# Identifying effective leadership practices for implementing a new mathematics curriculum in Taipei

Brandon Kao
*Queensland University of Technology*
<artekao@student.qut.edu.au>

Peter Hudson
*Queensland University of Technology*
<pb.hudson@qut.edu.au>

**Abstract**

This study explores successful junior high school principals' leadership practices for implementing the reformed mathematics curriculum in Taipei. Avolio and Bass's (2002) full range leadership theory was used to record data through interviews and observations of five Taipei "Grade A" junior high school principals. Findings revealed that specific leadership practices linked to management by exception-active and contingent reward (transaction leadership), and individualised consideration and idealised influence (transformational) were considered effective for implementing reform measures. Ensuring principals are aware of effective measures may further assist reform agendas.

Curriculum development and principals' leadership are both essential for creating a successful performing junior high school. Curriculum development is necessary to address the different needs of new generations (Thompson, 2004). Nevertheless, curriculum developments inevitably challenge principals' leadership to efficiently implement curriculum within their schools (Sergiovanni, Kelleher, McCarthy, & Wirt, 2003). This study aims to identify effective leadership practices for implementing a mathematics curriculum reform in Taiwan junior high schools.

In Taiwan, secondary school education separates into senior high schools (age from 15 to 18) and junior high schools (age from 12 to 15). The reform for junior high school mathematics curriculum was initiated in 1985 (Lee, 2004). The junior high school mathematics curriculum guidelines started to adopt the constructivism mathematics educational philosophy in 1997 (Ministry of Education, 2003). In 2001, the Ministry of Education of Taiwan proposed "General Guideline for Grade 1-9 Elementary and Junior High School Curriculum". This was seen as an eclectic version of previous guidelines (Chung, 2003). In 2005, the Ministry of Education in Taiwan officially implemented the "General Guideline for Grade 1-9 Elementary and Junior High School Curriculum". The principal is the one who takes responsibility for the effectiveness of each school (Currie, Boyett, & Suhomlinova, 2005). Principals were usually the key leaders to decide the result of curriculum changes at the school level (Afshari, Bakar, Luan, Samah, & Fooi, 2008). Therefore, to understand the leadership practices of junior high school principals whose implementations of the reformed mathematics curriculum had been recognised as successful may provide beneficial information to the Ministry of Education in Taiwan and other principals who are working under this dynamic education environment (Ou, 2000).

Leadership is important for developing effective and innovative schools (Dinham, 2005). Leadership has been defined as "a process of interpersonal influence from a person unto others in the direction of a goal" (Baruch, 1998). Leadership has also been seen as "the creation of empowered followers in pursuit of a moral purpose, leading to moral outcomes that are guided by moral means" (Antonakis, Cianciolo, & Sternberg, 2004). Numerous leadership theories, such as charismatic leadership, visionary leadership, and servant leadership have emerged (Hallinger, 2003). However, the full range leadership theory has had significant impacts on the

leadership research field since the 1980's (Nguni, Sleegers, & Denessen, 2006). Bass and Avolio's (1997) full range leadership theory provides researchers with a solid ground to understand leadership in various research fields, including the educational field (Leithwood & Jantzi, 2006).

The full range leadership theory consists of three typologies of leadership behaviours: Transactional, transformational, and laissez-faire leadership. The main distinction between the transactional and transformational leadership is based on how leaders motivate followers. Transactional leadership can be understood as exchanges of value items between leaders and followers while transformational leadership consists of motivation, morality, and ethical aspirations. The laissez-faire leadership indicates an absence of leadership in which leaders avoid the responsibilities towards followers and organisations (Avolio & Bass, 2002; Bryman, 1992). Combining with the Multifactor Leadership Questionnaire (Bass & Avolio, 2004), the full range leadership theory further categorised leadership behaviours into eight leadership styles, three from transactional leadership (contingent reward, management by exception-active, and management by exception-passive), four from transformational leadership (individualised consideration, intellectual stimulation, inspirational motivation, and idealised influences), with the eighth style being laissez-faire leadership which indicates an absent of leadership. With the three typologies of leadership behaviours, the full range leadership theory can provide this study with a broader range of leadership research methods to understand principals' leadership behaviours. The eight facets of the full range leadership theory allow researchers to describe and analyse principals' leadership behaviours in a more precise manner.

This study attempts to identify effective leadership practices for implementing the reformed junior high school mathematics curriculum in Taipei. This study aims to address the following research question: What leadership practices have effective principals employed to implement the reformed mathematics curriculum in Taipei junior high schools? Qualitative research methods will be utilised in this study.

