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PRINCIPALS' TRANSFORMATIONAL LEADERSHIP AND TEACHERS' WORK MOTIVATION: EVIDENCE FROM ELEMENTARY SCHOOLS IN TAIWAN

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Abstract

Through the empirical methods of this study, inferences were made regarding the relationship between elementary school principals' transformational leadership and teachers' work motivation. In total, 550 questionnaires were distributed to 40 public elementary schools in New Taipei City, Taichung City, and Kaohsiung City in Northern, Western, and Southern Taiwan, respectively. Among them, 430 valid responses were recovered with an availability rate of 78.18%. Transformational leadership of elementary school principals and motivation of teachers showed a significantly positive correlation; dimensions of transformational leadership of elementary school principals had predictive power for the overall work motivation of teachers. In particular, the higher the intellectual stimulation and individualized consideration were, the better the work motivation of teachers was. Confirmatory factor analysis verified the factor structure of the scales. All factor loads exceeded 0.5, indicating a good model fit. Furthermore, common method variance analysis and processing measures were explored to enhance the reference value and significance of the research results.

Keywords: transformational leadership, work motivation, school education, common method variance

Introduction

In schools, leadership effectiveness and quality of education have always been concerns of educators and

the general community. A school's promotion of educational outcomes can only be achieved if its principal and all its teachers recognize the significance and goals of education and make appropriate efforts. In 2012, 183 elementary and junior high school principals in the five special municipalities of Taiwan retired—a 33% higher retirement rate than in 2011 (137 principals). This wave of retirement was the largest in 10 years (Liang, 2012), leading to a shortage of school principals. Elementary school education is the foundation of scholastic education. Therefore, the effectiveness of its implementation determines the overall success or failure of education. Additionally, the effectiveness of elementary school education affects the development of families, societies, and even the nations. The principal is the leader of the school. In elementary school administration, the principal leads all teachers and students toward educational goals. Numerous studies have confirmed that leadership of the principal is closely related to school performance, teaching effectiveness, organizational climate, and teacher morale. In other words, the principal's leadership skills affect school development and performance (Huang, 1996).

Teachers are frontline workers in the field of teaching. The quality of teachers and their work motivation decisively influence the quality of education, but the leadership style of supervisors and their contribution to organizational performance have crucial and influential roles. Because the principal is the leader of the entire school administrative system, differing leadership styles of principals can lead to different school atmospheres. However, whether leadership style actually affects the work motivation of teachers and whether the degree of work motivation of teachers affects a principal's leadership style remain uncertain. Additionally, what leadership style a principal should adopt to establish an active emotional orientation of teachers' work and enhance teachers' degree of work motivation remains unclear.

Leadership style and leadership ability of a school principal are influential factors (Wu, 2001). Over the last three decades, the concept of teacher collaboration has been embraced as a promising concept in educational policy and research. Teacher collaboration is now considered crucial to strengthening the position of teachers, shaping their professional space, and improving their professionalism (Honingh and Hooge, 2013). Therefore, establishing professional recognition of school teachers and eliciting a sense of professional mission are concerns of school principals.

Before 2011, most empirical studies on Taiwanese education have adopted the leadership theory of The Ohio State University, which classifies leadership behavior into four types: high advocacy and high degree of care, high advocacy and low degree of care, low advocacy and high degree of care, and low advocacy and low degree of care. However, as new leadership theories emerge, school administration leaders can no longer consider only advocacy and care. Although this leadership behavior classification is easy to understand and conceptually clear,

high advocacy and a high degree of care are insufficient, as is simply coping with the current school organizational environment. Future education leaders should understand how to shape the school development vision, inspire the wisdom and ability of teachers, care for teachers, and develop attractive teacher qualities (Tsai, 2000).

On May 1, 2011, the Legislative Yuan approved amendments to Taiwan's the Labor Union Act, enabling teachers to form and join unions. Industrial and trade unions in 19 counties and cities were established shortly thereafter, and the National Federation of Teachers Unions (NFTU), Taiwan (Republic of China), was founded on July 1, 2011. The NFTU placed great emphasis on teachers' rights. During the early period after the NFTU was founded, substantial but conflicting measures were taken inevitably, which resulted in conflicts of the NFTU with school administrators (particularly principals) and parent associations. The establishment of the NFTU was intended to improve teachers' work rights and enable them to focus more on teaching. NFTU members comprise both laborers and professionals. Therefore, the NFTU is tasked with improving working conditions of teachers while providing a channel for teachers to continue their studies, thereby improving their professional status and consequently enhancing their teaching motivation. However, most research on work motivation has focused on workers in industrial and commercial sectors, whereas research on the work motivation of teachers remains scarce. The current work motivation of elementary school teachers in Taiwan is worth further exploration.

Angelides (2011) noted that the role of leadership changes along with the world and has been differentiated in a grade degree. Taiwanese research on principal behavior and teacher work motivation includes "A Study of the Relationship between the Leadership Styles of Elementary School and Junior High School Principals, Teacher's Work Motivation, and Organizational Performance" by Chen (1989) and "A Study of the Leadership Behaviors of Principals and Teachers' Work Motivation." The importance of these studies lies in the exploration of factors affecting organizational performance from the viewpoint of the organization as a whole. Therefore, work motivation was an independent variable (IV) of organizational performance. In addition, studies conducted through the traditional perspective of "advocacy and care" date back 20 years ago. With the current educational reform and adoption of principal election systems, principals' leadership behavior must transform because they have much less authority today owing to changes in the social, political, and educational environment. If leadership styles remain traditional, leadership effectiveness may become restricted and school education objectives may not be met.

