A study of the teacher quality index of professional teachers at vocational industrial high schools in Taiwan

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ABSTRACT: The purpose of this research was to investigate and consider the quality index of professional teachers at vocational industrial high schools, and provide directions to advance the cultivation of teachers. In order to achieve this research purpose, the authors first reviewed and analysed the relevant literature. A quality index of professional teachers at vocational industrial high schools in Taiwan was then developed after conducting interviews with seven kinds of internal/external customers of professional teachers at Taiwanese vocational industrial high schools. Based on the literature review and the interview results, the quality index hierarchy structure of professional teachers at vocational industrial high schools was confirmed via a focus group discussion. Finally, based on the survey results, the weights of the quality index were proposed by the authors.

INTRODUCTION

In Taiwan, the knowledge economy, the impact of globalisation, the structural transformation of industry, industry demands of the workforce, the decreasing national birth rate, education reforms, etc, have indirectly or directly influenced the future development of vocational education [1]. The success of vocational education is intimately dependent on teacher quality. Therefore, identifying how to promote teacher quality is certainly a central issue for Taiwan, as well as many other countries. Teacher quality is an indicator of a student's achievements. In other words, enlightened teachers are likely to cultivate accomplished students. Consequently, the continuous improvement of an index of teacher quality is necessary in order to produce good teachers.

Based on the importance of laying the foundations for quality teachers, this study was designed to explore the quality of professional teachers. The result provides a valuable reference point for the cultivation and future development of professional teachers. The aim of this research was to illustrate the importance of the quality index of professional teachers at Taiwanese vocational industrial high schools.

LITERATURE REVIEW

Many researchers have given definitions of teacher quality. For example, Reichardt proposed that the most basic definition of teacher quality is a teacher's ability to help students reach high standards [2]. According to the National Research Council, teacher quality refers to the knowledge, skills, abilities and dispositions of teachers that enable them to engage students in rigorous, meaningful activities that foster academic learning for all students [3]. Hart and Teeter also reported on the definition of teacher quality in their paper on *Americans Speak on Teacher Quality* [4].

The quality teacher is one who has demonstrated various abilities, including the following:

- Skills to design learning experiences that inspire/interest students;
- A lot of enthusiasm for the job;
- A caring attitude towards students;
- A thorough understanding of their subject;
- A great deal of involvement with students' parents;
- Several years' experience as a classroom teacher;
- An advanced degree from a good school of education.

In this research, the authors have also proposed a definition of teacher quality as follows:

> *A teacher should have a competent ability for his/her educational work, have enthusiasm and teaching knowledge, and can help students to achieve the high standard abilities*.

In addition, a teacher should undertake good teaching activities to stimulate effectively the student's studies and promote the student to achieve high standards.

Although scholars had different opinions regarding teacher quality, research work from various sources were generalised, including six outlines and 27 quality items [5-16]. The six outlines are as follows:

- Education knowledge: learning theory, counselling knowledge, classroom leadership theory, education and teaching expertise, general and subject matter pedagogy, and situational knowledge;
- Professional knowledge: professional subject matter knowledge and occupational practical knowledge;

- Teaching skills: the selection and compilation of teaching materials, effective teaching, instructional assessment, instructional improvement, technology manipulation and interdisciplinary integration;
- Professional skills: the acquisition of professional licenses, plus practical skills and factory management skills;
- Generic competences: problem-solving, interpersonal communication and coordination, and cooperation;
- Values and attitudes: high expectation, professional ethics, love of education, life-long learning, enthusiasm, leading by personal example, as well as fairness and justice.

RESEARCH DESIGN

In order to obtain a clear analysis, the researchers undertook interviews, a focus group discussion and a survey as the research methods. This first entailed reviewing the relevant literature. This was followed by a *semi-structured* interview with seven kinds of internal/external customers of professional teachers at vocational industrial high schools with a total of 21 participants who comprised educational administrators, school administrative personnel, professional teachers, students, patriarchs, experts and scholars, and an industry CEO. From this, the researchers constructed the initial quality index hierarchy structure of professional teachers at vocational industrial high schools. After this was completed, 18 persons, who were connected to teacher quality and who also came from seven different kinds of internal/external customers of professional teachers at vocational industrial high schools, were invited to participate in a focus group discussion. The topic of this focus group discussion was to identify the quality index of professional teachers. The confirmed quality index hierarchy structure of professional teachers at vocational industrial high school was proposed after this discussion.

Finally, according the results of the focus group discussion, the *hierarchy weights analysis questionnaire of the quality index of professional teachers at vocational industrial high schools* was established. A total of 20 experts, comprising experts and scholars, educational administrators, school administrative personnel and professional teachers, was then selected to fill out the questionnaire. After the survey, the Analytic Hierarchy Process (AHP) technique was used to confirm the weights of the quality index of professional teachers at vocational industrial high schools.

