
Development of a New Three-Dimensional Leadership Model in Technological and Vocational Education in Taiwan

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Leaders in schools face more critical challenges than before and this is compounded with the more complicated and changeable surroundings and the higher quality requirement of education. This study aims to develop a new model on three-dimensional leadership, and to construct a Three-dimensional Leadership Inventory - a quantitative instrument to measure the leadership behaviour of the administrators in technological and vocational schools, including president, board director, department head and chief, by means of cultural viewpoint. The basic assumption of this research is that under the influence of Chinese cultural values, Chinese people have unique cognition about leadership; moreover, the leadership behaviour also reflects some characteristics of Chinese culture. The Three-dimensional Leadership Inventory showed very satisfactory results: the internal consistency, the exploratory factor analysis and the confirmatory factor analysis were good. A field test was also applied to the faculty in technological and vocational schools.

INTRODUCTION

Leadership has been accepted to be the key factor of organisational effectiveness [1-3]. Mosley, Pietri and Megginson defined leadership as a process of influencing individual and group activities towards goal setting and goal achievement [2]. In addition, the contribution of leadership can include the handling of highly complicated and changeable things.

Leaders commit to the challenge and move toward opportunities. They articulate a shared vision of the future and mobilise members to struggle for shared aspiration [3]. Therefore, an organisation's effectiveness and workers' job satisfaction are deeply influenced by leadership.

Technological and Vocational Education

It is generally recognised that technological and vocational education (TVE) has played an important role in Taiwan's economic development. In the 1950s, domestic production was labour-intensive, the teaching of entry-level skills at the junior high school level

ensured that there was a sufficient labour pool to meet demands.

Later, in the late 1960s, production gradually became more skill-intensive. Vocational high schools were developed to train entry-level workers, and junior colleges were established to educate people for mid-level technical and managerial positions.

By the early 1970s, industry was entering a capital-intensive phase and there was an increased demand for individuals with well developed managerial and leadership skills. The first institute of technology was established in order to provide further educational opportunities to graduates of vocational high schools and junior colleges. More institutes were added, offering master and doctoral degree programmes [4].

Nowadays, the TVE system in Taiwan is provided at three levels:

- Vocational high schools;
- Junior colleges of technology;
- Colleges/universities.

Over 1.3 million students and 300,000 teachers are included under the system. Students in each level can

sit for national certification examinations to get related professional licenses. They can also sit for related national examinations after graduation in order to get positions in government agencies [4].

In the new era of 21st Century, coupled with the enormous changes in the domestic and international situation, TVE in Taiwan also faces numerous challenges, such as a stricter accountability, a move from a local economy to a global economy, and pressures of a faster and faster turnaround of technology. Therefore, there is an urgent need to proceed to the study of leadership in order to help the leaders in technological and vocational schools based on existing values. This should inspire the members in the organisation to be successful in maintaining internal stability and external adaptability while achieving organisational goals [5].

CONTEXT

Scientific research on leadership issues has continued for almost a century [5]. The evolution of leadership theory research has progressed from the Traits Approach to the Behavioural Approach, then the Contingency Approach. Nowadays, with the impact of cognition psychology, the research of leadership theory using the Cognition Psychology Approach has become a new trend. The main leadership theories adopting the Cognition Psychology Approach are:

- Competing Values Approach on Leadership Model [6].
- Multi-frames Leadership Theory [7].
- Connective Leadership [8].

From the viewpoint of cognition psychology, every individual possesses a *frame*, which he/she uses to determine and adapt to different circumstances. According to this frame, an individual defines situations and decides on action [9]. Since every individual has a different viewpoint of the world, each person will handle situations differently. In other words, because the world of one's experience is complicated and ambiguous, the referring frame is adopted to define situations and to decide strategies. The cognition frame adopted by leaders is called *leadership images of frame* [7].