## Research Method

This research used a multiple-case study approach (Yin, 2002) to produce descriptions and explanations of Taipei junior high school principals' leadership practices. Five junior high school principals participated in this research to share their leadership knowledge and experiences. These principals' leadership has been recognised by the Taipei City Government for their effective leadership in schools. Data collection methods included audio-taped interviews and observations of the leadership practices of these five successful principals (Creswell, 2004).

This qualitative research employed Avolio and Bass's (2002) full range leadership theory. That is: Four dimensions of transformational leadership: charismatic leadership, inspirational leadership, intellectual stimulation, and individualised consideration; three from transactional leadership: contingent reward, active management by exception, and passive management by exception; and one of laissez-faire leadership (Avolio & Bass, 2002). Data was obtained from in-depth interviews with principals and the observations of these principals' behaviour in weekly staff meetings. Interviews were 45-60 minutes duration using open-ended questions about: internal and external factors that influenced the principal to enact the reformed mathematics curriculum; and, procedures, strategies, problems and issues for implementing the reformed mathematics curriculum. Observations included environment, participants, activities, interactions, conversations, and behaviour relating to staff meetings (Bogdan & Biklen, 2003)

Participants in this research were five junior high school principals in Taipei. Three criteria identified the participants. First, principals are selected from the Grades-A junior high school in the "Annual Educational Organizations Evaluation, 2006" held by Taipei city government. In this report, each junior high school has been evaluated from multiple aspects such as principal's leadership, curriculum development, and school culture building. Schools receive an "A" grade represent principals of those schools who acquired the recognition of their efforts. Second, each principal must have remained at the same school since 2004 to ensure that they have experienced the original and, then, the reformed mathematics curriculum because the most recent curriculum was introduced in 2005. Third, the schools in which the principals work are limited to the city-run junior high school to ensure that, in some measures, all principals/schools involved in this research share similar resources, have similar goals, and experience similar pressures from the city government and society.

Five city-based Taipei junior high schools, represented as School A to School E, were involved in this study. All these schools earned an A-grade in the "Annual Educational Organisations Evaluation of Year 2006". Table 1 provides further information about each school, including the size, the total number of classes, students, teachers, and administrative members of each school.

Table 1: School Demographics for Year 7, 8 and 9

| Schools | Size | Classes | Students | Teachers | Administrative Members |
|---|---|---|---|---|---|
| School A | Middle | 43 | 1639 | 95 | 18 |
| School B | Middle | 26 | 820 | 67 | 17 |
| School C | Large | 84 | 2767 | 187 | 25 |
| School D | Large | 60 | 2242 | 131 | 20 |
| School E | Large | 69 | 2654 | 156 | 24 |

*Note.* Adapted from "Elementary and Junior High School General Information Report of 2006" by Department of Education, 2007.

## Results and Discussion

Various documents (e.g., Compulsory Education Law, 2007; Educational Fundamental Act, 2007; Teachers' Act, 2006) provided laws and regulations that shaped the principals' leadership roles in the schools. Principals reported that these documents had presented difficulties for them to change teachers' pedagogical practices. To illustrate, Principal B stated:

> A lot of teachers are resistance toward my attempts to carry out new pedagogies… Professional autonomy and the protections of teachers' working rights made it difficult to implement these new ideas. I cannot actually require them to do any changes by reward or punishment. Most of the powers that I can use are not compulsive. I can only utilise my personal influences, such as persuasions, to encourage them to try these new ideas instead of require them to do these changes.

Principals B and C held a different viewpoint about their school leadership roles compared with the other principals. Principals B and C frequently encouraged teachers to improve professional skills. Sometimes they may even directly pointed out teachers' weakness or asked teachers to redeem the mistakes. For example, through the interviews, Principal B kept indicating that "to develop teachers' professional skill is teachers' own responsibilities". In an observation of Principal B's meeting, Principal B suggested a particular teacher to "improve the communication skills and

learn how to communicate with parents". In the same meeting, Principal B also encouraged another teacher to "learn to build up a fairer standard to evaluate students learning performance". Principals B and C aimed to fulfil their responsibilities by pointing out teachers' weakness and adopting powers to redress teachers' flaws. Compared with Principals A, D, and E who "listen" to teachers' needs, Principal B and C actually "guide" teachers to do things. Principals A, D, and E considered utilising their powers to "assist" teachers while Principal B and C deemed their powers to "direct" teachers to improve themselves.