Thus, principals should strive to transcend traditional leadership styles to elicit teachers' work motivation and improve need satisfaction of teachers to achieve education objectives effectively. Research on transformational leadership and teachers' work motivation is critical.

Transformational leaders focus on the people around them as well as their relationships, values, beliefs, feelings, and attitudes (Angelides, 2011). Although principals' transformational leadership and teachers' work motivation have been investigated, understanding this relationship through Taiwanese empirical studies is warranted. Thus, this study investigated the overall situation of elementary school principals' transformational leadership and teachers' work motivation and analyzed the associations between them. This study provides a reference for educational administration institutions, elementary school principals, and school educational personnel to improve elementary school teachers' work motivation. The purposes of this study were as follows:

To understand the implications and current status of elementary school principals' transformational leadership behavior and teachers' work motivation

To explore the relationship between elementary school teachers' perceptions of principals' transformational leadership behavior and teachers' work motivation

To propose specific recommendations according to the findings as reference for educational administration institutions, elementary school principals and teachers, and future researchers.

Literature Review

Transformational Leadership

Since the 1980s, leadership theory and related research have developed substantially. Leadership cannot be reduced to a formula or rule because change comes from busy and complex organizational members. Change is no longer limited to top-down leadership concepts; this has led to the development of leader's respect, care, and authorization for subordinates and regard for them as sources of the knowledge, creativity, and vitality needed for organizational improvement (Owens, 1998). According to the leadership theory and research development classifications of Bryman (1992), research foci of the leadership theory before the 1980s included leadership traits, leadership styles, and contingency leadership. After the 1980s, the research focus turned to analysis of the leader's vision and authorizations and incentives given to subordinates as well as challenges arising from the current organizational status and positive and forward-looking attitudes. Research has involved analysis of the work motivation of subordinates elicited by the leader, enhancement of organization members' recognition of the organization, motivation for participation and involvement, and improvement of work performance context and interactive leadership behavior.

The concept of transformational leadership was first proposed by Burns (1978), who deemed transformational leadership a process through which a leader not only echoes members' needs through leadership charisma but also enhances levels of morality and motivation, which in turn contribute to continual improvements in members and the organization's display of the great-

est motivation. The core concept of transformational leadership lies in its differences from transactional leadership. The author also pointed out that transformational leaders hope to elicit the potential motivation of subordinates and enhance motivational levels to achieve satisfaction and subordinates' full work motivation. Transactional leadership leads to growth and improvement through mutually stimulating relationships. It can turn subordinates into leaders and leaders into moralists. The transactional leader wins the support, cooperation, and submissiveness of subordinates through work, security, long-term employment, and favorable assessments.

Transformational leadership transcends advocacy and care. It is a new type of leadership consistent with modern diverse social trends, and it emphasizes the moral requirements of the leader and the members (Sergiovanni, 1990; Hsu, 2001). The leader should transform the values and beliefs of members to enhance their commitment to organizational missions. The leader should also propose a common organizational vision to elicit members' motivation (Conget and Kanungo, 1988; Sergiovanni, 1990; Lin, 2002). The leader must provide up-to-date information and messages to members to stimulate intellectual development. The leader should also consider the needs of individual members. Moreover, transformational leadership is a way for a leader to share power with members. This type of leadership enables members to exceed expectations and realize their highest potential, thereby ensuring a more harmonious atmosphere within the organization.

Transformational leadership is considered an extension of transactional leadership. Scholars generally adopt the four dimensions proposed by Bass and Avolio (1994): idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Leithwood and Jantzi (2000) stated that transformational approaches to leadership have long been advocated as productive under these conditions. Evidence suggests that transformational practices contribute to the development of capacity and commitment. Survey data from an achieved sample of 1,762 teachers and 9,941 students in one large school district were used to explore the relative effects of transformational leadership practices on selected organizational conditions and student engagement with the school. The results demonstrated strong significant effects of such leadership on organizational condition and moderate but significant effects on student engagement. Therefore, transformational leadership research has expanded beyond the school domain, with considerable research results. Taiwanese scholars Lee, Hsin, and Kang (2008) referred to transformational leadership as the leader proposing a vision and offering individualized consideration and intellectual stimulation to subordinates. The leader has leadership charisma and can elicit subordinates' motivation and sense of involvement during the transformation. Most Taiwanese research divides principals' transformational leadership into five categories: charismatic influence, intellectual stimulation, individualized

consideration, inspirational motivation, and organizational vision development. In other words, transformational leadership means the leader through specific actions can propose a forward-looking vision to persuade members to accept and work hard toward achieving goals. Simultaneously, through sound linguistic ability, communication skills, and incentive strategies, the organization is pushed to continue growing and convert the ideas and attitudes of organization members and pass visions onto other members; thus, the common value orientation, cooperation, and trust needed to accomplish organizational requirements and development goals are formed.

Work Motivation

Lodahi and Kejner (1965) used the term "job involvement" based on the concepts of ego involvement proposed by Allport (1947) and central life interest proposed by Lodahl and Dubin (1956) as well as the definition first proposed by Lodahl (1965): "the importance of work in self-image." Chughtai (2008) noted that job involvement has been defined as individuals' psychological identification or commitment to their job. It is the degree to "which one is cognitively preoccupied with, engaged in and concerned with one's present job." This can be measured through organizational staff recognition, commitment to work values, and the staff's level of participation in personal actions (Lee, 2003). Paullay, Alliger, and Stone-Romero (1994) clarified the relationship between two concepts that have been confused and often used interchangeably in the literature. Job involvement was defined as the degree to which one is cognitively preoccupied with, engaged in, and concerned with one's present job. Work centrality was defined as the degree of importance that work, in general, plays in one's life. Questionnaires consistent with these definitions were constructed and tested. Lee (2003) adopted the viewpoint of Saleh and Hosek (1976) that job involvement is the recognition of the value of work and the level of willingness to make an effort and participate.