Impact of Culture

Getzels pointed out that the influence of culture is enormous and affects people's values through the social trend of thought unconsciously and deeply, modelling the behaviours and concepts of people in their daily lives [10]. As such, the leadership behaviours of leaders and the perceptions of subordinates on leadership

behaviour are greatly influenced by cultural values [5][11-13]. Moreover, people in the same tradition have a higher concurrent cognition of leadership [5][13-15].

Since humans cannot live independently from the origins of culture/society/history, it is necessary to include the culture/society/history context in the thinking frame in order to understand the concept or assumption of Chinese people on leadership [15]. Furthermore, according to structuralism, it is undoubtedly required to consider the context of culture/society/history [9][16]. This will contribute to understanding the established foundation's underlying structure of people behaviours [17][18].

However, much of the previous research in Taiwan tended to adopt foreign inventories or models directly without any modification. It is doubtful whether this research method could exactly reflect Chinese cultural values. Besides, the results of the research seem to draw a forced analogy in explanation due to ignorance of the differences in cultural recognition [19][20].

Taiwanese Model

So far, most of the research related to Chinese leadership in Taiwan only focused on leadership concepts and case studies. The studies on an inventory suitable for Taiwanese people and designed in line with cultural concerns and supported by field tests are needed and expected.

The Three-dimensional Leadership Model aims to respond to the defects of previous research and focuses on the cultural viewpoints to construct a leadership model suitable for the Chinese people. The study adopted the documentary analysis method to analyse the documents related to leadership, such as *Analects of Confucious* (Luen-Yu), *The Works of Mencius* (Meng-Tz), *The Great Learning* (Da-Shiue), Jung-Uung, Han Fei Tzu, *The Laws of War* by Sun Tzu (Suem-Tz-Bing -Fa), and *The Romance of the Three Kingdoms* (San-Guo-Yan-I). Furthermore, the empirical results of the indigenous studies were deliberated to establish the theoretical framework of Chinese leadership and to collect the items of leadership behaviours.

According to the results of documentary analysis, the Chinese leadership framework consists of three frame orientations: legality, affection and reason. These three frame orientations corresponded to the following three leader roles of *director*, *family* and *mentor*. Leaders decide the use of these three kinds of frame orientations in turn or to combine two or all of them according to the situations they are faced with (see Figure 1).

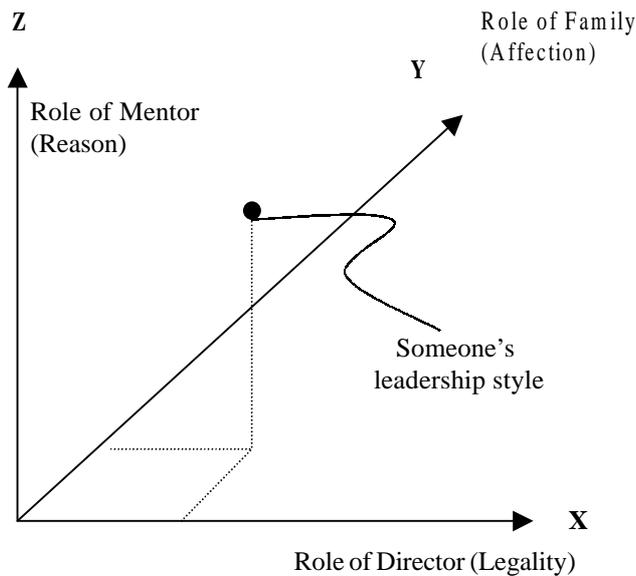


Figure 1: The Three-dimensional Leadership Model.

This Three-dimensional Leadership Model is an attempt to identify an indigenous leadership theory that covers the cultural influence on leadership cognition and behaviours. This article compares the Three-dimensional Leadership Model with other theories in terms of the composing frame, basic assumption and the process of influence on the results. The related leadership theories include the Connective Leadership [8], the Competing Value Approach on Leadership [6], the Multi-Frames Leadership Theory [7], and the Situational Theory of Leadership [21] in the Contingency Approach, the Transformational Leadership [22], and the Two-dimensional Leadership Theory from Ohio State University in the Behavioural Approach. A comparison of these theories is listed in Table 1.

