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A Study on the Causal Relationship of Evaluation and Selection Criteria for the Professional Capabilities in School's Administrative Operation

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Abstract: With the professional capabilities in school's administrative operation as the subject and through the literature reviews, the study tried to synthesize five dimensions of professional capabilities in school's administrative operation as the selection dimensions for enhancing the disciplines and performance in running school by the principals as well as the quality of school operation and efficiency: "school development", "instructional leadership", "administrative management", "public relations" and "professional responsibility". They also acted as selection dimensions for five professional capabilities that are most important for the school's administrative operation. The questionnaires were issued to the principals of 34 senior high schools. The causal relationship of selection dimensions for the professional capabilities of school's administrative operation were obtained through Decision Making Trial and Evaluation Laboratory (DEMATEL), in which the dimension of public relation, administrative management and professional responsibility were the professional capabilities most concerned by the school leaders for school's administrative operation.

Key words: Decision making trial and evaluation laboratory, school development, administrative management, instructional leadership, public relations, professional responsibility

INTRODUCTION

In recent years, the government has continued to implement education reforms that the school-based management and campus democracy have changed the orientation of school leadership. However, after reforms, responding the school-based administrative management and curriculum development, the principal's role and functions of leadership has diversified and the requirements and responsibility of expertise have increased. Facing the reality of "more complicated work, increased responsibility and heavier pressure", how a principal does a good job as a school leader and give full play to the effectiveness of a school leader have become challenges and issues he or she needs to address (Hanushek and Woessmann, 2007). Hsiao (2010) argued that the principals or school administrative chiefs faced not only school's administrative affairs but also the works, such as the build-up of relationship with communities, the confirmation of school vision, decision on curriculum and even school marketing, need closer cooperation between the members of the administration team. On the other hand, the campus democracy has led to the selection of principal by stakeholders instead of past appointment by the authorities that the principals feel more pressure in running schools. How a school leader uses leadership theories and administrative experiences to lead a team to achieve the educational mission have apparently become important issues.

In light of this situation, study is adopted Chen (2004) who explored the cultivation of principal's core capability in the administrative operation from the trend leadership theory. Chen (2004) argued that various discussions, reflections, thinking and learning of five professional capabilities in school's administrative operation: "school development", "instructional leadership", "administrative management", "public relations" and "professional responsibility", could enhance principal's discipline and performance in running schools and help them in the professional development of school's administrative operation. Chen (2004) believed that the approach could help the principals succeed in leading and managing schools, establishing a school which the social public has full confidence in as well as fully enhance the quality and efficiency of school operation.

Therefore, the study adopted Decision Making Trial and Evaluation Laboratory (DEMATEL) and divided all

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dimensions into two groups: causal category (cause) and affected category (consequence), respectively, before being analyzed by causal diagram that clearly pointed out the extent and course of mutual effects between dimensions. So the study adopted DEMATEL method to conduct further exploration and research on the causal relationship of dimension selections of the professional capabilities for the administrative operation of senior high schools.

LITERATURE REVIEW

Entering into the 21st century, Taiwan is under the trend of noisy voices, power deconstruction, diversification and autonomy and respect for difference and principals, teachers, parents and students are conscious of educational power as a shared and cooperative structure that they strive to grab more policy-making powers, thus a new school style has emerged. According to the researches by Leithwood *et al.* (2008), the strength of school leadership's effects on students' learning is second only to teaching in classrooms. The school leaders could enhance students' learning achievements through their effects on members' motivation, commitments and work environment. Therefore, a successful school leader could play an important role. Belchetz and Leithwood (2007) introduced four criteria for the implementation of school leadership including set-up of direction, assistance to members, restructure of organization, management of teaching plans. This study adopted Chen (2004) research, that is, exploring five core and key capabilities for administrative operation by principals: "school development", "instructional leadership", "administrative management", "public relations" and "professional responsibility", from the trend leadership theory.

School development: Lessem (1990) comparing with trees, the scholar of organization explained that a developmental management included "soil", "roots", "trunk" "branch and leaves" and "fruits" and when implemented developmental management, the manager emphasized on "holistic human" of humanity and humanism. Its main feature was that when human, organization and surrounding environment solved the problems, it could include the force and characteristics of evolution. In the initial stage of development, this was a shaping force that was behavior oriented and people would affirm it for its independence; the second stage was a stage of finalization of the shape and the establishment of normal model and people would praise it for its reliability; in the third stage, it had integrative force and it was added into

an element that is sufficient to enhance integral development. It included the personality traits in the previous stage and enhanced characteristics of interpersonal reliability and integrated them into one. People would emphasize it for its interdependence with others. In the case of knowledge management, teachers may have different views on it. Some may think it is important for the long-term development for a school while some think it is an optional task in their routine work (Leung, 2010). In the case of knowledge management, teachers may have different views on it. Some may think it is important for the long-term development for a school while some think it is an optional task in their routine work.

