Teachers' teaching and learning motivation in China

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UNIVERSITY-SCHOOL PARTNERSHIP IN CHINA: PERSONAL AND SCHOOL WORKING CONDITIONS, AND PRINCIPAL LEADERSHIP THAT EXPLAIN CHANGES IN TEACHING

Abstract

In China, New Basic Education (NBE) is a collection of continuous professional development for teachers' involving teacher educators who visit schools. This study explores teachers' personal factors, school working conditions, and principal leadership explaining differences in teachers' learning when they have participated in the training program. In one-group pre-test post-test design, 375 teachers from 12 primary schools in Shanghai participated. Their learning performance is measured by the change in their teaching quality evaluated by their students. Results of regression analyses show that teachers generally receive higher scores on their teaching quality after the program than before. Three factors are significantly and negatively related to the change in quality: teachers' educational level, the extent to which teachers feel emotional pressure in their profession and the support from their school principal. Implications for school leaders and policymakers are discussed.

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3.1 Introduction

Teaching is considered to be one of the most important predictors of students' learning outcomes (Seidel & Shavelson, 2007). As a consequence, more and more professional development (PD) programs are designed to improve teachers' use of various instructional practices effectively in class. In China, many large-scale education reforms have been launched as a result of the strong demand for teachers to learn how to improve their teaching to meet the challenges of a fast-changing society. One of these reforms is the New Basic Education (NBE). In the NBE, teacher educators from universities go to schools and based on class observation they provide teachers feedback on how to improve their teaching (Yuhua & Jiacheng, 2013). However, research on the impact of teachers' PD programs has indicated that it is not easy for teachers to make drastic changes to the teaching approaches to which they have been accustomed for years (Desimone, 2009). Teachers' personal factors (Ryan & Weinstein, 2009), as well as working conditions (Geijsel, Sleegers, Stoel, & Krüger, 2009), may affect teachers' learning when they participate in PD programs.

In addition, although the NBE is regarded as an effective PD program, it is not readily supported by all school principals. The NBE emphasizes teachers to base their teaching on students' interests, creative spirit, and teamwork skills rather than students' academic scores, whereas school principals generally focus on high student academic achievement in public examinations (Zhao et al., 2014). Yet leadership is only one – though important – factor that can explain differences in teachers' learning in PD. Therefore, this study aims to contribute to understand which teachers' personal factors, school working conditions, as well as principal leadership, are related to the effects of a PD program in terms of teaching quality.

3.2 New Basic Education

GaoKao (The National College Entrance Examination) is an academic examination held annually in China. Students are only allowed to enter a university (especially a prestigious one) when they pass the examination, which therefore has a significant impact on individual student life (Yu et al., 2016). GaoKao is always criticized for limiting students' deep learning and creativity (Yu et al., 2016). In light of the importance of examination success, school principals single-mindedly focus on the

students' academic scores rather than students' interests, creative spirit, and teamwork skills to ensure high student academic achievement in public examinations. Accordingly, teachers' teaching practices emphasize knowledge delivery, memory-driven learning, and teacher-centred approaches (Xin & Fred, 2014). This contradiction between the quality-oriented ideal and the test-oriented educational reality aroused Chinese scholars' concerns. In order to change this situation, they designed various innovations to improve teaching quality. A notable example in China is New Basic Education. The purpose of the NBE is to counteract the broadly criticized test-oriented education in China (Dello-Iacovo, 2009) and help teachers to reduce teacher-centred teaching in favour of student-centred approaches. Teacher educators from universities go to schools to use various ways *(see Introduction Table 1.1)* to continuously support teachers' development in school. They encourage teachers to support students as 'active learners', who creatively solve problems, challenge existing knowledge, and participate in lively teamwork (Yuhua & Jiacheng, 2013).

