Constructing the Assessing Indicators of Evaluation Effectiveness through Fuzzy Delphi Technique for Vocational High Schools

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ABSTRACT

The vocation school evaluation in Taiwan has been implementing for almost a decade. It is important to provide schools with the assessing indicators to establish their own self-check plans continuously and educational administrative units with references for policymaking. The purpose of this study aimed to construct the assessing indicators of evaluation effectiveness for vocational high schools. Literature review and focus group interview were employed to construct the 56-item Fuzzy Delphi technique questionnaire. The questionnaires were sent to 20 educational experts and scholars, such as professors, high school evaluation members, school administrative members, and teachers to ensure the assessing domains, subcategories, and indicators of the school evaluation effectiveness. Data collected from the questionnaires were analyzed by Fuzzy Delphi 1.0. The findings of the study suggest that the assessing indicators of evaluation effectiveness for vocational high schools consist of two domains, one is school management including subcategories of administrative effectiveness, resource integration, organizational interaction, and environment improvement; the other is professional development including subcategories of course planning, teacher profession, student performance, and top-notch talent cultivation and remedy for weak.
Keywords: assessing indicator, evaluation effectiveness, fuzzy Delphi Technique, school evaluation

I. Introduction

1. School Evaluation is an important mechanism for improving school quality

Stukalina (2010) pointed out that educational environment and quality can be monitored through school evaluation system and students' performance can also be inspired and enhanced. Thus, a school's improvement can be assessed through criteria such as school learning environment, students' feedback, students' participation in school affairs, students' learning satisfaction, and school staff members' interaction (Stukalina, 2010). As a result, school quality can be maintained or improved through school evaluation.

2. High school evaluation is the important project for the 12 year compulsory education in Taiwan

Tsai and Cheng (2008) mentioned that high school evaluation was included in the "12 year compulsory education" in 2007 to assist schools examine their own issues and conditions of school management for further improvement and development and quality assurance. Thus, every high school in Taiwan needs to participate in school evaluation to move from homogeneity to excellence, which has become the foundation of the implementation of the 12 year compulsory education.

3. Lack of studies on the development of the post evaluation of evaluated high schools

Many scholars tended to use meta-evaluation to assess the current schools evaluations. Yet, some issues were investigated through questionnaire survey or interviews, such as the appropriateness of the evaluated schools or the school improvement difficulties. Hall (2013) suggested that school evaluation process should vary depend upon various evaluation theories and methods. School evaluation should not just collect and analyze collected evaluation data. It should be the continuously interactive process between evaluators and evaluated units. Although the high school evaluation in Taiwan is rather effective but it cannot continuously investigate the evaluated schools' further progress and development of the post evaluation. Therefore, the assessing indicators of the post evaluation for high school evaluation should be established for schools to make self-check plans and sustainable development.

II. Literature Review

Many previous studies concerned only the effectiveness of school evaluation in western highly developed countries. In fact, school evaluation in some developing countries also produced a lot of evaluation of effectiveness. For instance, Bengal has improved its school management after the school evaluation was introduced. They also hope to further enhance the effectiveness of learning in the quality of teachers and students. In addition, Nepal's evaluation focused on school personnel and funds control and emphasized more on the school teachers' professional performance. DeGrauwe & Naidoo (2002) pointed out that Malaysia's schools actively seek to participate in school evaluation and their teachers possessed a high degree of willingness to be in accordance with the school schedule, and the school acceptance of evaluation was higher than other countries。As a result, Evaluation can effectively promote the school progressed. Some studies reveal that evaluation has significant effect on teacher's professional and student's performance. Why is that? We assume that school evaluation implementation enforces school administrative officials to realize the importance of school management. School evaluation also brings appropriate pressure to inform the school leaders of the evaluation results was highly regarded by the national education authorities. In the competition, the school will be more actively seek better performance; school

evaluation is to oversee the development of the school system, and thus the professional knowledge and ability and technical support can be obtained through school evaluation. In brief, prompting school progress through school evaluation is a global trend at present.