The 8 leadership styles and 30 indicators were adapted from the full range leadership theory (Avolio & Bass, 2002) and were used to analyse principals' leadership behaviours. Researchers utilised these indicators to categorise principals' leadership behaviours into corresponding leadership styles. Table 2 presents the frequency of each leadership strategy, which was recorded in three dimensions. The first was principals' statements about leadership that reported in the interviews (which were indicated under the column of "Int"). The second was principals' leading behaviours that observed in staff meetings (which were indicated under the columns of "Obs"). The third was principals' statements about leadership that related to their implementations of the reformed mathematics curriculum in their schools (which were indicated under the columns of "Maths"). Principals A and E exhibited the individualised consideration leadership behaviours more than other styles (Table 2). Thus, according to the full range leadership theory, Principals A and E were more likely to be the individualised consideration leaders in this research. According to the data (Table 2), Principal B may be considered as the management by exception-active leader, Principal C as the contingent reward leader, and Principal D the idealised influence leader.

Data obtained from this study indicated that laissez-faire, passive management by exception, and intellectual stimulation were principals' least performed leadership practices. Active management by exception and contingent reward were the two transactional leadership styles frequently exhibited by all five principals. Findings also revealed that these principals actively sought potential difficulties or problems. For example, Principals A, B, D, and E paid attention to things such as teachers' pedagogies, students' learning performance, school environment, and equipment arrangement. Principals A, B, D, and E indicated that they did not want to just sit in their offices and wait for problems to arise. Instead, they preferred to find out any possible deviation before it becomes a real problem. Principal B also identified the importance for a principal to physically monitor the school:

> Walking around the school allowed the principal to see how things were going on. How well the teachers teach in their classrooms? Was the environment friendly to our teachers and students? How efficiency the school equipment has been used...Some problems can only be observed when it's happening. Therefore, walking around the school was important. It allowed principals the chance to find out a problem before becoming a "real" disaster.

These principals employed active management by exception leadership practices to attend to followers' mistakes. They continuously monitored followers' performance to anticipate mistakes before becoming a problem. Moreover, these principals took corrective actions when necessary. For instance, in the process of implementing the reformed mathematics curriculum, Principal A pointed out mathematics teachers' mistake of unwilling to exchange information and to share experience. Principal A considered this mistake hindered mathematics teachers to accommodate with the reformed mathematics curriculum. To illustrated, Principal A stated, "They

(mathematics teachers) just did not want to share their pedagogies and experiences with each others. They almost had no interactions… It is difficult to improve one's teaching skills just by working alone." Another issue that Principals A, B, C, and D concerned was the overuse of the mathematics quiz sheets.