RESULTS AND DISCUSSION

Interview

From an analysis of the interview results, the authors determined six quality index dimensions of professional teachers of vocational industrial high school. These dimensions consisted of 27 items; specifically, the dimension of *education knowledge* included counselling knowledge, classroom leadership theory, as well as education and teaching expertise; *professional knowledge* included professional subject matter knowledge, occupational practical knowledge and new knowledge related to industries, *teaching skills* included teaching materials selection and compilation, effective teaching, instructional assessment, instructional improvement, and technology manipulation; *professional skills* included practical skills and the acquisition of professional licenses; *generic competences* included problem solving, interpersonal communication and coordination, cooperation, creativity and innovation, emotional management, and international perspective; *values and attitudes* included humanistic qualities, professional ethics, love of education, life-long learning, enthusiasm, leading by personal example, as well as fairness and justice.

Focus Group Discussion

After the focus group discussion, the establishment of the *hierarchy structure of the quality index of professional teacher at vocational industrial high schools* was composed of six dimensions and 35 items, as shown in Figure 1.

Hierarchy Questionnaire Survey

The study calculated the overall hierarchy weights listed in Figure 1. These were sorted by the level of importance in the quality index of professional teachers, as shown in Table 1. Among all the dimensions, *professional knowledge* was found to be the most important.

Table 1: Levels of importance for the dimensions of the professional teacher quality index.

Order	Quality	Eigenvector
1	Professional knowledge	0.245
2	Values and attitudes	0.242
3	Professional skills	0.185
4	Teaching skills	0.138
5	Education knowledge	0.120
6	Generic competences	0.069

The *education knowledge* dimension included the items of education and teaching expertise (eigenvector 0.293), classroom management theory (eigenvector 0.187), general and subject matter teaching principles (eigenvector 0.168), counselling knowledge (eigenvector 0.149), learning theory (eigenvector 0.131) and situational knowledge (eigenvector 0.073). In summary, the *education knowledge* of professional teachers was focused on *education and teaching expertise*.

The *professional knowledge* dimension included the items of correct concept of employment (eigenvector 0.295), professional subject matter knowledge (eigenvector 0.263), professional skills-related knowledge (eigenvector 0.260) and new knowledge related to industries (eigenvector 0.182). The *professional knowledge* of professional teachers was dominated by the *correct concept of employment* item.

The *teaching skill* dimension included the items of pedagogy application (eigenvector 0.388), teaching materials selection and compilation (eigenvector 0.160), technology manipulation (eigenvector 0.121), instructional improvement (eigenvector 0.120), instructional assessment (eigenvector 0.116), and interdisciplinary integration (eigenvector 0.095). The *teaching skills* aspect of professional teachers was focused on *pedagogy application*.

The *professional skills* dimension included the items of practical operation (eigenvector 0.409), factory management (eigenvector 0.181), the acquisition of professional technology licenses (eigenvector 0.148), assisting students in project work (eigenvector 0.139) and assisting students in obtaining professional technology licenses (eigenvector 0.123). The *professional skills* dimension of professional teachers was mainly focused on *practical operation*.

The *generic competence* dimension included the items of interpersonal communication and coordination (eigenvector 0.239), problem solving (eigenvector 0.232), emotional management (eigenvector 0.177), cooperation (eigenvector 0.126), research and innovation (eigenvector 0.118), language proficiency (eigenvector 0.067), and international connections (eigenvector 0.041). The *generic competences* dimension of professional teachers was emphatically focused on *interpersonal communication and coordination*.

The *values and attitudes* dimension included the items of professionalism (eigenvector 0.336), working attitude (eigenvector 0.229), professional ethics (eigenvector 0.143), leading by personal example (eigenvector 0.088), life-long learning (eigenvector 0.074), fairness and justice (eigenvector 0.072), and humanistic qualities (eigenvector 0.057). The *values and attitudes* aspect of professional teachers was mainly skewed towards *professionalism*.

The ranking of all 35 quality index items are listed in Table 2, with practical operation being the most important item.

Table 2: The ranked importance of the various quality index items.

Ranking	Quality Index Item
1	Practical operation
2	Pedagogy application
3	Professionalism
4	Correct concept of career
5	Education and teaching expertise
6	Professional subject matter knowledge
7	Professional skills-related knowledge
8	Interpersonal communication and coordination
9	Problem-solving
10	Working attitude
11	Classroom management theory
12	New knowledge related to industries
13	Factory management
14	Emotional management
15	General and subject matter teaching principle
16	Teaching materials selection and compilation
17	Counselling knowledge
18	Professional technology licenses obtainment
19	Professional ethics
20	Assisting students in the project work
21	Learning theory
22	Cooperation
23	Assisting students in obtaining professional technology licenses
24	Technology manipulation
25	Instructional improvement
26	Research and innovation
27	Instructional assessment
28	Interdisciplinary integration
29	Leading by personal example
30	Life-long learning
31	Situational knowledge
32	Fairness and justice
33	Language proficiency
34	Humanistic qualities
35	International connections

CONCLUSION

The viewpoint of internal/external customers of professional teachers and the quality index should be considered when developing the curriculum of professional teachers at vocational industrial high schools. In the research presented in this article, the authors created a quality index hierarchy structure of professional teachers at vocational industrial high schools with six quality index dimensions and 35 items that may contribute to the advancement of the quality curriculum development of professional teachers.