Tushman and O'Reilly (1997) argued that from the strategy, vision, resources, history of development, performance, could review the problems of organization in innovation and define needed type of innovation. For the performance of organizational operation, Degler and Battle (2000) stressed that organizational operation needed the establishment of vision of development and culture, strategy. Besides, it should take advantage of the advances of information technology to break the parochialism on the monopoly of information, use knowledge management that pass on the accumulated knowledge in the past to the newcomers and help implement the development of school. Principal is the leader of school that he or she could effectively combine human, material and financial resources through the full play of integrative, prospective, procedural and performance plans to achieve the goal of school. The contents could be simply divided as follows:

- A principal could clearly communicate the educational policies and regulations to the member of school
- A principal could set the goals of school development based on the educational policies and school characteristics
- A principal could indeed implement the established school development plans
- A principal could regularly review the implementation of school development plans

Administrative management: Seng (1990) introduced a new approach establishing learning communities through the conception of learning organization and emphasizing on injecting four core practices-self-transcendence, mental models, shared vision and team learning-through systematic thinking into it to solidify the organization as a learning organization filled with unlimited energy. Johannsen (2000) pointed out that knowledge and

information were two important variables for comprehensive quality management. Regarding the difference in conception between them, if knowledge could be applied to new work area, we may innovate the work. From the angle of comprehensive quality management, knowledge can only become "useful knowledge" and grow wisdom through the process of confirmation and conversion. Therefore, the knowledge management covers not only knowledge but also various dimensions from materials, information to wisdom. If we integrate them and take good advantage of them, we may obtain comprehensive effects. In the interviews on knowledge economy and educational development, Wu (2001) pointed out that knowledge economy emphasized on a new type of economy in which the fortune was generated by the production, distribution, spread and use of knowledge or information. In order to meet the arrival of knowledge economy era, entire administration or teaching in school should transform to be more flexible and innovative. Such change could be divided into three "S" (1) System: entire administrative system should be more flexible, (2) Staff: people will more concern about the professional growth activities of knowledge economy and (3) Strategy: more diversified, lively and innovative teaching method which combines with modern technology, online teaching. Principal is the leader of school that he or she could effectively combine human, material and financial resources through the full play of the function of administrative management including human resources, equipment and financial management to achieve the goal of school. The contents could be simply divided as follows:

- Principal is able to effectively implement school administrative work
- Principal is able to effectively integrate the departments and exert team spirit
- Principal is able to timely give members encouragement for their efforts and achievements
- Principal is able to effectively handle emergencies and campus crises

Instructional leadership: Hallinger *et al.* (1983) introduced a effective feasible instructional leadership model in school including, (1) Define missions of school: draw up the goals for sustainable operation of school and sufficiently communicate and deliver the goals to faculty and students, (2) Manage instructional plans: must have effective knowledge about instruction and courses and can timely evaluate the instructions and coordinate courses and (3) Promote atmosphere of positivism in school: can set up high expectation for students to enable

the students perform better, ensure no disruption in teaching, improve instruction and help professional development. Smith and Andrews (1989) pointed out that the principal's role of leadership should manifest in four areas (1) Principal is the provider of resources: principal provide, use and distribute resources in school to achieve the instructional goals of school, (2) Principal need to integrate instructional resources: principal should demonstrate his knowledge and skills in curriculum and instruction to enable the teachers feel they could interact with principal's leadership and enhance practical teaching effects, (3) Principal is a communicator: principal should use the skills and channels of communication to enable teachers, students and parents understand the activities and measures in school and (4) Principal often show up: principal should often appear in campus and classes to allow teachers and students understand he is diligent in school work.