Torres and Preskill (2001) and Owen(2007) suggested that the effectiveness of educational evaluation refers to the functions and effects of the outcomes and the process of the educational evaluation to the evaluated subjects and organizations. Estyn (2011) stated that the issues or problems can be found through evaluation in order to effectively use the evaluation outcome. Then, school staff members should develop some strategies for improvement, and do follow-ups to ensure the fulfillment of the suggestions provided by the evaluation. Therefore, the reports of evaluations need to be used properly to make evaluations helpful. The report of evaluation is the beginning of improvement for next level, rather an ending. An evaluation with high effectiveness can have many functions, such as promoting organizational members' reflection, dialogue, sharing, attitude, motivation, decision-making, mobility, or authority of the important issues within organization. The evaluation system can be embedded in the school system to continuously provide schools with necessary information feedback and learning opportunities. Thus, the evaluation effectiveness can have impact on personals and groups, and further influence organizational learning and development.

To conclude, the results of above mentioned studies suggest that we can reasonably infer that the implementation process of evaluation can promote a dialogue with members of the organization and their in-depth thinking and reflection. In this process, the organizational and personal values, beliefs, assumptions, and knowledge can be clarified and confirmed (Foley, Klinge, & Reisner 2008; Preskill, 2005). Under the interaction the organizational structure, organizational culture, members' growth, and professional development of members are generated (as shown in Figure 1). These are the important benefits/effectiveness of evaluation implementation for schools.
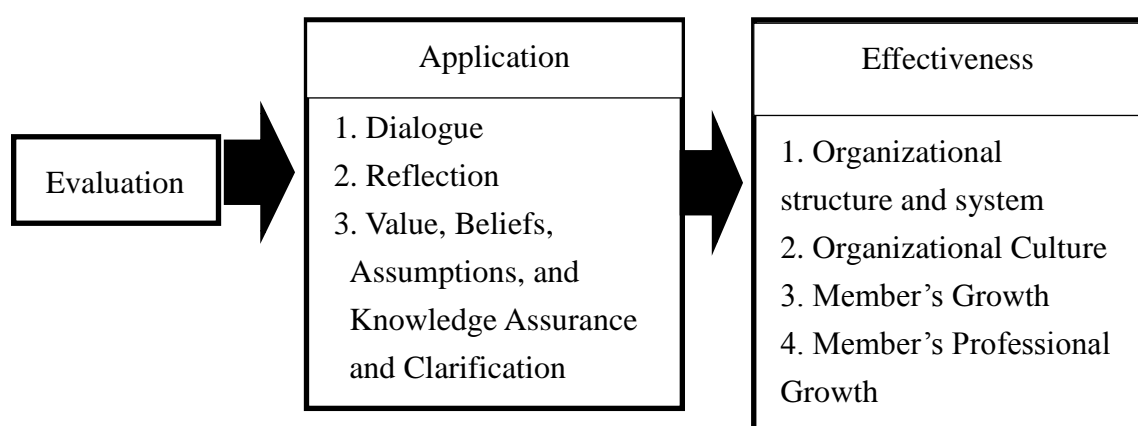

Figure 1. The Evaluation Effectiveness

According to Fleischer (2007), evaluation can be beneficial to an organization based on the results of surveying on the US evaluation association members. Through evaluation, an organization can obtain the following benefits: 1. the organizational capability can be enhanced; 2. the organization can improve and fulfill the implementations of the strategic plans; 3. assisting

those who are willing (intend) to use the results of evaluation to improve their basic concepts during practices; 4. increasing team learning motivation; and 5. strengthening those who are willing to use evaluation results to improve their thinking skills. Above mentioned benefits can be taken into considerations while constructing the indicators of vocational high school evaluation. Thus, the vocational high school evaluation effectiveness consists of two domains, including school management and professional development and eight subcategories (Amo & Cousins, 2004; Cousins et al., 2004; Owen, 2007; Reeve & Peerbhoy, 2007; Vanhoof & Petegem, 2012).

Table1. The Draft of Assessing Indicators of Evaluation Effectiveness for Vocational High Schools

Domain	Subcategory
School Management	administrative effectiveness, resource integration, organizational interaction, and environment improvement
Professional Development	course planning, teacher profession, student performance, and top-notch talent cultivation and remedy for weak

III. Research Method

In order to establish the assessing indicator system of vocational high school evaluation effectiveness, the researchers initially constructed 64 assessing indicators through reviewing the content of Taiwan vocational high school evaluation indicators, annual evaluation reports, and literature. After that, a total of 20 experts, including educators and scholars of educational administration, educational evaluation, and vocational education, and principals, directors, and staff members of vocational high schools were invited to join 2 times focus group interviews to obtain the draft of assessing indicators of evaluation effectiveness for vocational high schools.