The work motivation scale developed by Lodahl and Kejner (1965) is typically used to measure participants' degree of work motivation and analyze the degree of importance recognized by participants as well as the effect of performance on ego. After factor analysis, the scale identified four factors. The first factor is a high degree of involvement, the second factor is indifference toward work, the third factor is work responsibility and commitment, and the fourth factor is boredom with work and demotion a secondary priority. Taiwanese scholars have subsequently amended this scale to extract different factors, including focus, fun, self-evaluation, identification, and participation at work (Chen, 1989; Shyu, 1995; Tsai, 2001). Generally, researchers take a broad perspective to define work motivation, which includes the effort and participation of organization members in such aspects as value, attitude, emotions, and social action, all of which affect work motivation. Therefore, the meaning and measurement of work motivation also clearly reflect the multiple aspects of work motivation

(Chen and Chiu, 2009; Rotenberry and Moberg, 2007).

Ekmekçi (2011) believes that a person's work motivation critically affects personal and organizational results. Work motivation is crucial to education and greatly influences teachers' administration and teaching. Di Fabio and Taralla (2006) investigated the relationships between teacher self-efficacy, social demographic variables (age, years of teaching, and type of school), level of job involvement, organizational commitment, and organizational satisfaction. They confirmed the correlation of self-efficacy with job involvement, affective commitment, and organizational satisfaction. Gormley (2003) pointed out that these factors include professional autonomy, leader role expectations, organizational climate, perceived role conflict and role ambiguity, leadership behavior, and organizational characteristics.

Principals' Transformational Leadership and Teachers' Work Motivation

Numerous research outcomes are related to principals' transformational leadership and teachers' work motivation, but Taiwanese research on the relationship between these remain scarce. Most of these studies have explored personal attributes (e.g., gender, age, education, work experience, and marital status) of employees or the source of employees' work motivation and coping measures. Only a few studies have explored the relationship between work motivation of employees and leadership of supervisors. Feltion (1995) found that transformational leadership is more likely than transactional leadership to affect the work satisfaction of teachers. Chen (1989) found no significant interactions between organizational effectiveness and principal leadership style or teacher work motivation. Pu (1997) found that the transformational leadership of principals enhanced teachers' personal sense of achievement and reduced their sense of burnout. Hsu (2001) demonstrated that transformational leadership positively affected the service morale of teachers. Moreover, inspirational motivation, individualized consideration, and intellectual stimulation were the three elements that had the strongest predictive power on the service morale of teachers. These findings show that leadership behavior and work motivation have a certain causal relationship. That is, leadership behavior strongly influences work motivation. Leaders must therefore adopt appropriate leadership strategies based on organizational characteristics to enhance the work motivation of organization members.

Research Methods

Research Framework

The questionnaire framework presented in Figure 1 was constructed with reference to the research motivations, objectives, and questions, and the literature review; it was designed to analyze the factors affecting principals' transformational leadership and teachers' work motivation as perceived by elementary school teachers. The relationships between research variables are as follows:

Correlation between principals' transformational leadership and teachers' work motivation was investigated with overall and aspect-specific transformational leadership of principals as one group of variables and overall and aspect-specific work motivation of teachers as another group of variables.

Principals' transformational leadership of all aspects was the predictor (variable), and teachers' work motivation was the overall and aspect-specific criterion variable to investigate the predictive power of these relationships.

Research Tools

In response to empirical study needs, the researcher conducted literature review of related topics and constructed research indicators, which were revised into research tools with reference to topical questionnaires developed by Taiwanese and foreign scholars to explore the relationship between transformational leadership of elementary school principals and work motivation of teachers in Taiwan. The self-developed tools in this study included questionnaires on the transformational leadership of principals and on the work motivation of teachers. To prevent participants from reacting too sensitively to questions, the two questionnaires were integrated and collectively named "A Questionnaire on Perceptions of Elementary Schoolteachers on School Conditions" for test implementation. The questionnaires were named "Leadership Behavior of Principals" and "Working Conditions of Teachers" for both the pretest ad formal implementation. "Leadership Behaviors of Principals" was compiled in reference to the "Multifactor Leadership Questionnaire" and leadership questionnaires compiled by Taiwanese and foreign researchers, including Pu (1997) and Hsu (2001) based on transformational leadership theory. For questionnaire design, transformational leadership was divided into five aspects: attention through vision, charismatic influence, inspirational motivation, intellectual stimulation, and individualized consideration. Based on the theory in the previous chapter, the "Questionnaire on the Work Motivation of Teachers" identified five aspects of work motivation: work identification, work participation, work enjoyment, work self-evaluation, and work concentration. The central ideas of each aspect were summarized. The questionnaire on work motivation of teachers was compiled by Shyu (1995) and Tsai (2001) with reference to the local "Scale for Organizational Commitment Inventory," constructed by Lee, Chung, and Lin (2000).

The initial draft of the questionnaire was comprehensively summarized. Graduate school students and elementary school teachers were then requested to provide their opinions, and the advisor was repeatedly asked to make corrections. The questionnaire was then mailed to experts and scholars to provide ideas on how to correct the questionnaire content. After investigating the opinions of experts and scholars, a statistical analysis was performed and moderate revisions were made to arrive at the aspects of the initial draft of the work motivation of teachers.