Wildy and Dimmock (1993) summarized the instructional leadership as four main aspects (1) Describe and pass on the missions of school, (2) Arrange curriculum, (3) Fuel the active and positive atmosphere in school and (4) Evaluate and feedback. Principal is the leader of school that he or she could effectively combine human, material and financial resources through the full play of the function of instructional leadership including clinical supervision, developmental supervision, differentiated supervision and collegial supervision to achieve the goal of school. The contents could be simply divided as follows:

- Principal can create good teaching environment
- Principal can enhance teachers' teaching knowledge and ability
- Principal can guide teachers to engage in the development of curriculum and teaching materials
- Principal have the capability of instructional supervision

Public relations: Hsieh (1996) argued that public relations is a process in which the administrative personnel use contacts, communication, service or other activities to build up mutual understanding and good relationship with members of school to win over the support and sincere obedience and administrative operation goes smoothly to achieve completely the goals of school. Holliday (1988) argued that public relations for school is that in a school system, formulate programs according to all levels of systematic functions to improve and maintain best status of students' academic achievement and establish the public's support. Principal is the leader of school that he or she could effectively combine human, material and

financial resources through the full play of the functions of public relations including shaping school's public image, establishing the base of well-intentioned interdependence, integrating the functions of public opinions to achieve the goals of school. The contents could be simply divided as follows:

- Principal can respect and care about faculty
- Principal can respect and care about students
- Principal has good interaction with parents and community people
- Principal has good interaction with education board, social education-related authorities

Professional responsibility: McGrevin and Schemider (1993) conducted a survey among 450 principals and 280 education board chairmen in California, USA. The results found that the key skills a principal should have were, (1) Having vision for school and understand the steps of goals, (2) Able to exhibit different important requirements for different faculty members and students (3) Able to know how to evaluate all faculty members, (4) Able to understand the changes in process because they will continue to affect the changes of view of school, (5) Able to understand students' preference, strength and weakness, (6) Understand how guide/help member to chair the meeting, (7) Exhibit self-confidence, (8) Understand how to evaluate the work responsibility of role reality of leadership, (9) Understand how to encourage all people, including all educational groups, to participate in school affairs and (10) Understand the ethical limits existing in the administrative areas or the establishment and coordination of knowledge with individual's professional views. Lai (2002) pointed out that principal's professional practice capability include (1) Capability to know his subordinate's well enough to assign the jobs commensurate with their abilities, capability of interpersonal communication to promote the harmonious relationship between members, (2) Capability of crisis management (such as students' learning or discipline problems), (3) Capability of financial management to effectively plan funds, (4) Create a high-quality organizational climate, (5) Capability of chairing meetings, (6) Capability of instructional leadership, (7) Capability of analysis, communication, integration, judgment and reflection, (8) Capability of human and material resources management to operate good public relations and (9) Plan the development of school affairs: capability of shaping and implementation of visions for school, capability of reforms in school. Principal is the leader of school that he or she could effectively combine human, material and financial

resources through the full play of the functions of professional responsibilities including use of higher level of mind capability, received considerable long-term professional education, self-required advanced study, high level of participation and enhancement of professional level, emphasize on serving the community, abide by ethical rules, consider education as his life-long cause to achieve the goals of school. The contents could be simply divided as follows:

- Principal have right educational philosophy
- Principal responsibly and wholeheartedly devote to the school work
- Principal pursue advanced study to enhance professional knowledge and capability
- Principal regularly conduct researches on how to effectively implement the school work

METHODOLOGY

This study adopted DEMATEL to explore the causal relationship of professional capability of administrative operation in senior high schools. DEMATEL originated from the Battelle memorial association (Fontela and Gabus, 1972), a research center headquartered in Geneva, Switzerland. At that time, DEMATEL method was used in the researches of complicated, difficult problems in the world (such as races, hunger, environment protection and energy problems). In recent year, DEMATEL method is popular in Japan in some areas, such as agricultural development, women employment, environmental analyses, merchandise survey and medical behaviors (Hori and Shimizu, 1999), because such method can effectively understand complicated structure of causal relationship. Through observing the level of paired effects between elements, it use matrix and other mathematical theories to figure out causal relationship and strength of effects among all elements. Chiu *et al.* (2006) also mentioned that it is very practical because DEMATEL used direct relationship diagram to show the structure of causal relationship and that is why it is popular in Japan. Direct relationship diagram can describe the level and direction of effects between elements in a system. The number in the diagram represents the strength of effect. The positive and negative signs represent the direction effect, positive sign represents positive effect whereas negative represents reversal effect. As Fig. 1 shows, DEMATEL is using direct relationship diagram to divide all criteria into two groups: cause group and consequence group. In fact, DEMATEL can not only transform causal and consequential relationship between
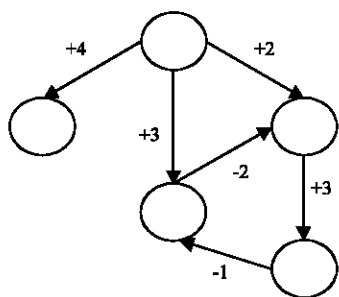
Fig. 1: Direct relationship diagram of DEMATEL

Table 1: Evaluation scale and represented meaning of DEMATEL source

Evaluation scale	Level of effect
0	No effect
1	Slight effect
2	Average effect
3	Great effect

criterion into a clear model of structure but it is also an appropriate method in handling a series of internal interdependence relationship (Fontela and Gabus, 1972, 1976; Gabus and Fontela, 1973; Hori and Shimizu, 1999).

