and academic education. Dewey believed that democracy could not flourish where there was vocational education for one class and liberal education for another (Cremin, 1961; Mustapha, 1999). Similarly, Addams argued that schools should provide all students with the skills they will need to function in society. Hence, the progressive educators advocated work education for all students through raising the consciousness of the learners about the context within which a job was performed and the social significance of the work (Bjorkquist, 1991; Cremin, 1961; Giroux, 1991; Kantor, 1988). Therefore, school should prepare all students with the necessary attitudes, knowledge, and skills for success in the world of work.

Labaree (1997) summarised the purpose of education into three categories: democratic equality, social efficiency, and social mobility. From the democratic equality perspective, the purpose of schooling is to provide equal access to education and to prepare all young individuals to become responsible citizens and to play constructive roles in a democratic society (Cremin, 1980; Kaestle, 1983). This is basically the ideology of the progressive education movement. The second educational goal, social efficiency, can be described as the effort to make the school curriculum more practical and responsive to the needs of the job market. Schools should prepare and supply future workers with appropriate skills that will enhance their productivity and, therefore, promote economic growth (Finch, 1993). Vocational and technical education has been generally delivered within the paradigm of social efficiency advocated by the pro-industrial movement since the earlier part of the 20th century (Dentith, 1997; Herschbach, 1979; Mustapha, 1999). The third educational goal, social mobility, is viewed as the preparation of individuals to compete for social positions in society.

Vocational and technical education has been broadly defined as efforts by schools to include relevant practical subjects in the curricula which are likely to produce basic knowledge, specific skills, and dispositions that prepare students for employment (Bacchus, 1988; Barlow, 1974; Thompson, 1973; Wenrich, Wenrich, & Galloway, 1988; Mustapha, 1999; 2017). In most developing countries, the main objectives of vocational and technical education have been to expand the occupational choices of students so that they become aware of the emerging cluster skills that are needed in the labour market. In the workplace, broad-based education is required to cope with the post-Taylorist work environment in which workers are

expected to perform more broadly-defined jobs (Luttringer, 1995; Noyelle & Hirsch, 1995; Williams & Hornsby, 1989). In general, employers expect high school graduates to possess basic skills, effective work habits, and positive attitudes toward work (Heckert, 1984; Lee, 1986; Levin & Rumberger, 1983; Lund & Hansen, 1986; Wellington, 1987). Therefore, vocational and technical education should assist students to develop their capacity to learn; to think critically; and, to adjust to rapid changes in technology (Cantor, 1989).

The debate between “academic” and “vocational” education has had high social and political visibility because of the assumption that vocational preparation significantly improves the chances for youth to obtain employment, especially those who are economically or academically disadvantaged (Bacchus, 1988; Dunham, 1989; Jonathan, 1990; Middleton, Ziderman, & Adams, 1993). As the rate of unemployment among the academic stream graduates begins to rise, there is awareness to enhance students’ participation in the vocational stream to ensure the well-being of the people in terms of getting a job. Hence, VET provided a clear pathway to skilled employment (Mustapha, 2017). Since the Industrial Revolution in the late 18th century, progress and prosperity have been closely identified with economic development (Jomo, 1993). The economic competitiveness of a country depends on the quality of its workforce. Knowledge, skills, and the innovativeness of the workforce rely on the education and training systems. Vocational education is perceived as one of the crucial elements in enhancing economic productivity (Min, 1995). Based on the human capital and social efficiency theories, school should prepare and supply future workers with appropriate knowledge and skills that would enhance their productivity and upward mobility, and, therefore, promote economic growth (Becker, 1964; Finch, 1993; Harbison, 1973; Labaree, 1997; Mustapha, 1999; Schultz, 1961). However, the high rate of unemployment among youth in several countries could be due to economic downturn or outdated curricula.