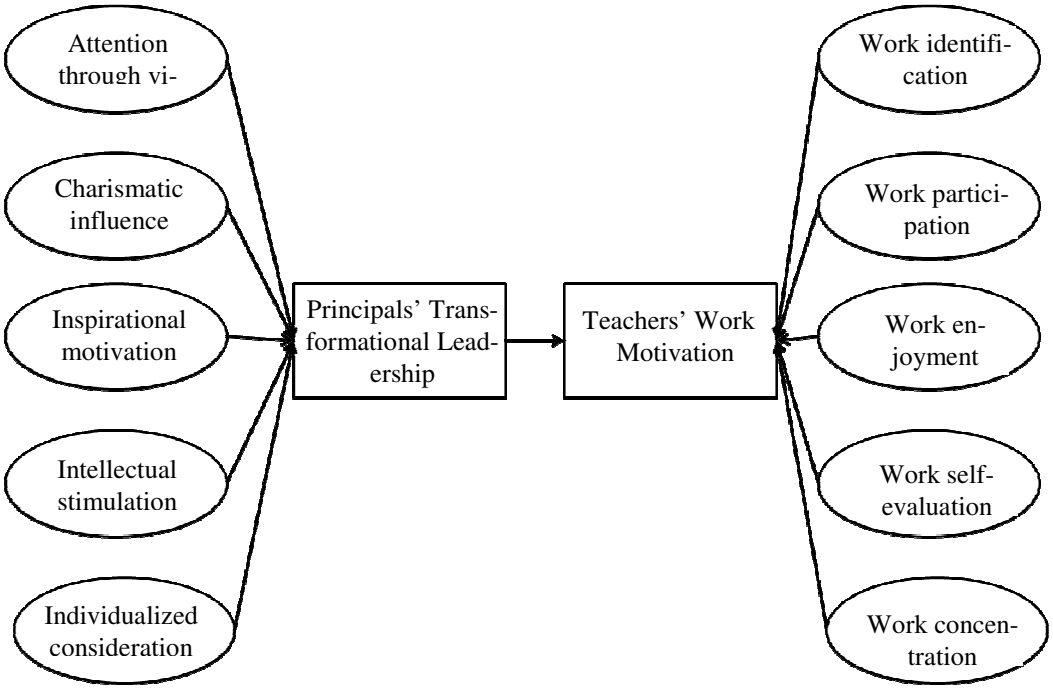

Figure 1. Research Framework

Every question in the two questionnaires included a description of the transformational leadership of principals and the work motivation of teachers in simple sentences. A 6-point scale was adopted, and respondents were asked to select one of the following answers based on their actual observations, perceived degree of consistency with transformational leadership, and actual feelings toward their job: highly consistent, consistent, somewhat consistent, somewhat inconsistent, inconsistent, and highly inconsistent, which scored 6, 5, 4, 3, 2, and 1, respectively. The teachers' scores in the aspects of principals' transformational leadership signified the degree of performance in these respective aspects, whereas the total score of transformational leadership represented the principals' overall performance in transformational leadership. Teachers' scores in the respective aspects of teachers' work motivation represented the teachers' performance in those aspects, whereas the total score represented the degree of the overall work motivation of teachers. The initial draft of the questionnaire consisted of 2 parts and 70 questions (40 on transformational leadership of principals and 30 on work motivation of teachers). Subsequently, the initial draft was revised into the expert review questionnaire survey. Three scholars, seven standing principals, and two standing directors were invited to fill out the expert review questionnaire. An appraisal of the appropriateness of the questionnaire was conducted, and opinions were provided to serve as references for experts to vali-

date the content and revise the questionnaire. After the expert review questionnaire, the revision opinions and selected answers provided were used to conduct statistical analysis. Based on the statistical analysis, high standards were adopted to screen questions. Questions considered appropriate by more than 83% of experts and scholars were retained, and selections and revisions were made based on the questions and opinions provided by experts. Other questions were eliminated. Finally, 10 questions were eliminated from the questionnaire on transformational leadership of principals and 30 were retained. All questions were retained in the questionnaire on teachers' work motivation.

Research Participants and Sampling Methods

To ensure appropriateness, the study questionnaire comprised two sections: principals' transformational leadership and teachers' work motivation. Selection of respondents was mainly teacher based. To maintain the objectivity and veracity of the collected data, the sample was composed of 21,888 ordinary class teachers of 444 public elementary schools in the 2012 academic year from New Taipei City, Taichung City, and Kaohsiung City (i.e., Northern, Western, and Southern Taiwan, respectively). A proportional stratified random sampling method was adopted. During sampling, the school size and district were taken as the first stratification criteria, followed by the teacher's position as next criterion, to make the school size sampling mode stratified with the number of classes. One tenth of Taiwan's public elementary schools (i.e., 40 schools) totaling 550 teachers, comprised the sample; these teachers were randomly selected.

A letter of authorization was sent along with the questionnaire, authorizing the school principal to request assisting directors or team leaders to allocate questionnaires as much as possible in accordance with teacher gender, age, years of service, qualifications, and positions held and to assist in the recovery of the questionnaire. Teachers who had served less than 1 year were excluded. Random sampling was conducted on principals. Based on the content of the recovered questionnaire, a statistical analysis was conducted.

According to Krejcie and Morgan (1970), when the population of narrative research reaches 15,000, its sample size should be 375. In this study, the number of samples was 550; 430 were valid, the retrieval rate was 80.18%, and the availability rate was 78.18%. As long as at least 375 valid samples (approximately 70%) are recovered, the characteristics of the population should be fully reflected. Statistical Analysis Method and Common Method Variance Analysis

This study conducted descriptive statistical analysis of the sample. Second, exploratory factor analysis and Cronbach's α analysis were conducted on the various dimensions to exclude inappropriate questions. Third, after eliminating inappropriate questions, confirmatory factor analysis (CFA) was conducted for each dimension to explore the composite reliability val-

ues, extract variance, and analyze the measurement mode of convergence and discriminant validities. Fourth, variance and correlation analyses were conducted between principals' transformational leadership and teachers' work motivation.