Table 2: The Frequencies of Principals' Leadership Practices

**Frequencies**

| The Full Range Leadership Theory | | | School A | | | School B | | | School C | | | School D | | | School E | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Int. | Obs. | Math | Int. | Obs. | Math | Int. | Obs. | Math | Int. | Obs. | Math | Int. | Obs. | Math |
| Transactional Leadership | | | | | | | | | | | | | | | | | |
| Management by Exception-Passive | 1 | Wait for problem arises | | | | | | | | | | | | | 4 | | 4 |
| | 2 | Maintain status quo | | | | | | | 2 | | 2 | | | | 1 | | 1 |
| | 3 | Fix the problem & resume normal functioning | | | | | | | | | | | | | | | |
| Management by Exception-Active | 4 | Arrange to find anything wrong | 3 | | | 11 | 5 | 4 | 1 | | 1 | 2 | 5 | 1 | 7 | | 2 |
| | 5 | Attend mostly to mistakes | 5 | | 3 | 28 | 4 | 11 | 1 | 2 | 1 | | | | 6 | | 6 |
| | 6 | Enforce the rules | 3 | | 1 | 23 | 8 | 10 | 1 | | 1 | | 2 | | | | |
| | 7 | Teach followers to correct mistakes | 9 | 2 | 6 | 34 | 11 | 15 | | | | 3 | 2 | | 1 | 1 | 3 |
| Contingent Reward | 8 | Set the goals for followers | 2 | | | | | | 9 | 1 | 4 | | 1 | | | | |
| | 9 | Provide support in exchange for required effort | 15 | 2 | 4 | 2 | 1 | | 10 | 3 | 5 | 5 | | 4 | 5 | | |
| | 10 | Give recognition when followers meet the goal | 2 | | | | | | 3 | 2 | 1 | | | | 2 | | |
| | 11 | Follow up to ensure the goal is satisfactorily met | | | | | | | 3 | 1 | | | 1 | | | | |
| Transformational Leadership | | | | | | | | | | | | | | | | | |
| Individualized Consideration | 12 | Assign projects based on individuals' strengths and weaknesses | 6 | 4 | 3 | | | | | | | 1 | | | 11 | | 2 |
| | 13 | Make interpersonal connections with followers | 4 | 1 | 2 | | | | 2 | | 2 | | | | 5 | 2 | 1 |
| | 15 | Encourage a two-way exchanges of views | 8 | 5 | 2 | 2 | 1 | 1 | | | | 4 | | 1 | 5 | 2 | 2 |
| | 16 | Promote self-development | 9 | 1 | 7 | 3 | | | 2 | | | | | | 2 | 1 | |
| Intellectual Stimulation | 17 | Re-examine assumptions | | | | | | | | | | | | | | 1 | |
| | 19 | Encourage the imagination of followers | 1 | | 1 | | | | | | | | | | | | |
| | 20 | Encourage followers to revisit problems | | 1 | | | | | | | | | | | | 1 | |
| | 21 | Create a readiness for changes in thinking | | | | | | | 2 | 1 | 1 | | | | | 1 | |
| Inspirational Motivation | 22 | Present an optimistic/attainable view of future | | | | 7 | | 4 | 1 | 1 | | 3 | | 1 | | 2 | |
| | 23 | Mould expectations and shapes meaning | | | | 1 | | | | | | 1 | | | | | |
| | 24 | Reduce complex matters to key issues | | | | | | | | | | 2 | | | 1 | | |
| | 25 | Create a sense of priorities and purpose | | | | 1 | | 1 | | | | 1 | | | | | |
| Idealized Influence | 26 | Demonstrate Outstanding Competence | | | | 8 | | 1 | 1 | | | 5 | 2 | 2 | 2 | | |
| | 27 | Celebrate followers' achievements | 1 | | | | | | | | | 4 | 2 | 2 | 6 | 1 | |
| | 28 | Develop trust and confidence among followers | | 1 | | | | | 3 | 1 | 2 | 13 | 5 | 5 | 6 | | 2 |
| | 29 | Express confidence in the vision | | | | | | | | | | 2 | | | | | |
| Laissez-Faire | 30 | Avoid making decisions | | 1 | | | | | 1 | | | | | | | | |
| | 31 | Abdicate responsibilities | 1 | | 1 | | | | 1 | | | | | | | | |
| | 32 | Show lack of interest in what is going on | | | | | | | | | | | | | | | |

Management by exception-active was Principal B's preferred leadership style in leading the school as well as in the process of implementing the reformed mathematics curriculum. Principal B utilised various methods to uncover problems. She set up rules at the outset of monitoring and enforced these rules. Principal B closely monitored followers' performance to anticipate any mistakes before such mistakes became a problem. Once she detected problems or deviations, Principal B formulated a corrective plan and asked followers to rectify problems by following her instructions.

Participating principals indicated various leadership preferences in this study. As shown on Tables 2, Principals A, D, and E preferred to utilise the transformational leadership strategies for implementing the reformed mathematics curriculum in their schools. On the contrary, Principals B and C tended to employ the transactional leadership strategies for leading their schools. This section summarises these principals' preferred leadership practices.

Principals A and E tended to utilise the individualised consideration leadership strategy for leading their schools. Principals A and E emphasised the importance for junior high school principals to assign projects in consistent with teachers' personal strengths. Therefore, these principals would employ certain strategies, such as reviewing teachers' personal files or actively talking with teachers, in order to determine teachers' individual strengths and weaknesses. They exhibited concern for staff and attempted to further understand teachers by building interpersonal connections. In addition, Principals A and E encouraged teachers to exchange ideas with them. They claimed that teachers' self-improvement would enhance the principals' leadership. They also encouraged teachers to pursue further self-development by providing necessary support.

Principal B preferred to utilise the management by exception-active leadership practice. Compared with other participating principals, Principal B attended mostly to problems and deviations. She set up the rules for teachers and administrators, enforced these rules, and set the monitoring systems to uncover any deviations. Principal B was proactive by walking around the school and talking with teachers to detect potential problems. Once Principal B uncovered a problem, she tended to formulate a corrective plan without consultation and asked teachers to follow her plan to correct the problem.