The related applications of DEMATEL is wide, including business planning and policy-making, urban planning and design, evaluation of geographical environment, analyses of global problems. The overseas researches such as the researches by Fontela and Gabus (1974, 1976) and Warfield (1976) who used DEMATEL to explore the level of complexity of business problems, Lin (2003) applied DEMATEL to the evaluation and shaping strategy for the development of pastoral landscape, Ji (2005) applied it to the evaluation and research of performance of suppliers. Zhang (2005) on the analyses of key evaluation factors in decision-making by consumers of sports and leisure shoes and Lin (2005) took advantage of DEMATEL to conduct research on the causal relationship of management issues and establish analytical model.

DEMATEL is an effective method in establishing and analyzing structural model, it is usually used in looking for the relationship in social phenomena and solve interdependence problems between elements (Tzeng *et al.*, 2007). Through the use of DEMATEL, we could quantify the related relationship among several elements contained in complicated problems. Obtaining the structural model of complicated problems us is important and useful. From the structural model, we could obtain the priority order in several strategies to improve entire structure and this is the main purpose of DEMATEL. Because the evaluation and selection criteria for school leadership cover various types and the complicated relationship exist different criteria, through DEMATEL, this study shows the causal relationship diagram of complicated relationship among criteria. Through the causal relationship diagram, we could clearly understand which evaluation and selection dimensions are relatively important and know its causal relationship that will be helpful to the continuous improvement of school operation.

In order to use DEMATEL, this study simplified the viewpoints from Fontela and Gabus (1976) and obtained following five definition and steps:

Define elements and judge relationship: List the elements in the system and define them. The element could be obtained from exploration, literature reviews and brain storm. In this study, through literature review and discussions among scholars of practical experiences, the related dimensions of evaluation and selection criteria of school leadership were obtained before judging the relationship between paired elements after discussions and cognition of issues by experts. The evaluation scale was making reference to the scale designed by Fontela and Gabus (1976) that was divided into four levels. Among which, 0,1 and 2 represents no effect, slight effect, average effect and great effect, respectively as shown in Table 1.

Establish direct-relation matrix: When the degree of effect is known, a direct-relation matrix could be established. If there are n evaluation criteria, compare the criteria in pairs by their relation and degree of effect, a n×n sized direct-relation matrix will be produced and represented by $X = [x_{ij}](i = 1, 2, 3,\ldots, n; j = 1, 2, 3,\ldots n)$, in which the x_{ij} represents the degree of effect of Criterion i on Criterion j and set its diagonal element as 0.

Establish standardarized direct-relation matrix: standardarized direct-relation matrix obtained from step two, that is, multiply entire matrix X by S as Eq. 1 shows, in which, S is as Eq. 2 shows and thus obtain standardized direct-relation matrix that is represented by D.

$$D = X \times S \qquad (1)$$

$$S = \frac{1}{\underset{1 \le i \le n}{MAX} \sum_{j=1}^{n} a_{ij}} \qquad (2)$$

Establish total influence-relation matrix: After knowing standardized direct-relation matrix D, through Eq. 3, we could obtain total influence-relation matrix T, in which I is unit matrix:

$$T = D(I-D)^{-1} \qquad (3)$$

Draw up causal diagram:

a = Assume t_{ij} (i, j = 1, 2.....n) as the element of T, the sum of column and the sum of row are represented by D_i and R_j, we obtain following equation:

$$D_i = \sum_{j=1}^{n} t_{ij} \ (i = 1, 2, \ldots, n);$$

$$R_j = \sum_{i=1}^{n} t_{ij} \ (i = 1, 2, \ldots, n)$$

Where:

D_i = Represents the sum of effects of element i as cause on other elements (including direct and indirect effects)

R_j = Represents the sum of effects on element j as consequence that is affected by other elements

b = The sum of row and column (D+R) is called correlation degree that comes from the result of D_k plus R_k and represent the total degree effects of the element that include it affects other elements and it is affected by other elements. It could show the strength of correlation of element with the problem group; the discrepancy of row and column (D-R) is called causal degree and it is the result of D_k minus R_k. If ($D^-_k R_k$) is positive, the element tends to be the category that affects other elements. If ($D^-_k R_k$) is negative, the element tends to be the category that is affected by other elements

c = Mark coordinates of known (D+R) and (D-R) and in the causal diagram, ($D_k + R_k, D^-_k R_k$) are ordered pairs, the horizontal axis is (D+R) whereas vertical axis is (D-R). Through expression of each element in the form of coordinates. Then the causal diagram can simplify complex causal relationship as easy-to-understand structure that could understand the problem in-depth to offer the direction of solution. Besides, by the help of causal diagram, the decision-maker could plan appropriate decision according to affecting category and affected category in the criteria