The study questionnaire was conducted in two phases:
(1) pretest sample to conduct reliability and validity analysis of the study instrument and
(2) formal samples to detect common method variance (CMV).

CMV was first proposed by Billings and Wroten (1987): when a series of variables are measured through the same method, the path coefficients between observed variables is overestimated (Williams and Brown, 1994). Schwab (2005) asserted that CMV and construct validity are highly correlated, and both random error variance and method variance affect the validity of measurement tools. The author further noted that systematic error may produce a measured "construct" that was not originally wanted; that is, it measures a surplus component not intended for measurement, adulterating the construct validity of the measurement tools. Additionally, systematic errors may occur because the measuring tools fail to measure the desired constructs. That is, measured data may be incomplete, resulting in construct deficiency. When measured with a self-report scale simultaneously, the replies of respondents from a single source are likely influenced by personal behavioral factors, such as attitudes, beliefs, and perceptions, which can present inflated correlations between constructs, generating CMV (Avolio, Yammarino, and Bass, 1991). The general approaches to avoid or reduce DMV are ex post and ex ante approaches (Peng, Kao, and Lin, 2006). Three-phase methods include Harmon's single-factor test method, the third-factor test method, the latent CMV variables test method, and scale item trimming, among which the most commonly used are the latent CMV variables test method and scale item trimming. The basic principles of the latent CMV variables test method are similar to those of Harmen's single-factor test method. Researchers are not required find ways to discover biased factors in advance and can control systematic variation without a theoretical basis between observed variables. Second, these methods allow researchers to relax the limits of the effects of CMV factors on different variables. Podsakoff et al. (2003) found that this approach is a direct measurement of latent method bias factors. Method effects must be measured from observed variables rather than directly from theoretical constructs; however, the weakness of this method is that researchers must first know what the major method bias factors are and be able to directly measure these factors, which is difficult. The basic principle of scale item trimming is that by excluding similar semantic concepts, it can reduce method variance when measuring many topics of different variables, that is, IVs, dependent variables (DVs), intermediaries, and disturbance variables, each of which have many measurable topics, some of which may have repeated concepts. Using only the unique parts of the scale reduced CMV.

Many experts and scholars have applied the LISREL (linear structural relations) software to multitrait–multimethod (MTMM) data analysis and to test construct validity through CFA. Its largest contribution is that statistical methods verify related coefficients obtained through traditional MTMM analysis, and the influences of method effects can be removed through estimations of method factors; this substantially increases the effectiveness of the test. The MTMM approach is conducted with structural equations. Researchers identify several factors that may cause CMV, consider them latent variables, and place them in the model to estimate the effects of these factors on the measurement of IVs and DVs. Moreover, CMV sources are complex and usually include the methods, constructs, and questions. Total elimination of CMV is difficult in practice because of the time and cost involved as well as the nature of the problem.

CMV Treatment Measures and Analysis

To avoid limitations of data collection restrictions, this study used process control of time separation to reduce CMV and homologous bias. The pretest questionnaire was conducted in early September 2012 and subsequently revised to fix ambiguous questions, incomprehensible semantics, difficulties in answering, and similarities to reduce respondents' speculation regarding the test purpose and reduce the halo effects of questions. Before the formal questionnaire in early November 2012, the questionnaire layout was treated. First, an anonymous questionnaire survey was adopted so that respondents could relax and answer truthfully, thereby reducing many biases. Then, the research purposes and variable names were hidden, and the variables were ordered randomly. Finally, questions were straightforward; that is, obtuse management jargon, combining two questions, and double negatives were avoided. Furthermore, some reverse questions were included to identify careless answers and reduce any latent motive of consistency (Peng, Kao, and Lin, 2006).

To explore the relationships between variables, the empirical research adopted a cross-sectional approach to avoid any time bias. Furthermore, to reduce CMV, the IVs and DVs were measured at different times. This practice excludes interfering factors at the same point in time (Peng, Kao, and Lin, 2006). Past studies have mentioned that the biggest difficulty of this method lies in time moderation. An excessively long interval leads to unrelated interfering factors, but an insufficient time interval produces a recency effect. Moreover, this method concerns IVs with a high degree of context orientation; although the IV in this study did not have this feature and questionnaire pairing work would be required, this method could still effectively reduce the chances of CMV.

In statistical control, reference was made to Podsakoff and Organ (1986), who used Harman's one-factor test to detect whether CMV was acceptable. (1) The results of this study were 30 factors with eigenvalue greater than 1 extracted from the 60 questions, and the majority of explained variances were less than 50%; that is, there was

no serious CMV. (2) The number of factors was 1, all questions were put in a nonrotating order, and CFA was conducted. The load levels of all questions were greater than 0.5, indicating a significant load on each factor. Therefore, none of the questions were affected by CMV.

Results and Discussion

In this study, 550 questionnaires were distributed in early November 2012, and 441 were recovered for a recovery rate of 80.18%. After exclusion of incomplete questionnaires and ones with aptitude reaction, 430 valid questionnaires were recovered for an availability rate of 78.18%. After collection, questionnaires were immediately coded, followed by statistical analysis and research write-up.

Research Tool Reliability and Validity Analysis

Scale preparation in this study was based on literature and the opinions of 12 experts and scholars; therefore, the questionnaire should have a certain content validity. In this study, the construct validity of each scale was first analyzed through CFA and Cronbach's α analysis. Factors with Kaiser's exploratory factor analysis values greater than 1 were selected, and questions with factor loadings less than 0.5 were excluded to improve the model's explanatory power.