3.3 Teachers' learning in PD programs

A growing body of literature confirms that PD can impact teaching practices. Teachers can learn from PD by observing, asking questions, and actually participating alongside teacher educators. It will eventually lead to a change in teachers' knowledge and teaching practices. However, teachers tend to assimilate new notions into their existing belief systems when they are implementing new approaches (Desimone, 2009). It indicates that teachers' implementation of new teaching approaches may be influenced by teachers' personal characteristics. In addition, as a member of a school community, teachers' learning is social rather than being solely individual. The support from external sources is very important for the development of teaching quality, especially when they intend to experiment with newly acquired knowledge and skills (J.-W. Zhang, Lo, & Chiu, 2014). Based on the literature on factors related to the effects of teachers' PD programs (e.g., Blume, Ford, Baldwin, & Huang, 2010; Wal, van den Beemt, Martens, & den Brok, 2020; Leithwood & Jantzi, 2005; Louws, Meirink, van Veen, & van Driel, 2018; Mintzes et al., 2013; Roehrig & Kruse, 2005), we will provide a framework to discuss the potential factors distinguishing between teacher personal factors, their school working conditions and their principal's leadership.

3.3.1 Teacher characteristics

Teacher personal factors can be divided into two aspects: (1) teacher characteristics and (2) teacher psychological factors. For teacher characteristics, teachers' teaching experience and educational level are included in this study because of their significance in other studies. Some researchers have reported that teachers' teaching experience affects their learning in PD programs. For instance, in a study exploring the professional learning goals of early-mid-and later-career teachers, Louws et al. (2018) report that early-career teachers spoke more explicitly about the specific skills that they would like to learn in order to become better teachers, compared to teachers with more teaching experience. Similary, Maskit (2011) indicates that teachers displayed significant differences in attitudes towards pedagogical changes at different stages of their careers with early-career teachers being more likely to alter their style of instruction than those in more stable stages. Such findings are also found by Hildebrandt and Eom (2011), who report that inexperienced teachers showed higher needs for achievement and growth compared to experienced teachers. To pursue greater achievements, inexperienced teachers showed more willingness to learn and had a better learning performance compared to experienced teachers.

Previous studies have been conducted on the relationship between teachers' educational level and teachers' learning in PD programs, albeit with inconsistent findings. Some researchers indicate that teachers' educational level is positively related to teachers' learning performance. Teachers with higher educational level were more confident about their ability of learning and more willing to change what they were so used to doing in the classroom (Tschannen-Moran & McMaster, 2009). However, some other studies indicate that teachers with higher educational level were more confident and satisfied in their teaching, had less willingness to alter their way of teaching (Supovitz et al., 2010; Zhao et al., 2014). Due to these contradictory findings, the direct relation between teachers' educational level and learning in PD programs requires further investigation.

3.3.2 Teacher psychological factor

Previous studies have reported that teachers' psychological factors, such as beliefs in learning (Roehrig & Kruse, 2005), self-efficacy (Mintzes et al., 2013), and teachers' learning motivation (Blume et al., 2010) influence their learning performance during

PD programs.

Teachers' beliefs of learning, which refers to what teachers know about learning and how they think they learn may contribute to understanding the troubles and pitfalls in learning (Bolhuis & Voeten, 2004), can directly shape teachers' reactions to professional learning (Roehrig & Kruse, 2005), and how they utilize their pedagogical knowledge in the classroom (Morine-Dershimer & Kent, 1999). Several authors also claim that teachers' beliefs about learning seem to be important for the effects of teachers' PD programs. For example, Bolhuis and Voeten (2004) found that teachers with stronger beliefs in intelligence as a malleable quality were more concerned with developing their teaching competence and were more persistent in their learning activities. Whereas teachers with more beliefs in intelligence as a fixed quality were more likely to give up when confronted with difficulties in PD programs.

When it comes to self-efficacy, which refers to the beliefs in teachers' capability to make a difference in student learning (Tschannen-Moran, Hoy, & Hoy, 1998). Many studies have indicated that perceived self-efficacy influence teachers' learning when they participate in PD programs. However, their conclusions are inconsistent. For example, Tschannen-Moran and Hoy (2001) found that the more self-efficacy teachers had in their teaching, the more willing they were to demonstrate acceptance of new ideas and experiment with new instructional methods. Similarly, Geijsel, Sleegers, Stoel, and Krüger (2009) showed that teachers with a strong belief in their own capabilities were more involved in learning activities, showed more enthusiasm and passion for learning, compared to the teachers with low self-efficacy. Other authors, however, came to a somewhat different conclusion, indicating that teachers with more confidence in, and satisfaction with, their teaching showed less willingness to learn and to alter their way of teaching (e.g., Supovitz et al., 2010).