Table 2 lists the contents and the related leadership behaviours of these three frame orientations corresponding to the three leader roles of *director*, *family* and *mentor*. The meanings of these three frames are described briefly as follow:

- The first behavioural frame of Three-dimension Leadership Model is *bound with legality*. The role taken by leaders is the role of director. The orientation is mainly based on legalists' concepts. This leadership concept is developed by the kernel of *legality*, *art*, and *position*. It emphasises that the leaders should take the leadership, the position, then make rules for members' behaviour with legality and finally lead members by utilising skill.
- The second frame is *move with affection*, in which leaders take on the role of family. Leaders should consider subordinates as their own family

members, and treat them with intimacy, friendliness, respect, trust, concern and consideration. Besides, leaders should start the mutual-beneficial process, driving members to actively contribute their strength to organisation.

- The third frame is *persuade with reason*. The leader takes the role of mentor and should set a good example of role with dignified character and rich experience. Then leaders have to do *intelligent inspiration*. That is, they should provide guidance in working and train their subordinates by assigning missions in order to stimulate them for the preparation of promotion. Finally, on *sharing and participation* part, the leaders should propose the future visions and share with their subordinates, giving them a sense of honour and inspiring them to complete missions by getting them involved.

Based on the contents of these three frames, the item bank of inventory was developed and modified by reviewing the transition of the leadership concept surveyed in the literature, including the organisational context of technological and vocational schools.

Moreover, a field test was applied to the subordinates in technical and vocational schools, abbreviated as the *faculty* in this study, including department chairperson/dean, chief, teachers and staff, to explore the perception of leadership behaviour of faculty, the gap between leadership behaviour expectation and perception, and their influence on leadership effectiveness.

RESEARCH DESIGN

Literature Review

Related literature was reviewed in developing the inventory. The focus of the study is to understand and explain clearly the transition of leadership concepts and the transition regulations of the Taiwanese people. Therefore, modern *Chinese* and *indigenous* literature was surveyed.

The Development of the Item Bank

This study developed the item bank on the basis of three frames covering the roles of director, family and mentor from the Three-dimensional Leadership Model. The items are modified according to the transition of leadership concepts deduced from the literature review and the situation of the subjects in this study.

Table 1: A comparison of the Three-dimensional Leadership Model with other leadership theories.

Leadership Model	Composing Frame	Basic Assumptions	Process of Influencing Effectiveness
Three-dimensional Leadership Model	Role of director Role of family Role of mentor	Affection, legality, and reason are important components in Chinese culture and culture will affect the leadership recognition and behaviour of people.	The one adopting three frames and adjusting flexibly to different situations, enhances the leadership effectiveness.
Connective Leadership [8]	Direct to the point Emphasise relationships Use tools well	Leadership can be learned. Leaders have to learn different leading styles to enhance leadership effectiveness.	Leadership effectiveness becomes higher when one has more achievement styles and can work out adequately by situations.
Competing Value Approach on Leadership Model [6]	Guide, Producer, Agent, Reformer, Instructor, Assistant, Supervisor, Coordinator	The role behaviour of leaders is based on the individual leader's value system.	Outstanding leaders have a balancing ability on the eight kinds of roles.
Multi-frames Leadership [7]	Structure frame Human resource frame Politic frame Symbolise frame	Multi-framed organisation Multi-framed leadership	Superior leadership effectiveness can be obtained through the use of more frames.
Transformational Leadership [22]	Characteristic leadership Individual concern Intelligence inspiration	From the viewpoint of morals and culture, emphasis is on providing the high-level satisfaction of inside to transform the relationship of the contract and encourage subordinates' active behaviour.	Inspire subordinates to surpass the concept of practical mutual-deal and develop the potential to do missions that are beneficial to the organisation.
Situational Theory of Leadership [21]	Mission-oriented Relationship-oriented Subordinate maturity	Leadership effectiveness could be influenced by the situation element, which is subordinate maturity.	Different leadership model needs to cooperate with subordinate's maturity of work and mind to develop leadership effectiveness.
Behavioural Theory (Ohio State Univ., 1950)	Consideration Initiating structure	Interact with four different leadership models by consideration and initiating.	Adopting high consideration and high initiating leadership model obtains superior effectiveness than other frames.