The measurement model was subjected to CFA to ensure that measurement scales had sufficient single-dimension characteristics. All measurement model basic fits were in the acceptable range: $\chi 2/df = 2.713$, PNFI = 0.594, NNFI = 0.990, CFI = 0.994, RMSEA = 0.063, GFI = 0.967, and RMR = 0.008. The model, except GFI = 0.86, was slightly below the standards but within the acceptable range, and the remaining indicators were all established, which means model has good fit overall. The analysis of reliability and validity referred to Table 1 – Table 3.

Based on Bentler and Wu (1993), analysis with standard loadings was conducted. Squared multiple correlations, error terms, and each dimension's composite reliability were higher than 0.6. Average variance extracted was higher than 0.5, indicating construct validity.

LISREL Analysis

This section expands the study framework to full structural equation modeling, as shown in Figure 2. Principals' transformational leadership includes attention through vision, charismatic influence, inspirational motivation, intellectual stimulation, and individualized consideration; teachers' work motivation includes work identification, work participation, work enjoyment, work self-evaluation, and work concentration.

The regression path analysis results are listed in Table 4 as following: Table 4 tabulates regression path analysis results and verifies the proposed relationships.

Table 1. Fit Index Finishing Table

Index name and nature	Range	Judgment value	Fit status of this study mode
Overall goodness-of-fit index			
RMSEA (MacCallum, Browne and Sugawara, 1996) Comparison of gap between theoretical models and saturation models.	0-1	<.05	RMSEA=0.063 Not affected by the number of samples and model complexity.
GFI (Jöreskog and Sörbom,1981) Hypothetical model can explain proportionality of observed data.	0-1	>.90	GFI= 0.967 Description of explanatory power of the model.
RMR(Bagozzi and Yi,1988) Gap between sample covariance matrix and fit matrix.	>0	<.08	RMR=0.008 On correction, model can be referred to.
Comparative fit index			
NNFI(Bentler&Bonett,1980) NFI after considering complexity of the model.	0 -1	>.90	NNFI=0.990 Not affected by model complexity.
CFI(Bentler,1995) Non-central difference between the hypothetical model and independent model.	0-1	>.90	CFI=0.994 The degree of improvement of description model compared to nothingness model is particularly suitable for a small sample.
Parsimonious fit index			
x^2/df(Hair, Anderson, Tatham and Black,1998) Chi-square value after considering the complexity of model.	-	2 ~ 5	x^2/df=2.713 Not affected by the model complexity.
PNFI(Hu and Bentler,1999) Consider model parsimony.	0-1	>0.50	PNFI=0.594 Describe the simplicity of the model.

Table 2. CFA Of Principals' Transformational Behavior Questionnaire

Dimensions	Question No.	Mean	Load	SE	CR	AVE	Cronbach's α
Attention through vision	1	3.517	0.609	0.629	0.862	0.515	0.837
	6		0.674	0.546			
	11		0.805	0.352			
	16		0.779	0.393			
	21		0.798	0.363			
	26		0.609	0.629			
Charismatic in-fluence	2	3.463	0.689	0.525	0.859	0.507	0.846
	7		0.775	0.399			
	12		0.801	0.358			
	17		0.679	0.539			
	22		0.704	0.504			
	27		0.606	0.633			
Inspirational motivation	3	3.450	0.781	0.390	0.861	0.512	0.860
	8		0.747	0.442			
	13		0.844	0.288			
	18		0.700	0.510			
	23		0.587	0.655			
	28		0.598	0.642			
Intellectual stimulation	4	3.493	0.780	0.392	0.881	0.556	0.878
	9		0.868	0.247			
	14		0.799	0.362			
	19		0.755	0.430			
	24		0.620	0.616			
	29		0.616	0.621			
Individualized consideration	5	3.573	0.698	0.513	0.867	0.526	0.839
	10		0.766	0.413			
	15		0.837	0.299			
	20		0.794	0.370			
	25		0.687	0.528			
	30		0.528	0.721			

Table 3. CFA Of Teachers' Work Motivation Questionnaire

Dimensions	Question No.	Mean	Load	SE	CR	AVE	Cronbach's α
Work identification	1	3.742	0.670	0.551	0.895	0.590	0.895
	6		0.736	0.458			
	11		0.856	0.267			
	16		0.769	0.409			
	21		0.726	0.473			
	26		0.835	0.303			
Work participation	2	3.741	0.686	0.529	0.880	0.551	0.880
	7		0.723	0.477			
	12		0.771	0.406			
	17		0.746	0.443			
	22		0.838	0.298			
	27		0.680	0.538			
Work enjoyment	3	3.845	0.568	0.677	0.865	0.526	0.864
	8		0.485	0.765			
	13		0.823	0.323			
	18		0.884	0.219			
	23		0.712	0.493			
	28		0.794	0.370			
Work self-evaluation	4	3.816	0.614	0.623	0.861	0.516	0.806
	9		0.546	0.702			
	14		0.804	0.354			
	19		0.845	0.286			
	24		0.604	0.635			
	29		0.834	0.304			
Work concentration	5	3.823	0.716	0.487	0.873	0.543	0.870
	10		0.586	0.657			
	15		0.873	0.238			
	20		0.865	0.252			
	25		0.502	0.748			
	30		0.801	0.358			