For learning motivation, which refers to reasons for engaging in learning activities (Deci & Ryan, 2002). Some researchers report that when teachers are highly motivated to learn, they may have more successful learning experience, which may contribute to their implementation of new approaches from PD programs (Bolhuis & Voeten, 2004; Donche & Van Petegem, 2011). In a study to explore the relationship teachers' self-efficacy, Suchodoletz, Jamil, Larsen, and Hamre (2018) come to a similar conclusion, indicating that teachers who are more motivated to participate in learning activities may acquire more teaching techniques, and ultimately increase

their willingness to implement new teaching strategies.

3.3.3 Working conditions

Based on the study of the psychosocial workload of teaching (Veldhoven & Meijman, 1994), Wal et al. (2020) divided teachers' perceptions of workplace conditions into four aspects:

- *Task autonomy,* which comprises the extent to which teachers can decide on when and how to execute their work;
- *Colleague support,* which refers to helpful social interactions available from colleagues on the job;
- *Work pressure,* which refers to challenging aspects of the job, such as work load and the pace of work;
- *Emotional pressure,* which concerns the extent to which teachers perceive their jobs to require emotional investment, such as emotional load, mental strain or suspense;

Many studies have indicated that these four variables may affect teachers' learning in PD programs. For example, according to Rosenholtz (1989), the more emotional pressure teachers perceive in school, the more reluctant they are to learn or to attend PD. In addition, in a survey study with 502 teachers from 32 elementary schools in the Netherlands, Thoonen et al. (2011) found that task autonomy may reinforce the extent to which school values are internalized as teachers' personal goals and subsequently affect their learning from PD activities.

3.3.4 Principal transformational leadership

A number of leadership concepts have been posited to describe various principal leadership practices, such as transformational leadership (Finnigan, 2010), transactional leadership (Eyal & Roth, 2011), and instructional leadership (S. Liu, Hallinger, & Feng, 2016). However, it is the literature on "transformational leadership" that provides useful insights into the role of the principal in the context of teachers' learning and school improvement (Y. Yang, 2014). Transformational leadership focuses on development for the purpose of change and motivates followers to do more

than they originally expected or they thought possible (Bass & Avolio, 1994). Bass (1985) identified three aspects of transformational leadership: stimulating version building, providing individualized support, and supporting intellectual stimulation. Version building refers to stimulate teachers' willingness to internalize organizational goals as their personal goals, increasing their sense of belonging in schools. Individualized support represents an attempt to understand and satisfy teachers' needs to increase their sense of self-efficacy. And intellectual stimulation encourages teachers to question their own beliefs, assumptions and enhance teachers' willingness to learn and improve their learning ability. In this study, we focus on intellectual stimulation, which means that transformational school leaders can help teachers to reflect on their own beliefs, and values, and encourage them to update their traditional approach by the implementation of new teaching approaches. Previous work shows that principals as transformational leaders use intellectual stimulation to enhance teachers' learning performance and help them in their PD (Leithwood & Jantzi, 2005; Silins, 1994).

3.4 This study

The present study focuses on the evaluation of the development of teaching quality after a period of participating in the NBE. Two common methods for measuring the quality of teaching practice are registration methods, such as classroom observation and methods based on perceptions, mostly student surveys (Hassan & Wium, 2014). Students can evaluate the deeper structure without using surface indicators, they have a good understanding of how interesting or difficult an instruction is in general and their feedback can help to improve teaching (Dockterman, 2017a). Therefore, we use students' perceptions to evaluate the change in teaching quality in this study.

Most studies focus on teaching, learning, or implementing an educational innovation in a Western cultural setting. Empirical investigations into the influential factors in the change in teaching quality of Chinese teachers in the university−school partnership are still scarce. Some studies have indicated that Chinese culture has a great influence on Chinese teachers' teaching and future PD (Kennedy, 2002; Shi, 2006; Walker & Qian, 2015; Wong, 2001), particularly for the role of school principals as they are always treated as playing a managerial and political role in the Chinese educational system. This study was conducted in Shanghai, a Chinese society; we expect that the non-Western cultural setting will provide a valuable view of the rela-

tionship between these influential factors and the effects of PD program with respect to teaching quality. Compared with previous studies, the present study provides a comprehensive overview of teacher characteristics (e.g., educational level, teaching experience), teacher psychological factors (e.g., self-efficacy, learning motivation, conception of learning), working conditions (e.g. work and emotional pressure, task autonomy, colleague support) and principal leadership that are related to change in teaching quality in a Chinese context. The following research questions are addressed:

1: Do teachers increase their teaching quality as evaluated by their students during participation in the NBE program?