Curricula for Vocational Education

Curricula and learning are two terms that are related to each other in educational studies. Curricula is often defined as the planned and guided learning experiences and learning is a process of acquiring knowledge. Sidin (2000) stated that the curriculum is referred to as courses that are offered in a certain program. Curricula normally consists of a number of components: (a) philosophy of the course, (b) learning outcomes, (c) contents which include knowledge, skills, and values, (d) teaching and learning activities, and (e) evaluation activities.

According to Finch and Crunkilton (1999), there are two important elements in a curriculum: students themselves and also the curriculum must be able to provide a learning experience that is not only related to schools but also outside schools. Oliva (1992) defined a curriculum as a plan or a program which is related to experience, internalised by students under a

school's supervision. Dewey (1916), an educational philosopher, always holds on tightly to the philosophy or the concept of democracy in education. Democratisation of education should provide the opportunity for all students to opt for academics and vocational subjects. Dewey mentioned that vocational education is for all students. Therefore, a vocational education curriculum has to focus on students' performance in mastering their skills related to specific jobs but at the same time, it provides liberal arts courses to the students.

But in most vocational institutions, the curriculum for vocational education focuses on hands-on activities that involve psychomotor skills and kinesthetics. According to Reynolds (1965), psychomotor learning will involve physical movement (motor) and will coordinate with mental processes (psycho). In general, the mind will control the physical movement. The psychometer system is related to mind-body coordination. According to Dave (1970), practical hands-on learning is a process to develop a student's ability to perform physical tasks. Hence, the psychomotor domain is highly relevant to vocational education and training because it involves hands-on skills training (Mustapha, 2017; Okwelle, 2013). Vocational curriculum designers are expected to be proficient in content vocational subject matter and curriculum development theories. However, the vocational instructors and curriculum developers often have a difficult task to map the specific vocational content to a general educational taxonomy (Bloom taxonomy). Hence, a new vocational taxonomy is deemed necessary. Nevertheless, in order to develop a vocational taxonomy, several underpinning theories should be understood.

Relevant Theories

Several theories are useful as the basis for vocational taxonomy. The relevant theories are cognitive, behaviourist, and psychomotor theories. Firstly, cognitivism is relevant to vocational taxonomy in terms of its ability to explain cognitive-based domains in the taxonomy. As proposed by Long (2019), vocational knowledge is the basic level of vocational taxonomy. Theoretical knowledge is acquired through mental process that is apt with cognitive theory. Cognitivism is a learning theory that claims that learning is a thinking process. Human beings do receive not only information but also process the information received, which makes individuals as thinkers who can build and achieve something based on their abilities (Piaget, 1936; Wadsworth, 2004). Bruner (1964), through his study, stated that cognitive development expands through three stages: enactive stage (activities to understand the nature), iconic stage (understand objects through images and verbal visualisation), and symbolic stage (have abstract ideas which are influenced by language and logic). Hence, cognitivism involves the process of understanding, verbal visualisation, concept-building, reasoning, problem-solving, and inventive thinking (Charcharos et al., 2016; Long, 2019). Long (2019) also proposed visualisation, problem-solving and inventive thinking as higher cognitive domains in a vocational taxonomy.

Secondly, behaviourism is a theory of learning based on the idea that all behaviours are acquired through conditioning. The theory looks at learning as a behavioural conditioning. In other words, behaviourism explains behavioural forming based on the relationship between observed stimulus (S) and response (R). The behaviourist theory is the opposite of the cognitivist theory in which the cognitivism claims that the learning process is the mental process that cannot not be observed directly. In behaviourism, the change in behaviours may reflect that a learning process has occurred and can be observed. Since most learnings in vocational education involve practical tasks, hence, behaviourist theory is apt to explain the learning process in VET. Long (2019) proposed gross and fine motor skills as the intermediate levels in vocational taxonomy.