Table 4. Regression Path Analysis Table

	Path	Regression coefficient	t value	p value
	Principals' transformational leadership →Teachers' work motivation	0.223	3.270	**
	Principals' transformational leadership→ Attention through vision	1.000		
	Principals' transformational leadership → Charismatic influence	1.002	39.868	***
	Principals' transformational leadership → Inspirational motivation	1.009	35.908	***
	Principals' transformational leadership → Intellectual stimulation	1.095	36.233	***
	Principals' transformational leadership → Individu-alized consideration	1.058	45.036	***
	Teachers' work motivation → Work identification	1.000		
	Teachers' work motivation → Work participation	0.871	42.674	***
	Teachers' work motivation → Work enjoyment	0.998	50.853	***
	Teachers' work motivation → Work self-evaluation	1.037	48.554	***
	Teachers' work motivation → Work concentration	1.040	49.499	***

*: p <.05; **: p <.01; ***: p <.001

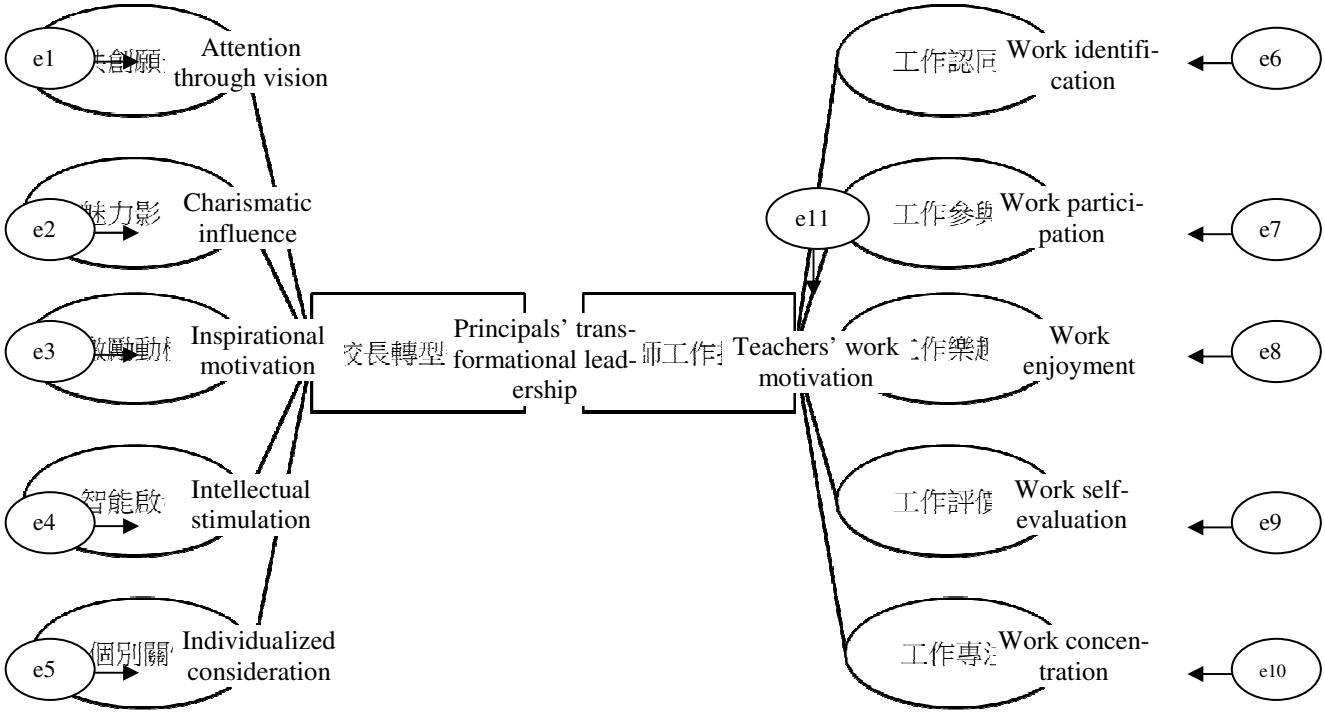

Figure 2. AMOS Basic Path Diagram Of The Study Framework

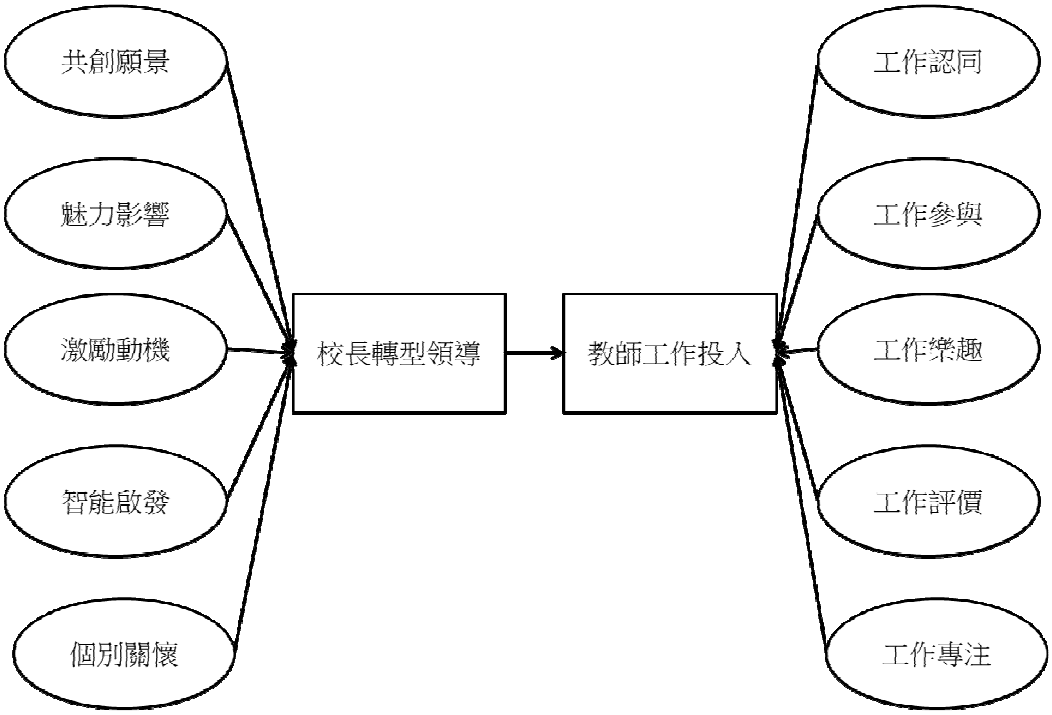

Figure 3. Standardized Path Map (Including Coefficients)