The results obtained from the two time focus group interviews were administered to the Fuzzy Delphi technique for further verification. Survey questionnaires were sent to a total of 20 experts in the related fields to obtained feedback, suggestions, and comments on the appropriateness of the assessing indicators of evaluation effectiveness for vocational high schools. The questionnaires collected from the 20 experts was first calculated the indicators of the triangular fuzzy values, L represents the minimum value of the expert consensus, M represents the geometric mean of possible values of the expert consensus, and U represents the maximum value of the expert consensus.

IV. Results and Discussion

The triangular fuzzy number of the study was employed with the Fuzzy set defuzzify approach, using Fuzzy Delphi version 1.0 software package to calculate the l-values, r-values, and total values of the indicators. Screening GDP threshold setting of this study of the effectiveness of mining quartile calculations to Q1 as the threshold value of .600. Thus, the item values lower than .600 are removed. Table 2 shows the total values of the indicators for school management and professional development of the assessing indicators of evaluation effectiveness for vocational high schools.

The following shows some indicators of the school management and professional development domains with values lower than the standard are deleted:

1. The school management domain

The following indicators with values lower than the standard value are deleted. They are 1-1-3 "School funding is effectively used", 1-2-2 "The resources of various disciplines are effectively integrated", 1-3-4 "Students and the school have better interaction mechanism.", 1-4-4 "Environment improvement", 。1-4-4 "The school facilities and books should be enriched."

2. The professional development domain

2-2-2 "Teacher should adopt differentiated teaching according to students' capabilities", 2-2-3 "Teacher should adopt multiple assessment approaches", 2-3-1 "Students overall behavior performances are progressed", 2-3-2 "Student government organization can be more actively involved in the school of public affairs", 2-3-3 "Student physical fitness can be more improved", and 2-4-8 "Schools can more actively promote second language learning" are deleted due to the low total values. As a result, a total of 45 assessing indicators of school evaluation effectiveness for vocational high schools are kept after deleting 11 indicators from the original 56 indicators.

Table 2 The defuzzification values of the assessing indicators of evaluation effectiveness

Assessing Indicators	Right value	Left value	Synthesizing value	Delete or Not
I. School Management				
1-1 Administrative Effectiveness				
1-1-1 Help school understand the current situation and problems.	.770	.336	.717	
1-1-2 Can guide the school about administrative decision-making and the development direction.	.748	.374	.687	
1-1-3 School funding is effectively used.	.650	.499	.575	delete
1-1-4 The administrative satisfaction of school is enhanced.	.725	.389	.668	
1-1-5 School emphasizes more on performance management, continuous improvement through a feedback mechanism.	.737	.387	.675	
1-1-6 School can do school self-management, and enhance the educational performance through innovation.	.722	.419	.652	
1-1-7 Can help promote school reputation and public image.	.694	.430	.632	
1-2 Resource Integration				
1-2-1 The resources of all administrative units can be integrated.	.674	.466	.604	
1-2-2 The resources of various disciplines are effectively integrated.	.666	.480	.593	delete
1-2-3 School can actively seek external resources to improve school conditions.	.690	.449	.620	

1-2-4 School can utilize students' parents or social connections.	.680	.435	.622	
1-2-5 School can establish various resource database.	.665	.462	.601	
1-2-6 Can actively integrate resource platform and establish the standardized process.	.708	.454	.627	

1-3 Organizational Interaction

1-3-1 Can promote internal cooperation of administrative units.	.707	.429	.639	
1-3-2 Can promote teachers' interactions.	.671	.463	.604	
1-3-3 Can promote the interactions between teachers and administrative units.	.680	.432	.624	
1-3-4 Students and the school have better interaction mechanism.	.644	.517	.564	delete
1-3-5 School has better interactions with outside/industry.	.678	.467	.606	
1-3-6 School staff can involve in more school affairs.	.705	.412	.647	
1-3-7 School staff can agree on school development plans and objectives.	.741	.363	.689	