CASE STUDY

This study used DEMATEL to conduct a questionnaire survey among principals of 34 senior high schools and tried to find out if there is any causal and consequential relationship between evaluation and selection aspect and their correlation degrees. The research structure of DEMATEL and computing steps includes analysis of 34 retrieved effective questionnaires by DEMATEL and use EXCEL software to operate. The computing steps are described as follows:

Step 1: Establish direct-relation matrix: The direct-relation matrix of 34 effective questionnaires (H1~H34) to five evaluation dimensions is listed as example H_1 as shown in Table 2.

Step 2: Establish average expert opinion matrix: Figure out arithmetic mean of direct-relation matrix of 34 expert questionnaire to five evaluation aspects, that is, evaluate arithmetic mean of five elements on the same positions of row and column (because 34 experts form 34 matrixes) and obtain the results as shown in Table 3. Put the values into the matrix separately and set the diagonal value as 0 to produce direct-relation matrix(A). The first element a_{11} will be equal to $(0+0+0+......+0)/34 = 0$ and so on. In which a_{ij} is the element of matrix (A).

From Table 3, we could learn that when evaluate the degrees of mutual effects between five dimensions by 34 experts, the obtained mean not necessarily symmetrical to each other. For example, compare "school development" and "administrative management", the value obtained is 2.684211, but when compare "administrative management" and "school development", the value obtained is 2.789474. The reason is that each person who filled in the questionnaire from different

Table 2: Evaluation dimensions of direct-relation matrix

	H_1				
	School development	Instructional leadership	Administrative management	Public relation	Professional responsibility
School development	0	3	3	2	3
Instructional leadership	3	0	3	2	3
Administrative management	3	3	0	2	2
Public relation	2	2	3	0	2
Professional responsibility	2	3	3	2	0

$$H_1 = \begin{bmatrix} 0 & 3 & 3 & 2 & 3 \\ 3 & 0 & 3 & 2 & 3 \\ 3 & 3 & 0 & 2 & 2 \\ 2 & 2 & 3 & 0 & 2 \\ 2 & 3 & 3 & 2 & 0 \end{bmatrix} \sim H_{34} = \begin{bmatrix} 0 & 2 & 3 & 1 & 2 \\ 3 & 0 & 2 & 1 & 2 \\ 2 & 2 & 0 & 2 & 1 \\ 2 & 1 & 1 & 0 & 1 \\ 3 & 3 & 1 & 1 & 0 \end{bmatrix}$$

Table 3: Arithmetic mean of mutual-effects of five dimensions on evaluation

	A				
	School development	Instructional leadership	Administrative management	Public relation	Professional responsibility
School development	0	2.578947	2.684211	1.789474	2.368241
Instructional leadership	2.631579	0	2.368421	1.315789	2.421053
Administrative management	2.789474	2.105263	0	2.105263	2.368421
Public relation	2.105263	1.210526	1.894737	0	1.473684
Professional responsibility	2.789474	2.631579	2.315789	1.315789	0

$$A = \begin{bmatrix} 0 & 2.578947 & 2.684211 & 1.789474 & 2.368421 \\ 2.631579 & 0 & 2.368421 & 1.315789 & 2.421053 \\ 2.789474 & 2.105263 & 0 & 2.105263 & 2.368421 \\ 2.105263 & 1.210526 & 1.894737 & 0 & 1.473684 \\ 2.789474 & 2.631579 & 2.315789 & 1.315789 & 0 \end{bmatrix}$$

angle that they had different subjective viewpoints on each aspects. Therefore, when conduct research on the correlation between evaluation dimensions of professional capability in administrative operation, you have to explore its relations from different dimensions and this is the advantage of using DEMATEL. Besides, from Table 3, we could also find that the numerical size represents different meanings, the greater value is, the greater degree of effects of one dimension on the other dimension will be. On the contrary, the smaller value means the smaller degree of effects of one dimension on the other dimension. For example, as Table 3 shows, after comparing "administrative management" and "school development", the value obtained is 2.789474, it means the great effects of "administrative management on "school development" whereas after comparing " school development" and "administrative management", the value obtained is 2.684211, it means that the effects of "school development" on "administrative management" is smaller and so on. Then we could understand that the degree of effect represented by the each value in average experts' opinion matrix (A).