Thirdly, psychomotor theory was proposed by Hermann von Helmholtz (1821 - 1894) and Carl Wernicke (1848-1905) during the 19th century experimental era. Hermann von Helmholtz is assumed as the father of modern nerve conduction field (Cahan, 1993). By combining the nerve system into the perceptions and behavioural reaction, Helmholtz has an invaluable contribution to the study of psychomotor ability. Helmholtz believed that all perceptions and reactions toward stimulus are directed by the nerve system, which is then controlled by the natural speed of physiology nerve flow (Cahan, 1993). Nevertheless, according to literature, the first theorist who coined the term “psychomotor” was Carl Wernicke. According to his study, Wernicke showed how a human’s function could be explained by sensory input, psychomotor output, as well as human consciousness and unconsciousness (intrapsychic). Wernicke used reflex arc or impulse movement during psychological reflex action to explain human interaction with their environment (Weckowicz, 2010).

In terms of psychomotor taxonomy, several psychomotor experts have attempted to classify human movements such as Dave (1970), Simpson (1972), and Harrow (1972). Dave’s psychomotor domains mainly focused on imitation and manipulation. It consisted of five main elements: (a) imitation, (b) manipulation, (c) precision, (d) articulation, and (e) naturalisation. Simpson (1972) taxonomy, on the other hand, emphasised adaptability. It comprised seven components: (a) perception, (b) set/readiness, (c) guided response, (d) mechanism, (e) complex overt response, (f) adaptation, and (g) origination. Finally, a psychomotor taxonomy presented by Harrow (1972) is based on the theory of movement comprising six categories: (a) reflexive motion, (b) fundamental motion, (c) observing ability, (d) physical ability, (e) skill movement, and (f) non-discursive communication skills (Tomei, 2005; Wayne, 2014).

Vocational Taxonomy

Due to the deficiency of Bloom’s taxonomy, several related taxonomies have been developed by some researchers (Carbonell, 2004). Hauenstein (1998) developed a taxonomy related to

assimilation, adaptation, performance, and aspiration for the affective domain (Walter & Charles, 2013). Harrow (1976) presented a taxonomy for the psychomotor domain, stressing that most educators find that students do not attain the skill level of their intended objectives, but encourage students to learn advanced skills or more complex movements. Although Bloom taxonomy is mainly emphasising the cognitive domain, other educational psychologists, such as Ebel and Frisbie (1991) and Gagne (1985) have also proposed ways to set teaching objectives in the affective and psychomotor domains to assist teachers in the design and implementation of their teaching. However, most teaching models focus on cognitive rather than affective or psychomotor domains (Sperber, 2005).

One of the important aspects of vocational education and training is its orientation toward the world of work (Mustapha, 2017). Hence, psychomotor domain is emphasised in VET – particularly concerning the development of physical or practical skills (Okwelle, 2013). Without a well-established vocational taxonomy, there is a gap in the shaping of learning objectives and outcomes in the vocational fields, so the development of a vocational taxonomy is critical.

Based on a vast literature review, it can be concluded that studies related to the development of vocational taxonomy are very limited. To date, there is no single comprehensive classification of vocational domains. This makes it pertinent to develop vocational taxonomy because there is very little corpus of literature on vocational taxonomy. Thus, it is crucial to develop a comprehensive vocational taxonomy. As an initial step, a needs analysis is conducted to identify the importance of taxonomy in vocational education.

Needs Analysis of Vocational Taxonomy

In this study, a critical analysis was conducted to identify the need of a new taxonomy which is a vocational taxonomy. Prior to that, a corpus of relevant literature was critically reviewed to determine the potential domains that could be included in the vocational taxonomy. As mentioned before, a Bloom taxonomy is used by most vocational educators to map their teaching and assessment activities. However, based on the interview with vocational experts, the Bloom taxonomy is inadequate for assessing psychomotor, visualisation, problem-solving, and inventive aspects of vocational and technical fields. To conduct the needs analysis, seven vocational experts were selected to obtain their input regarding the need to develop a vocational taxonomy.