Figure 3 shows the relationships between model dimensions resulting from this study's linear structural path analysis. The path of principals' transformational leadership to teachers' work motivation with an intensity of 0.223 is significant. The dimensional intensities of principals' transformative leadership were, in descending order, those of intellectual stimulation, individualized consideration, inspirational motivation, charismatic influence, and attention through vision. The dimensional intensities of teachers' work motivation were, in descending order, work concentration, work self-evaluation, work identification, work enjoyment, and work participation.

Conclusions and Recommendations

Conclusions

(1) Current status of elementary school teachers' perceptions of principals' transformational leadership

This study found that on average, elementary school teachers perceived principals' transformational leadership overall as high (3.49). The averages levels of dimensions of transformational leadership in descending order were inspirational motivation, charismatic influence, vision creation, intellectual stimulation, and individualized consideration; the average of each of the four levels were higher than that of overall transformational leadership. The average levels of all transformational leadership dimensions were higher than 3.4; that is, elementary school teachers perceived principals' transformational leadership as in a good condition. Therefore, the leadership behavior of elementary school principals mostly aligned with the precepts of transformational leadership.

(2) Current status of elementary school teachers' work motivation

Overall, teachers' work motivation was high (3.79). In descending order, the highest aspects of teachers' work motivation were work self-evaluation, work identification, work concentration, work participation, and work enjoyment. Mean values of work self-evaluation, work identification, and work concentration were significantly higher than teachers' overall work motivation, and mean values of work participation and work enjoyment were lower than that of teachers' overall work motivation. For all aspects, the mean values were higher than 3.7 points, showing that elementary school teachers' work motivation is presently good, and work self-evaluation is the highest aspect of motivation. Work enjoyment was lowest, indicating that teachers' work enjoyment should be further improved.

(3) Elementary school teachers' perceptions of principals' transformational leadership explain teachers' work motivation.

To explore whether elementary school teachers' perceptions of the various dimensions of principals' transformational leadership have predictive power for teachers' work motivation, linear structural analysis was conducted on all predictive variables with overall teachers' work motivation. The path of principals' transformational leadership to teachers' work par-

ticipation was significant, and its intensity was 0.223. Dimensional intensities of principals' transformational leadership ranked in order, from strongest to weakest, were intellectual stimulation, individualized consideration, inspirational motivation, charismatic influence, and attention through vision. The dimensional intensities of teachers' work motivation ranked in order were work concentration, work self-evaluation, work identification, work enjoyment, and work participation.

(4) Inspiration for leaders

Based on the study findings, principals' transformational leadership significantly influenced teachers' work motivation. That is, the higher the questionnaire score of teachers' perception of principals' transformational leadership, the higher their overall work motivation was, and the higher the scores were at all levels of work identification, work participation, work enjoyment, work self-evaluation, and work concentration. In other words, principals should realize from conditions at their school how to use vision creation, charismatic influence, inspirational motivation, intellectual stimulation, and individualized consideration in transformational leadership and integrate the campus culture and school organizational characteristics to enhance teachers' work motivation.

Recommendations

(1) Study recommendations for CMV treatment measures

When conducting related research, researchers can use different sources of data collection to avoid CMV. As discussed by Peng et al. (2006), CMV can be addressed through statistical treatment or careful research design. Solutions discussed in the literature are statistical treatments and coping, whereas data collection methods and questionnaire design are precautions against CMV in study design. The literature suggests that comprehensive study design is more effective than the various remedial measures adopted after statistical analysis to prevent CMV.

Scholars increasingly consider the effect of CMV on research and believe that the use of a single source of data collection leads easily to CMV. Researchers are obliged consider the caused by CMV. Although researchers adopt different reasons, they believe in the legitimacy and rationality of adopting a single source of data collection in a study. This study also suggests that post-analysis detection of CMV is essential study construction.

Research Limitations And Future Research Directions

Because of labor and time constraints, the research range covered only elementary schools in Taiwan's northern, western, and southern regions, including New Taipei City, Taichung City, and Kaohsiung City, respectively. The research participants were also confined to public elementary school teachers. Therefore, the study results only refer to educators serving in Taiwan's public elementary schools. Future studies should extend

this research to other regions or the entire nation, so that results are more inferential and representative, increasing the richness and completeness of data to improve the external validity of the results.

Although this study used a random sampling method for schools, respondents were selected by the school directors or group leaders. Unavoidable sampling distribution bias caused by directors' or group leaders' preferences and interpersonal relationships may have affected the results of teachers' perception of principals' transformational leadership and teachers' work motivation. Future researchers should consider distributing questionnaires to respondents simultaneously to avoid this drawback. Additionally, the transformational leadership of principals was measured through teachers' perceptions; therefore, participants were limited to teachers. Future studies adding principals' self-assessment can aid cross-referencing validation, which could enable understanding the differences in perceptions of principals' transformational leadership and teachers' work motivation, thereby enriching the research content.

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