Expert Validation

The purpose of the expert consulting conference was to identify the appropriateness of the explanation of the leadership concept transition and the transition regulation. Moreover, the fitness and completeness of leadership behaviour orientation and the development

of the item bank were examined and corrected. The inventory was kept in three frames and the item bank was reduced to 65 items.

Pilot-test Inventory

The pilot-test sample was selected by means of the

Table 2: Content in frame and related behaviours in the Three-dimensional Leadership Model.

The role of director (legality)	The role of family (affection)	The role of mentor (reason)
<ul style="list-style-type: none"> • Position <ul style="list-style-type: none"> – To affect subordinates with formal authority. – To encourage subordinates to accomplish the task with rewards. – To dissuade subordinates from making mistakes by punishment. • Legality <ul style="list-style-type: none"> – To ask subordinates to deal with matters according to laws and rules. – To deal with matters with equality and fairness. – To be strict and fair both in practicing command and implementing out rewards and punishment. • Art <ul style="list-style-type: none"> – To appoint the position according to abilities of subordinates. – To set an objective target to evaluate the accomplishment of subordinates. – To evaluate services, give praise and grant rewards when subordinates complete missions. – To punish according to the rules or admonish subordinates when they cannot complete missions or make mistakes. – To take the preparation of plans seriously. – To pay attention to oversee and the control and prevention of mistakes. 	<ul style="list-style-type: none"> • Harmony <ul style="list-style-type: none"> – To build up an intimate and harmonious relationship with subordinates. – To emphasise the friendship and affection among subordinates. – To make efforts to keep good cooperative relationship with other departments. – To estimate and handle conflicts rapidly. • Respect and consideration <ul style="list-style-type: none"> – To respect subordinates. – To be willing to listen to suggestions, humble to learn and to accept criticisms for improving. – To show trust and support in the deeds of subordinates. • Empathy <ul style="list-style-type: none"> – To care about subordinates and their benefits actively. – To be considerate and try to understand the feelings and emotions of subordinates. – To understand when subordinates make mistakes or are unable to complete missions. – To express appreciation, thanks and acceptance when subordinates finish their work. 	<ul style="list-style-type: none"> • Modelling <ul style="list-style-type: none"> – To have good reputation and image to show behaviours that can be accepted by subordinates. – To win the trust of subordinates by dignified character and honesty. – To be decisive, showing determination or firmness in dealing with incidents without bias. – To be prescient and be able to think and find a solution. – To do what is appropriate according to the circumstances and be flexible enough to act according to changes. • Intelligence inspiration <ul style="list-style-type: none"> – To provide work experiences and directions for subordinates and give them assistance to recognise their roles and targets to increase effectiveness. – To assign challenging missions to subordinates to improve their knowledge and skills, to stimulate and encourage them to obtain promotion. – To consult with subordinates, share experiences and views with each other, create a learning atmosphere and inspire imagination. • Sharing and Participation <ul style="list-style-type: none"> – To propose and share ideas in accordance with the expectations of members and encourage them to make efforts to achieve goals. – To set examples by one's own actions and to endeavour to realise plans. – To encourage subordinates to strive for common goals through participation and awarding them with a sense of honour. – To encourage subordinates to see the virtuous and think of equalling or emulating them by sharing successful experiences.

judgmental sampling method according to the proportion of area distribution of the schools. A total number of ten schools were chosen and each received 50 copies of the inventories. The total of the 411 inventories were collected and the usable inventories were 396 copies. The effective returned rate is 79%.