The qualitative data from the interview showed, in general, the experts agreed that a new taxonomy in vocational fields is needed. To assess psychomotor domain, a vocational taxonomy is required to classify the levels of vocational competencies. As one of the experts (E06) said:

“A new taxonomy is needed that focuses on psychomotor domain to produce skilled workers. This vocational taxonomy could be used to guide the instructors on how to assess the competencies of the trainees”.

Another informant (E01) agreed that in order to develop a new vocational program, a curriculum developer needs to map the program to a vocational taxonomy so that main vocational domains are included. Cognitive learning outcomes are usually mapped to Bloom taxonomy but the psychomotor learning outcomes lack a clear benchmark. Expert (E01) made this suggestion:

“For [vocational] curriculum developers, they need a benchmark [a taxonomy] to map vocational competencies in order to produce a quality skilled worker ... for cognitive learning outcomes, we have [Bloom taxonomy] but not for practical aspects [psychomotor domain]... we don't have.

In terms of teaching and learning of vocational subjects, another expert (E02) believed that a vocational taxonomy is needed to arrange the teaching modules and learning activities based on hierarchical structure of knowledge for simple to complex tasks. He (E02) asserted:

“In teaching vocational subjects ... we need a vocational taxonomy because Bloom taxonomy is lacking [inadequate] for mapping the vocational traits. We need to teach from simple concepts [theory] to more complex practical hands-on ... students learn through [proper] contexts”.

In addition, another expert (E03) saw the importance of vocational taxonomy in terms of mapping the visualisation aspect of vocational subjects such as engineering drawings and designs. He asserted that Bloom taxonomy has no domain for visualisation, thus a new taxonomy is deemed necessary:

“When it comes to measuring visualisation competence ... such as in [engineering] drawings, we have a problem with setting the benchmark ... Bloom taxonomy lacks of category for visualisation ... so I think we need a new taxonomy...”

The importance of vocational taxonomy is often emphasised in vocational assessment. According to informant E07, a vocational taxonomy is pertinent especially for vocational assessment. He emphasised the difficulty of developing vocational tests without a clear benchmark. For paper and pencil tests (cognitive domain), they are easier to develop based on Bloom taxonomy, but for practical hands-on and problem-solving tasks, they are more difficult to construct. He (E07) explained:

“With a vocational taxonomy, it could make it easier for vocational instructors to develop vocational tests ... especially the practical [part]. For paper and pencil tests [theory part] ... we could use Bloom taxonomy”.

Based on the qualitative interview data, it can be summarised that a new vocational taxonomy is needed. The vocational taxonomy is important to classify vocational domains from the lowest level, which is the theoretical vocational knowledge, to the highest level which is the inventive thinking. This vocational taxonomy is crucial for vocational instructors and practitioners. The vocational taxonomy could be used to map the subject content or curriculum, the level of teaching and learning, the practical tasks, and the vocational assessment.

Conclusion

The purpose of this study was to identify the need to develop a new taxonomy for the vocational field. In education, Bloom and his colleagues created an education taxonomy that encompasses three domains comprising the cognitive domain, including intellectual abilities and skills; affective domain related to feelings, attitudes, values, and emotions; and psychomotor domain related to manipulation or motor skills. Bloom’s taxonomy was created to classify educational goals, objectives, and outcomes. However, the deficiency of the Bloom taxonomy is that it does not focus on the domain of psychomotor – which is the main domain in vocational education and training. There were earlier forms of psychomotor taxonomy developed by several psychomotor experts, such as Dave, Simpson, and Harrow. But their taxonomies are limited to perceptions and kinaesthetic manipulation. A more generic vocational taxonomy is deemed necessary. Hence, this study was conducted to obtain experts’ views on the need for a new vocational taxonomy. The findings show that the experts agreed that a new vocational taxonomy is needed. They asserted that vocational taxonomy is important to classify vocational domains from the lowest level, which is the theoretical vocational knowledge, to the highest level which is the inventive thinking. This vocational taxonomy is crucial for vocational instructors and practitioners. The vocational taxonomy could be used to map the subject content, the level of teaching and learning, the practical tasks, and the vocational assessment.



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