2: How are teacher personal factors, school working conditions and principal's transformational leadership related to the change in teaching quality?

3.5 Methods

3.5.1 Participants and procedure

This study is situated in the NBE implemented by East China Normal University in Shanghai, China. Shanghai used to classify schools into "key" and "ordinary" and gave additional resources to "key" schools (Pye, 1997). Although these labels now have been removed, the previously classified key schools remain privileged and have a better teaching quality than ordinary schools (Qian & Walker, 2013). Consequently, considering the quality of schools, we selected 12 schools from 20 schools that were recommended by East China Normal University: 6 schools from "key" schools and 6 schools from "ordinary" schools. Finally, a total of 375 teachers from 12 primary schools who were active in the NBE program participated in this study. Two waves of questionnaire data were collected. The first questionnaire (T1) was administered in October 2017, and the second (T2) was in April 2018. Participation in the study was strictly voluntary and confidential for teachers and students. Ethics approval for this study was granted by the Leiden University Graduate School of Teaching (ICLON).

Sample statistics and population parameters regarding age, gender, teaching experience, educational background, and other information are presented in Table 3.1.

The teachers who participated taught a large array of subjects (including Chinese, English, mathematics, music, art, science, history, among others). On average the teachers were 37.6 years old (SD=8.3). Teachers completed their questionnaires in their office.

Table 3.1
Participant information (N=375)

		Participants
Gender	Female	342
	Male	33
Subject	Chinese	128
	English	98
	Math	83
	Art	19
	Music	15
	Others	32
Teaching experience	0−3 years	41
	4−6 years	59
	7−18 years	117
	19−30 years	134
	31−plus years	24
Educational background	Diploma of Secondary vocational school	2
	Senior college degree	28
	Bachelor's degree	290
	Master's degree	55

3.5.2 Teaching quality

NBE focuses on three aspects of teaching: classroom climate, classroom management, and cognitive activation. Classroom climate support includes specific aspects of a positive teacher−student relationship and constructive teachers' feedback. In order to enhance a positive climate, teachers should provide extra help when needed,

respect students' questions, and care about the students. It is assumed that a positive student−teacher relationship fosters students' intrinsic motivation and subject-related interest, which in turn are crucial for students' learning gains. Classroom management refers to classroom rules and procedures, coping with disruptions, and providing smooth transitions, which are crucial for students' learning gains. Cognitive activation encourages students' cognitive engagement by integrating various tasks, exploring theoretical conceptions, and applying knowledge. A growing global literature reports that these three aspects reflect the key aspects of teaching quality, and are positively related to student academic achievement and subject-specific interest (Ferguson, 2012). Accordingly, in this study, a teacher teaching quality questionnaire was administered to students to assess teacher teaching in class (Fauth et al., 2014). The instrument consists of three subscales: classroom management (5 items); cognitive activation (7 items); supportive climate (9 items), a total of 21 items. Students are asked to evaluate their teaching quality from 1= strongly disagree to 4= strongly agree. The 21 items were subjected to an exploratory principal component factor analysis to determine the underlying factors. The final analysis consists of two components of 19 items, which explain 41.9% and 11.5% of the variance in scores, respectively. The first component includes cognitive activation and supportive climate; it is labelled 'classroom teaching', indicating exploration of students' prior knowledge, the way of thinking, and a good relationship between teachers and students. The second component is labelled 'classroom management', with items on classroom rules and procedures dealing with disruptions, and ensuring smooth transitions in the classroom. The Cronbach's alphas of classroom teaching and classroom management are 0.91 and 0.89, respectively.

3.5.3 Teacher characteristics

Teacher characteristics included educational background, teaching experience and prior experience with NBE. Teachers' teaching experience were divided into five categories (Huberman, 1989): 0−3 years of teaching experience (Career Entry Stage); 4−6 years of teaching experience (Stabilization Stage); 7−18 years of teaching experience (Experimentation−Diversification Stage);19−30 years of teaching experience (Serenity Stage); and 31 or more years of teaching experience (Disengagement Stage).