Step 3: Establish standarized direct-relation matrix: Calculate the sum of each column of matrix (A) and obtain that the greatest number of sum of each column appears in the first column, that is max (9.8235294, 8.9411765, 9.7058824, 7.4117647, 9.3823529) = 9.8235294, then multiply each value in matrix (A) by:

$$S = 1/9.8235294 \left(S = \frac{1}{\max\limits_{1 \le i \le 5} \sum\limits_{j=1}^{5} a_{ij}} \right),$$

that is, through D = A×S, we could obtain a standardized direct-relation matrix (D):

$$D = A \times S = \begin{bmatrix} 0 & 0.269461 & 0.269461 & 0.209581 & 0.251497 \\ 0.269461 & 0 & 0.242515 & 0.143713 & 0.254491 \\ 0.290419 & 0.233533 & 0 & 0.212575 & 0.251497 \\ 0.233533 & 0.146707 & 0.200599 & 0 & 0.173653 \\ 0.284431 & 0.272455 & 0.242515 & 0.155689 & 0 \end{bmatrix}$$

Step 4: Establish total influence-relation matrix: After standardized direct-relation matrix (D), due to $\lim\limits_{k \to \infty} D^k = 0$ (0 means zero matrix), so through:

$$T = \lim\limits_{k \to \infty}(D + D^2 + \ldots\ldots + D^k) = D(I - D)^{-1}$$

where, T is the total influence-relation matrix, D is standardized direct-relation matrix and I is unit matrix, so we can have total influence-relation matrix (T) as follows:

$$T = \begin{bmatrix} 3.010377 & 2.903011 & 2.955946 & 2.33703 & 2.896631 \\ 3.028555 & 2.51959 & 2.762403 & 2.152136 & 2.725837 \\ 3.209199 & 2.856654 & 2.719816 & 2.321108 & 2.872686 \\ 2.570645 & 2.258611 & 2.338334 & 1.715538 & 2.28095 \\ 3.14432 & 2.829058 & 2.859557 & 2.236766 & 2.618348 \end{bmatrix}$$

Step 5: Determinant operation of total influence-relation matrix: Sum up each row and each column in total influence relation matrix (T) and obtain the sum of each column (D value) and each row (R value) and calculate the values of D+R and D-R as shown in Table 4.

Step 6: Analysis of results and draw causal diagram: With the sum of row and column (D+R) and the discrepancy of row and column in Table 4 and cross way in which (D+R) is horizontal axis and (D-R) as vertical axis, mark the coordinate values of five evaluation dimensions on coordinate diagram. Besides, in order to show more significant causal relationship, through setting of threshold values to rule out some unqualified values. The threshold value is the arithmetic mean (26.449242) in total

Table 4: Determinant operation of total influence-relation matrix of five dimensions

| Sum of column (D)		Sum of row (R)		Sum of column and row (D+R)		Discrepancy of column and row (D-R)	
Order of questions	Value	Order of questions	Value	Order of questions	Value	Order of questions	Value
School development	14.102994	School development	14.963097	School development	29.06092	Public relation	0.4015011
Administrative management	13.979463	Administrative management	13.636056	Administrative management	27.61552	Administrative management	0.3434070
Professional responsibility	13.688049	Professional responsibility	13.394452	Professional responsibility	27.082501	Professional responsibility	0.2935976
Instructional leadership	13.188521	Instructional leadership	13.366924	Instructional leadership	26.555444	Instructional leadership	-0.1784030
Public relation	11.164078	Public relation	10.762577	Public relation	21.926654	School development	-8.6010300

Compiled by the author
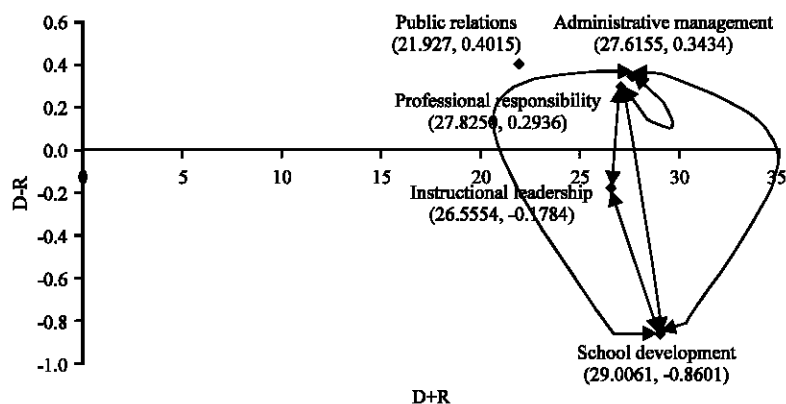
Fig. 2: Casual diagram of five dimensions, complied by the author, Threshold value = 2.6449242

influence-relation matrix (T). Finally, pick up values that are greater or equal to threshold value and mark them on coordinate diagram by comparative relations of five dimensions to obtain the causal diagram of direct-relations between evaluation dimensions as (Fig. 2).