Item Analysis

After analysing the data, a total number of 15 items that violated the criteria of item analysis were deleted from the item bank. The inventory was still kept in three frames, and the item bank consisted of 50 items. The amount of the variance explained by the inventory was about 65%. The Cronbach α of each sub-scale was over 0.95.

Formal Test

This study selected 125 schools according to the proportion of the area distribution and school number proportion of vocational high schools, junior colleges of technology and colleges/universities. There were 25 to 50 inventories sent to the sample. The total amount of inventories was 3,353 copies and 2,612 inventories were collected. The effective inventories were 2,515 copies, yielding an available ratio of 75%.

Reliability and Validity

The valid data collected by the inventory were analysed by using SPSS for Windows and LISREL for Windows to conduct a reliability analysis and validity analysis. The coefficient of internal consistency of the inventory, Cronbach's α , was 0.97. As to the exploratory factor analysis, the explained variance amount was up to 67.6%.

The inventory consisted of three dimensions covering the roles of director, family and mentor. On a confirmatory factor analysis, the overall model fitness was good.

RESULTS AND DISCUSSION

The effective data collected by inventory were analysed by statistical method, such as t-test, MANOVA (Wilk's Lambda), canonical correlation and stepwise regression. The results of this empirical study are as follows.

Faculty Expectations

The faculty expected much from the administrator's leadership behaviour. The leadership behaviour frame

orientations required by the faculty could be ranked incorporating the roles of family, mentor and director.

The research shows that the faculty's expecting intensity of leadership behaviour on any one of leadership role frames were significantly stronger than perceiving intensity. This phenomenon showed the administrator's leadership behaviour could be improved in further step.

Furthermore, the faculty considers the *role of family* as the most important, secondly *the role of mentor* and then *the role of director*. These results show that the faculty expect their administrators to respect and show concern for them first, provide training, development and instruction for them secondly and then to encourage or take precaution.

Faculty Expectations

The faculty's perception of the administrator's overall leadership behaviour varied with the administrator's background and situations.

The administrator's variables of sex, degree, rank, age, level, and the possibility of direct control had significant influence on the perceptions of faculty toward the administrator's leadership behaviour. This was paralleled with the variables of degree, work nature and work unit of the faculty.

The administrator in technological and vocational schools should adopt three leadership frame-orientations: *director*, *family* and *mentor*, and apply them according to different situations in order to promote school effectiveness.

Leadership Effectiveness

There was a close relationship between the faculty's leadership behaviour perception and the faculty's perception of leadership effectiveness. The faculty's leadership behaviour perception could predict mostly the administrator's leadership effectiveness.

From this study, the correlation between the levels of leadership behaviour perception and leadership effectiveness perception was significantly positive. That is, the stronger the leadership behaviour perception becomes, the higher the leadership effectiveness perception is. In contrast, the correlation between the gap between leadership behaviour expectation and perception and leadership effectiveness perception was significantly negative. Therefore, the bigger the gap between leadership behaviour expectation and perception is, the lower the leadership effectiveness perception was.

As to the prediction power toward leadership effectiveness perception, the study also revealed that

the leadership behaviour perception gave the strongest explanation power. The gap between leadership behaviour expectation and perception was second best, and then the situation variables. The background variables of administrator had no power to predict leadership effectiveness.

Obviously, if the administrators want to raise leadership effectiveness, they have to explore the expectations of the faculty and shorten the gap between expectations and perceptions.

CONCLUDING COMMENTS

The results and suggestions outlined in this article could be a useful reference for administrators of technological and vocational schools. In conclusion, the Three-dimensional Leadership Inventory showed very satisfactory results. The internal consistency, the exploratory factor analysis and the confirmatory factor analysis were all good. Therefore, the inventory could be identified as a suitable tool for measuring the leadership behaviour of administrators in technological and vocational schools.

The Three-dimensional Leadership Model and the quantitative instrument, the Three-dimensional Leadership Inventory, have measured leadership behaviour in many fields, including service industries, manufacturing industries and the Taiwanese army. Moreover, the leadership behaviour comparison between the administrators of technological and vocational schools in China and those in Taiwan are proceeding. Additionally, norms in terms of the leader's background variables and situational variables could be developed. The database of these studies could be a useful reference tool for promoting leadership effectiveness.