3.5.4 Teacher conceptions of learning

To capture teacher conceptions' of student learning and their own learning, 46 items are derived from the teacher conception questionnaire which has five subscales: External versus Internal Regulation; Reproductive versus Constructive Knowledge; Individual versus Social Learning; Fixed versus Dynamic Ability; and Intolerance of Uncertainty versus Tolerance of Uncertainty. (Bolhuis & Voeten, 2004). Teachers were asked to state to what extent they agree with the learning conception for themselves and for their students. A four-point scale is used: (1) I quite agree with the statement on the left; (2) I agree somewhat more with the statement on the left than I do with the one on the right; (3) I agree somewhat more with the statement on the right than I do with the one on the left; and (4) I quite agree with the statement on the right. Reliability analysis of teacher conception of student learning reveals that the reliability of only Reproductive versus Constructive Knowledge (α=0.64), Individual versus Social Learning (α=0.59) and Fixed versus Dynamic Ability (α=0.67) is acceptable. For teacher conception of their own learning, only Fixed versus Dynamic Ability (α=0.67) shows satisfying reliability. These four scales are labelled 'conception of student knowledge', 'conception of student teamwork', 'conception of student ability' and 'conception of their own ability'.

3.5.5 Teacher self-efficacy

Teachers' self-efficacy has been assessed using the Teachers' Sense of Efficacy Scale (TSES, 12 items) developed by Tschannen-Moran and Hoy (2001), which has three subscales: 1) instructional strategies; 2) classroom management; 3) student engagement. The 12 items have been subjected to an exploratory principal component factor analysis with oblimin rotation to determine underlying factors. The final factor solution results in two components with 11 items, which explaine55.3% and 9.6% of the variance in self-efficacy scores, respectively.

The first component is labelled 'efficacy in teaching'(7 items) and includes items from the original scale instructional strategies and student engagement. Example items are 'How much can you do to motivate students who show low interest in school work?' and 'To what extent can you craft good questions for your students?' The second component is labelled 'efficacy in classroom management' (4 items). An example item is 'How much can you do to control disruptive behaviour in the class-

room?' Teachers were asked to indicate their feeling of self-efficacy on a nine-point scale: 1= nothing, 3= very little, 5= some influence, 7= quite a bit, 9= a great deal. The Cronbach's alphas of the two factors are 0.88 and 0.88, respectively, showing satisfying reliabilities for both scales.

3.5.6 Teacher motivation for participation in PD

Teachers' motivation to participate in PD programs has been assessed with the Teacher Motivation Inventory (Lam, Cheng, & Choy, 2010). The instrument consists of four subscales (external regulation, introjected regulation, identified regulation, intrinsic motivation) with five items per scale, a total of 20 items. The items were presented randomly. Teachers were asked to indicate their feeling of motivation on a five-point scale (1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree). The 20 motivation items are subjected to an exploratory principal component factor analysis to determine underlying factors. Three components of 16 items are extracted, which explain 44%, 15%, and 7.7% of the variance in motivation scores, respectively. The first component includes intrinsic motivation and identified regulation. According to the perspective of self-determination theory (Deci & Ryan, 2002), the combination of intrinsic motivation and identified regulation is designated as autonomous motivation; therefore, the first component has been labelled 'autonomous motivation'. This means that teachers engage in a learning activity for the inherent enjoyment and pleasure, or the pursuit of a meaningful outcome from the activity. One example item is 'I participated because I am interested in it'. The second component has been labelled 'external regulation', which implies that the reason why the teacher engages in activities is to attain material incentives, recognition or rewards, or to avoid punishment. An example item is 'I participated because it was a duty assigned by my school'. The third component has been labelled as introjected regulation: where self-determination is relatively higher than in the case of external regulation, it involves taking in regulation but not fully accepting it as one's own. It is a relatively controlled form of regulation in which behaviour is performed to avoid guilt or to attain ego enhancements, such as pride. An example item is 'I participated because I would feel embarrassed to explain my absence to others'. The Cronbach's alphas of autonomous motivation, external regulation, introjected regulation are 0.94, 0.83, and 0.62, respectively, showing satisfying reliabilities for each scale.