Principal C preferred to utilise the contingent reward leadership practice. He emphasised the importance of the relationship between rewards and goal achievement in the principal's leadership. Principal C made clear the goals he expected teachers to achieve and the rewards he would provide if teachers achieved these goals. Then he provided teachers with necessary support in order to achieve these goals. Principal C would follow up to ensure the goals were satisfactorily met and provided reward and recognitions for teachers' efforts.

Finally, Principal D preferred to utilise the idealised influence leadership practice. She attempted to be the role model for teachers by presenting her professional specialities, such as her expert understanding of the "multiple senior high school entrance program". She also influenced teachers by demonstrating to them an image of hard work, pedagogical expertise, and honesty. Principal D displayed respect for teachers' professional capabilities and had confidence in teachers' capabilities for completing their tasks. Principal D tended to attribute the success of the school to teachers' efforts and celebrated teachers' achievements.

## Conclusion

This study used qualitative methods to explore and identify effective junior high school principals' leadership practices for implementing the reformed mathematics curriculum in their schools. Five Taipei junior high school principals, recognised with awards by the Taipei City Government, participated in this study. Findings indicated that principals' leading strategies were usually influenced by the perceptions of their roles and the ways of utilising their powers. The finding that two transactional leadership strategies, active management by exception and contingent reward, have positive effects on principals' leadership is consistent with several researchers. For example, Nguni et al. (2006) studied primary school principals' leadership and remarked that the management by exception-active and contingent reward leadership practices tended to bring moderate to strong positive influence to primary school principals' leadership. On the contrary, the passive management by exception and laissez-faire leadership had mainly shown to have strong negative effects on primary school principals' leadership (Nguni et al., 2006). Bass et al. (2003) had also pointed out that followers tended to perceive passive management by exception and laissez-faire leaders as ineffective leaders. The result of this study confirmed these previous studies by indicating that effective Taipei junior high school principals also preferred to utilise the active management by exception and contingent reward leadership rather than passive management by exception and laissez-faire leadership for leading their schools.

Individualised consideration and idealised influence were the two transformational leadership practices that Grade A Taipei junior high school principals frequently utilised. A previous study suggested that leaders who utilised the strategies associated with individualised consideration had to add more emphases on developing followers, such as promoting followers' further education and self-development instead of focusing on supporting their followers (Geijsel, Sleegers, Leithwood, & Jantzi, 2003). However, findings of this study indicated that effective Taipei junior high school principals lay similar attentions on these two leadership strategies. They exhibited the developing practices as frequently as the supporting practices. In a local study, Wang (2005) analysed two outstanding Taipei kindergarten principals' leadership and remarked that both principals emphasised on caring and planning for teachers' career development as well as on understanding teachers concerns. Similar to Wang's (2005) study, this study indicated that effective principals utilise individualised consideration leadership practice had to put effort on both promoting teachers' self-development as well as to know their teachers better.

Findings of this study also revealed that demonstrating principals' outstanding competences, characteristics of commitment, high expectations, and trust among teachers were important strategies for these Grade A Taipei junior high school principals to utilised the idealised influence leadership. These behaviours were also found in Bass and Avolio's (2004) observation about leaders' behaviours which making them become the role model among their followers. Findings of their research suggested leaders who utilised the idealised influences leadership had to emphasise the purpose, commitment, and confidence among followers (Bass & Avolio, 2004).

The results of this study have several implications and directions. Since most empirical evidence about the full range leadership had been more confined to the Western world, this study extends the investigation of the full range leadership theory to non-western societies and cultures by focusing on Taiwanese principals' leadership. Moreover, this study places emphasises on leadership practices for implementing the mathematics curriculum while most studies about full range leadership focus on

business organisations. The findings of this study indicated that Bass and Avolio's (2004) full range leadership theory could benefit non-western society as specific leadership practices can be identified. In addition, junior high school principals may be able to use leadership strategies employed by successful principals (e.g., Grade A from Taiwan) for implementing the reformed mathematics curriculum in their schools. Indeed, principals can receive professional development for enhancing their own leadership practices. Furthermore, checklists can be supplied to principals to ensure they are more focused on effective practices and at the same time minimising practices considered to be ineffectual. Finally, as indicators from the full range leadership theory were generated from western societies, it will be important for further research to develop statements that are culturally and educationally representative of non-western societies. As a result, this study could serve as a starting point that will stimulate further research on the exploration of the effects that the full range leadership on junior high school principals' leadership and the outcome of the education reform in Taiwan.

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