According to the causal diagram of five dimensions, we could understand of complex causal relationship between five dimensions in which the values of four dimensions: school development, administrative management, professional responsibility and instructional leadership is located at right side of D+R (degree of correlation) of causal diagram and after calculation, the D+R values of four dimensions are greater than 26.44924, so we could learn that comparing to other dimensions, the degree of correlation of the four dimensions is greater. Besides, because the d-r values of "public relations", "administrative management" and "professional responsibility" are greater than 0, they belong to causal dimensions, that is, the cause in causal relationship; "instructional leadership" and "school development" belong to the affected dimension because their D-R values are smaller than 0, that is the consequence in causal relationship. In the past and at present, the evaluation and selection of professional capability of administrative operation of school has been a headache for principals. Although, with the passing of time and the change of environment, the evaluation and selection

dimension have changed accordingly. Under competitive society, school development seems to be paid more and more attention. Apparently, how a school leader use leadership theory and administrative experiences to lead the team to achieve educational missions has become a very important issue. However, a school comes out from numerous competitors and maintains competitiveness is a relatively important decision. How a principal make a choice from numerous evaluation dimensions of professional capability for administrative operation of school to effectively improve the performance and enhance the competitiveness of school?

According to the causal diagram of five dimensions, D+R is the degree of correlation. The higher correlation degree of evaluation dimension, represents the higher degree of importance of operation process of professional capability for the administrative operation in school and the principal has greater willingness to improve the dimensions of professional capability for the administrative operation of school. Therefore, from the view of the degree of correlation (D+R), among five dimensions, the principal have higher willingness to improve the dimensions of "school development", "administrative management", "professional responsibility" and "instructional leadership" which have higher degree of correlation in the professional capability for the administrative operation of school. Besides, when

D-R (causal degree)value is negative, it represents the professional capability for the administrative operation of school tends to be affected dimension that the professional capability for administrative operation of school has no room for improving such category of dimensions; if it is positive, it represents such category of dimension is causal dimension that the principal's professional capability for the administrative operation of school is more flexible for adjusting and improving such dimensions. Therefore, from the view of causal degree (D-R), there are three causal dimensions in five dimensions, they are "public relations", "administrative management" and "professional responsibility". If couple with the degree of correlation, principal's professional capability for administrative operation of school can improve and adjust "administrative management" because its degree of correlation is the highest and belongs to causal category of elements. Starting from "administrative management" not only improve "administrative management" itself but also affect the improvement of other dimensions. In addition to analysis through the degree of correlation and the degree of causes, the direction of arrow in causal diagram implies important meaning of management. From the causal diagram of five dimensions, we could find that the direction of arrows of the dimensions of "school development", "administrative management", "professional responsibility" and "instructional leadership" mutually pointed in pairs, such phenomenon represents will be affected by other dimensions mutually. But the dimension of "Public Relations" not only not affects other dimensions but also is not affected by other dimensions. Therefore, the improvement of principal's professional capability for the administrative operation of school should be started from the dimensions of "administrative management" and "professional responsibility" because it will obtain the maximum performance of improvement. For example, if the principal starts from the performance improvement of dimensions of "administrative management" and "professional responsibility" of professional capability for the administrative operation of school, it will directly affect the dimensions of "instructional leadership" and "school development" . The change of such a dimension due to being affected may affect dimensions of "administrative management" and "professional responsibility" and under double-way effects, the improvement may be weakened. Therefore, from the angle of direction of arrow, in the professional capabilities for the administrative operation of school, we could find that public relations cannot affect other dimensions. Also in the dimensions of "school development", "administrative management",