3.5.7 Perceived workplace conditions

The Dutch Questionnaire Social Psychological Work Demand (Veldhoven & Meijman, 1994) has been used. It has three subscales: pressure from work features and emotional aspects of work; task autonomy; and support from colleagues. We conducted an exploratory principal component factor analysis to determine the underlying factors. Four scales were distinguished:1) Emotional pressure (4 items), indicating teacher emotional pressure at work, with items such as, 'Are you confronted in your work with situations that affect you personally?' and 'Do you experience a major emotional workload?'; 2) Task autonomy with 4 items explaining 15.5% of the variance in scores, showing teacher's autonomy at work, with items such as: 'Can you decide for yourself how you carry out your work?' and 'Can you do your job at your own pace?'; 3) Colleague support with 4 items explaining 10.2%, indicating teachers received support from colleagues, with items such as: 'My fellow colleagues give notice to what I say?' and 'My fellow colleagues are willing to listen to my work-related problems?'; and 4) Work pressure, 5 items explaining 7.1%, showing teachers perceived pressure from their work, with items such as: 'Do you have to work very fast' and 'Do you have too much work to do?' The Cronbach's alphas of emotional pressure, work pressure, task autonomy, colleague support is 0.81, 0.73, 0.62, and 0.68, respectively. This indicated a satisfying-reliability.

3.5.8 Principal transformational leadership

Principal transformational leadership has been measured by six items from the aspect of intellectual stimulation (Geijsel et al., 2009). An example item is 'As a precondition for catering to teachers' interests, the headmaster encourages teachers to attempt innovation'. All items are scored on a four-point Likert-type scale: 0=never, 2=sometimes, 3=often, 4=always. The Cronbach's alpha for principal support is 0.91, indicating satisfactory reliability. Table 3.3 provides descriptive statistics for the dependent and independent variables.

Table 3.3

Descriptive statistics for dependent and independent variables

	Number of items	Mean	SD	α	N
Teaching quality					
Change in classroom teaching	10	0.05	0.30		375
Change in classroom management	3	0.09	0.48		375
Teacher characteristics					
Educational level	4				375
Teaching experience	5				375
Efficacy in classroom teaching	7	6.37	1.02	0.88	375
Efficacy in classroom management	4	6.94	1.24	0.88	375
Conception of student knowledge	4	3.50	0.51	0.64	375
Conception of student teamwork learning	5	3.27	0.53	0.59	375
Conception of student ability	4	3.08	0.56	0.67	375
Conception of their own ability	4	3.35	0.54	0.67	375
Autonomous motivation for learning	10	3.91	0.64	0.94	375
External regulation for learning	3	3.48	0.91	0.83	375
Introjected regulation for learning	3	2.94	0.76	0.62	375
Working conditions					
Emotional pressure	4	2.26	0.64	0.81	375
Work pressure	3	3.28	0.59	0.73	375
Colleague support	4	2.80	0.49	0.68	375
Task autonomy	4	2.20	0.56	0.62	375
Principal leadership	6	3.07	0.65	0.91	375

3.6 Analysis

First, paired-samples t-test is carried out for two teaching quality scales separately to test whether the change between time 1 and 2 was significant. Then we have created new variables by calculating a difference in teaching quality between the two moments. These two teaching quality variables are treated as dependent variables

for answering research question 2. They have been labelled as 'change in classroom teaching' and 'change in classroom management'. And then, as data are nested (teachers within the school), multilevel variance components analyses are carried out for each teaching scale. For both scales, we found no significant variance at the school level (with **α = 0.05)**. Therefore, stepwise regression analyses have been performed at the teacher level only to assess the relationship between teacher personal factors (educational level, teaching experience, self-efficacy, conceptions of learning, learning motivation), working conditions (work, and emotional pressure, task autonomy, colleague support), and principal transformational leadership, one the one hand, and change in teaching quality (classroom teaching and classroom management), on the other hand. These regression analyses have been performed for each dependent variables separately although the correlation between change in classroom teaching and change in classroom management was quite high (r= 0.64).

3.7 Results

The results of the paired-samples t-test indicate a significant difference in the scores for classroom teaching at time 1 (Mean= 2.88) and time 2 (Mean= 2.97; t (378)= -3.73, p< 0.001), and for classroom management at time 1 (Mean= 3.36) and time 2 (Mean= 3.41; t (378)= -3.41, p= 0.001). Then the results of the two multiple regression analyses indicate that teachers' educational level and transformational leadership from school principals are negatively related to change in classroom teaching, and emotional pressure and transformational leadership from school principals are negatively related to the change in classroom management. The final models are shown in Table 3.4.