Of note is that *professional knowledge*, as well as *values and attitudes*, were found to be particularly important with regard to cultivating the curriculum of professional teachers at vocational industrial high schools. Also, the quality index hierarchy and its weights could be reference materials for teacher evaluations of professional teachers at vocational industrial high schools, especially with regard to evaluation items and measurement.

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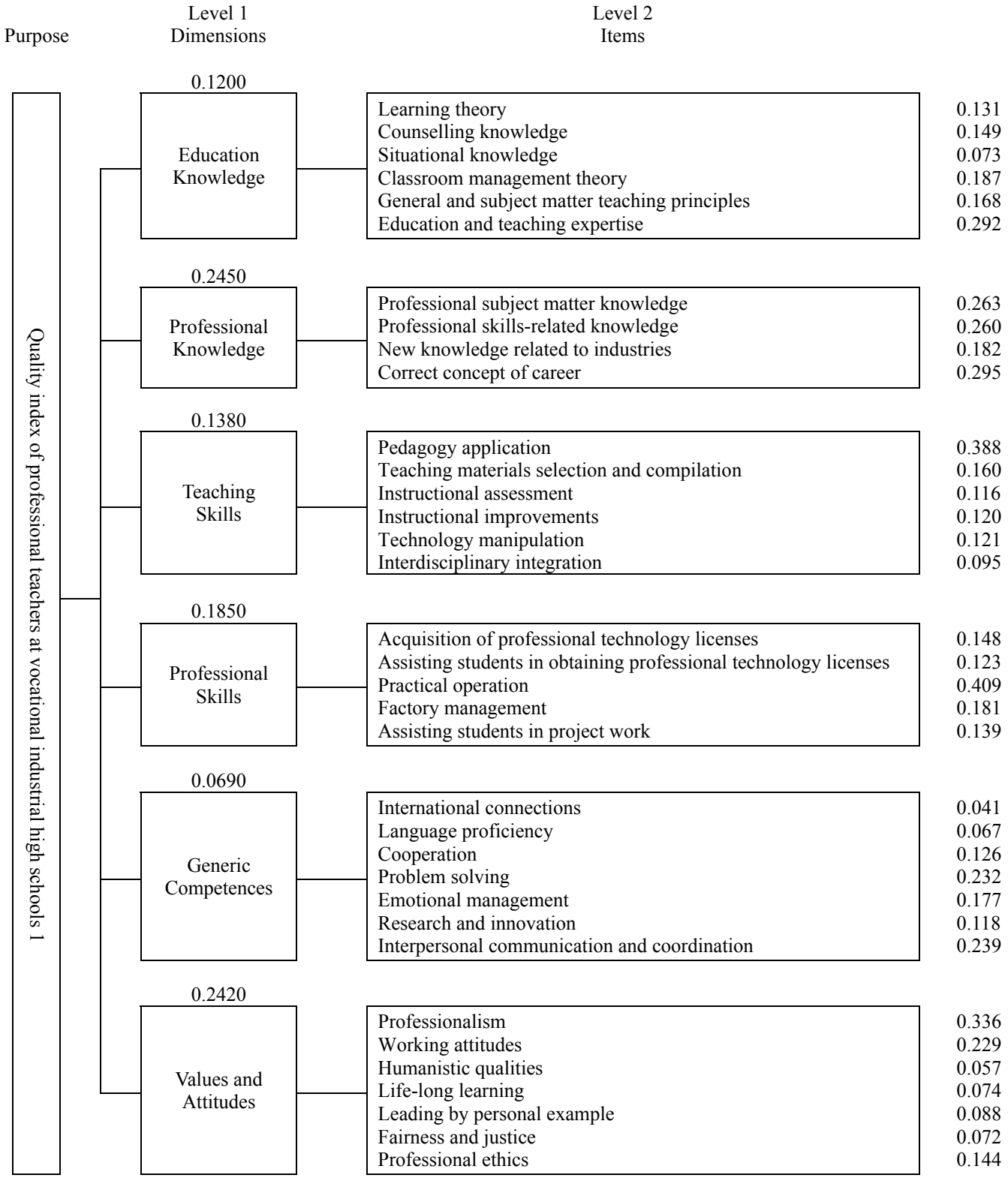

Figure 1: The hierarchy structure and the weights of the quality index of professional teachers at vocational industrial high schools.