1-4 Environmental Improvement

1-4-1 Campus can do more sustainable green landscaping work.	.693	.430	.631	
1-4-2 School experiment sites can be improved.	.704	.422	.641	
1-4-3 The management and safety can be more faultless.	.686	.421	.633	
1-4-4 The school facilities and books should be enriched.	.658	.474	.592	delete
1-4-5 The classrooms and teaching equipment can be effectively used.	.688	.460	.614	
1-4-6 School sports field, facilities, and equipment can be more complete.	.710	.406	.652	
1-4-7 School barrier-free facilities can be more complete.	.706	.421	.643	
1-4-8 School energy saving and reduce can be more effective.	.668	.444	.612	

II. Professional Development

2-1 Course Planning

2-1-1 School should strengthen the function of the curriculum development board.	.723	.404	.660	
2-1-2 School should adjust curriculum according to educational policies and social development.	.689	.424	.632	
2-1-3 School can offer more featured courses.	.717	.402	.657	
2-1-4 School can provide more career counseling courses.	.715	.401	.657	
2-1-5 School can provide students with more appropriate counseling for choosing elective course.	.696	.457	.620	
2-1-6 School can construct a platform for students to share curriculum information.	.724	.391	.667	

2-2 Teacher's profession

2-2-1 Teachers can develop the expertise and specialty.	.710	.402	.654	

2-2-2 Teachers should adopt differentiated teaching according to students' capabilities.	.650	.492	.579	delete
2-2-3 Teachers should adopt multiple assessment approaches.	.649	.493	.578	delete
2-2-4 Teachers can adjust their teaching strategies according to students' learning assessments.	.691	.431	.630	
2-2-5 Teachers can actively involve in teaching.	.725	.411	.657	
2-2-6 Teachers can do well on class management.	.708	.417	.646	
2-2-7 Teachers can actively participate in various seminars to improve professional knowledge.	.727	.408	.660	
2-2-8 Teachers can actively participate in social network groups to share their teaching experience with peers.	.718	.416	.651	
2-3 Students Performance				
2-3-1 Students overall behavior performances are progressed.	.633	.524	.555	delete
2-3-2 Student government organization can be more actively involved in the school of public affairs.	.646	.515	.565	delete
2-3-3 Student physical fitness can be more improved.	.638	.516	.561	delete
2-3-4 Students can actively participate in school club activities and performance.	.702	.434	.634	
2-3-5 Students can actively participate in on- and off-campus competitions.	.667	.462	.602	
2-3-6 Students can actively participate in outside visitations, exhibitions, and performances.	.651	.500	.576	delete
2-4 Top-notch talent cultivation and remedy for weak				
2-4-1 School can more actively promote remedial teaching.	.710	.402	.654	
2-4-2 School can offer special students more intensive individualized instruction.	.712	.423	.645	
2-4-3 School can establish mechanisms for helping and caring disadvantaged students.	.742	.390	.676	
2-4-4 School can establish mechanisms for helping low achieved students.	.678	.451	.614	
2-4-5 School can set up more diversified scholarship programs.	.679	.449	.615	
2-4-6 School can actively promote special projects.	.705	.420	.643	
2-4-7 School can actively encourage academic exchange activities.	.679	.445	.617	
2-4-8 School can more actively promote second language learning.	.654	.461	.596	delete

V. Conclusion

This study aimed to establish the assessing indicators of evaluation effectiveness for vocational high schools in Taiwan through document analysis and focus group interviews. The results of the study suggest that the assessing indicators can be categorized into 64 essential

indicators including 2 domain (school management and professional development), and 8 subcategories (course planning, teacher profession, student performance, and top-notch talent cultivation and remedy for weak). The fuzzy Delphi technique was employed to refine the 64 indicators. The results are listed as follows.

1. The domains of the evaluation effectiveness for vocational high schools are school management and professional development. 2. The school management domain consists of 4 subcategories, including administrative effectiveness, resource integration, organizational interaction, and environment improvement; the professional development domain consists of course planning, teacher profession, student performance, and top-notch talent cultivation and remedy for weak.

3. The school management contains 24 indicators, and the professional development contains 21 indicators, which adds up 45 indicators in total (as shown in Table 2).

Vocational high schools and the administrative officials can adopt the 45 indicators developed by this study to assess the effectiveness of school evaluation. In addition, although the 45 indicators are reliable and effective through document analysis, focus group interview, and fuzzy Delphi technique, a large-scale questionnaire survey can be conducted to further verify the indicators and thus to assess the evaluation effectiveness after the evaluation.

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