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REFERENCES

1. Yukl, G.A., *Leadership in Organizations* (3rd edn). Englewood Cliffs, NJ: Prentice-Hall, 7-10 (1994).
2. Mosley, D.C., Pietri, P.H. and Megginson, L.C., *Management: Leadership in Action* (5th edn). New York: Harper Collins Publishers, 393 (1996).
3. Kouzes, J.M. and Posner, B.Z., *The Leadership Challenge: How to Keep Getting Extraordinary Things Done in Organizations*. San Francisco: Jossey-Bass, 30-61 (1995).
4. Ministry of Education of R.O.C., Historical background of the Technological and Vocational Education in Taiwan. http://tve.npust.edu.tw/national/public_html/etve/mainframe.htm (2001).
5. Nahavandi, A., *The Art and Science of Leadership*. Englewood Cliffs, NJ: Prentice-Hall (1997).
6. Quinn, R.E., *Personal Reflective Instruments for Successful Management: Competing Values Developmental Tool*. San Francisco: Jossey-Bass (1992).
7. Bolman, L.G. and Deal, T.E., Leadership and management effectiveness: a multi-frame, multi-sector analysis. *Human Resource Management*, 30, 4, 517-518 (1991).
8. Lipman-Blumen, J., *The Connective Edge: Leading in an Interdependent World*. Taipei: Triumph Publishing (1997).
9. Piaget, J., *Le Structuralisme*. Paris: Presses Universitaires de France (1979).
10. Getzels, J.W., *Conflict and Role Behavior in the Educational Setting*. In: Charters, W.W. and Gage, N.L., (Eds.), *Readings in the Social Psychology of Education*. Boston: Allyn & Bacon (1963).
11. Meade, R.D., Leadership studies of Chinese and Chinese-Americans. *J. of Cross-Cultural Psychology*, 1, 325-332 (1970).
12. Bennett, M., Testing management theories cross-culturally. *J. of Applied Psychology*, 62, 578-581 (1977).
13. Hofstede, G., Cultural constraints in management theories. *Academy of Management Review*, 7, 1, 81-94 (1993).
14. Redding, S.G. and Casey, T.W., Managerial beliefs among Asians. *Proc. 36th Annual Meeting of the Academy of Management*, KS, USA, 351-356 (1976).
15. Yang, C.F. *How to Study Chinese*. Taipei: Laureate Book Co., 25-40 (1996).
16. Levi-Strauss, C. *Structural Anthropology*. Trans. by Jacobson, C. and Schoepf, B.G., New York: Basic Books (1963).
17. Hwang, K.K. *Knowledge and Action - The Comprehension of Chinese Traditional Culture in Social Psychology*. Taipei: Psychology, 2-5 (1995).
18. Rust, V.D., *Toward a Taiwanese Educational Policy: Internationalization and Indigenization*. In: National Forum of Ministry of Education of R.O.C. (Eds.), *Educational Sciences: Internationalization and Indigenization*. Taipei: Yang-Chih Book Co., 29-53 (1999).

19. Hsu, S.C., From the viewpoint of comparison to study the development of Chinese management theory. *Proc. Conf. on Chinese Management*, Taipei, Taiwan, 75-100 (1984).
20. Yang, K.S., *Social Science Research: Internationalization and Indigenization*. In: National Forum of Ministry of Education of R.O.C. (Eds.), *Educational Sciences: Internationalization and Indigenization*. Taipei: Yang-Chih Book Co., 5-28 (1999).
21. Hersey, P. and Blanchard, K.H, *Management of Organizational Behavior: Vitalizing Human Resources* (5th edn). New York: Prentice-Hall (1988).
22. Bass, B.M., From transactional to transformational leadership: learning to share the vision. *Organizational Dynamics*, 19-31 (1990).

BIOGRAPHIES



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