"professional responsibility" and "instructional leadership", we could not find out causal relationship. Synthesizing above analyses, that is, synthesizing the degree of correlation, degree of cause and the direction of arrow, we could find that "administrative management" and "professional responsibility" are two dimensions that are most worthwhile to improve for principals because the two dimensions belong to causal category of dimensions. Although, the degree of correlation (D+R) represents the degree of importance of the dimension in entire operation process, that is, for the professional capability for the administrative operation of school, "school development" is the most important dimension; 'public relations" is relatively not important. But by means of analyses of causal relationship between five dimensions, "administrative management" and "professional responsibility" are the causes of causal relationship, that is, the improvement of "administrative management" and "professional responsibility" not only improves themselves but also will affect "instructional leadership" and "school development" and enhance their performance. Therefore, if a principal wants to achieve better performance, it is more efficient to improve the dimension of "administrative management" than "professional responsibility". Finally, according to synthetic judgment of the degree of correlation, the degree of cause and the direction of arrow, "administrative management" is the best choice for the professional capability of administrative operation of school because like "professional responsibility", it belongs to the causal category of dimensions and the degree of correlation of "administrative management" is greater than "professional responsibility" that means "administrative management" is on the first place of importance in the evaluation process of professional capability for administrative operation of school. Therefore, if a principal wants to achieve the most efficient improvement and effective the performance of school, he should start to the improvement of the dimension of "administrative management".

CONCLUSION

Through literature reviews about professional capability for administrative operation of school and interviews with principals, the study sorted out five evaluation and selection dimensions of professional capability for administrative operation of school. Based on the dimensions, the study also develop DEMATEL questionnaires that were used by principals who have practical experiences in school work to judge the relationship between the dimensions and the degree of

effects. In the last stage, we used DEMATEL to evaluate the cause and consequence relationship and explore practical meaning of management. Through the re-organization of the results, the study concluded and made related recommendations as follows:

Research Conclusion and Recommendations: Followings are empirical results based on the purposes of research:

- Determine evaluation and selection dimensions from the viewpoints of professional capability of administrative operation of school
- Under the keenly competitive environment, if the principal himself could clearly control evaluation and selection criteria for the professional capability of administrative operation of school and actively prepare and improve the related evaluation and selection dimension, the school could come out from numerous competitors to become the most suitable high-quality school in the eyes of educational authorities. The study selected the professional capability of administrative operation of school as research scope that the questionnaires were distributed among the principals of senior high schools. Through the principals' professional knowledge about school leadership, the relationship and the degree of mutual effects of five dimensions were sorted out from the evaluation and selection criteria for the professional capability of administrative operation of school

Analysis of results of DEMATEL: The causal diagram of five dimensions of the professional capability of administrative operation of school is as Fig. 2 shows. In the dimensions, "public relations" , "administrative management". "Professional responsibility" belong to causal category of dimensions, that is the cause in the causal relationship whereas "instructional leadership" and "school development" belong to affected category of dimensions, that is the consequence in causal relationship. Synthesizing and analyzing the degree of correlation, degree of cause and the direction of arrow, "administrative management" is the best choice for principals in professional capability for administrative operation of school because it not only, like "professional responsibility", belongs to causal category but also its direction arrow pointed in pairs to the dimensions of "instructional leadership" and "school development". Besides, the degree of correlation of "administrative management" is greater than "professional

responsibility", that means the principals have rich educational ideas and beliefs in the professional capability for the administrative operation of school and are able to effectively implement the administration in school, integrate the various departments of school, bring to the full play of team spirit, create good instructional environment and resources, enhance teachers' instructional expertise, realize school development and establish a value-based school. Although, "public relation" belongs to causal category, the direction of arrow does not point to any dimension that means it has indirect effects on school development.

Limitations of research and recommendations: Through questionnaires and judgment of the degree of effects between evaluation and selection dimensions of professional capability for the administrative operation of school and adopting DEMATEL to analyze and explore, the causal relationship for the application of practical management cannot only provide the educational authorities with the basis for evaluating the professional capability for the administrative operation of school but also provide the leadership of school with the goals to achieve. In the process of research, there were some unavoidable problems. The limits and difficulties are presented here for follow-up researchers' reference, (a) The subjects were the principals of senior high school, the number of valid questionnaires were 34. In spite of the fact that the principals who participated in the study had professional knowledge and decision-making and judgment capabilities, the study limited to the principals of senior high schools that if the results are applied to the principals of all levels of schools, the errors may emerge. Therefore, we recommend that the future researches increase the number of samples so the results could be more in line with actual situation and provide the leadership of school more references and bases, (b) Because the purpose of the study is to explore the causal relationship between the dimensions of evaluation and selection dimensions of professional capabilities for administrative operation of school, the study adopted DEMATEL analytical method. The results found that "public relations" was causal dimension in DEMATEL, but in Fig. 2 causal diagram, we also found that it had no direction relationship with "school development. Therefore, the study recommends that the future researches find out the medium factors between "public relations" and "school development" to provide the principals with concrete direction in the implementation of school development plans.

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