3.7.1 Factors related to change in classroom teaching

For the change in classroom teaching, the result of the regression showed that the model is a significant predictor of teachers' change in classroom teaching (F(2, 372)= 5.89, p= 0.003, R^2= 0.031). Two variables are significant predictors: principal transformational leadership (B= -0.064, SE= 0.02; p= 0.008) and teachers' educational level (B= -0.071, SE= 0.03, p=0.024). This means that the more teachers perceived transformational leadership from their principals and the higher the educational level of the teachers, the less they have changed their classroom teaching

during the program.

3.7.2 Factors related to change in classroom management

For the change in classroom management, the result of the regression indicated that the model is a significant predictor of teachers' change in classroom management ($F(2, 372)= 4.59$, $p= 0.011$, $R^2= 0.024$). Emotional pressure (B= -0.086, SE= 0.04, p= 0.028) and principal transformational leadership (B= -0.088, SE= 0.04, p=0.024) contributed significantly to the model, which means that the more emotional pressure teachers reported and the more transformational leadership the principal demonstrated, the less the improvement in their classroom management during the program.

Table 3.4

The result of multiple regression analyses of the changes in classroom teaching and classroom management

Predictor	Change in classroom teaching			Change in classroom management		
	B	S.E.	Sr^2	B	S.E.	Sr^2
Teacher characteristics						
Educational level	-0.071*	0.03	0.013	-0.059		
Teaching experience	-0.002			-0.038		
Efficacy in teaching	-0.061			-0.020		
Efficacy in management	0.070			-0.002		
Conception of student knowledge	-0.023			-0.044		
Conception of student teamwork learning	-0.062			0.008		
Conception of student ability	0.032			-0.005		
Conception of their own ability	0.035			0.038		
Autonomous motivation for learning	-0.001			0.030		
External regulation for learning	-0.015			0.003		
Introjected regulation for learning	0.037			0.087		
Working conditions						
Emotional pressure	-0.043			-0.086*	0.04	0.012
Work pressure	0.001			-0.059		
Colleague support	0.001			0.051		
Task autonomy	0.042			0.016		
Principal leadership	-0.064**	0.02	0.018	-0.088*	0.04	0.013
R^2	0.031			0.024		

*Note: *p<0.05, **p<0.01.*

3.8 Discussion and conclusion

The present study helps to identify the important teacher characteristics, working conditions, and principal leadership with respect to teachers' change in teaching quality after six months of NBE. The results show that the transformational leadership from school principal and teachers' educational level are negatively related to the change in classroom teaching, and that transformational leadership from school principal and emotional pressure are also negatively related to the change in classroom management.

3.8.1 Emotional pressure and teachers' learning in PD

First, emotional pressure is negatively related to a change in teachers' classroom management, but not to a change in classroom teaching. This finding is in line with previous studies (see.e.g., Lewis, 1999) showing that pressure has a direct negative impact on teachers' ability to deal with classroom discipline (Kaldi, 2009), student misbehaviour (Lewis, Romi, Qui, & Katz, 2005), and students' inattentive behaviour (Ding, Li, Li, & Kulm, 2010). It seems that teachers who feel emotional pressure may not feel mental space to improve their classroom management. Pelletier et al. (2002) have pointed out that the negative influence of pressure on teachers' instruction is crucial. Teachers who are under more pressure are more likely to teach in a routine way, keeping their present method of instruction, thereby avoiding change and possible mistakes.

3.8.2 Teachers' educational level and teachers' learning in PD

We also find that teachers' educational level is negatively related to the change in classroom teaching. One explanation is that teachers with higher educational level are more confident about their teaching and more reluctant to change what they are so used to doing in the classroom. Some studies also indicated that teachers with more confidence and satisfaction in their teaching have less willingness to alter their way of teaching (Supovitz et al., 2010; Zhao et al., 2014). Another possible reason is that teachers with higher educational level might already have a better teaching quality than teachers with lower educational level. Compared to the teachers with lower educational level, it might be harder for them to continuously improve their instruc-

tional quality.

3.8.3 School principal leadership and teachers' learning in PD

We also found that the more teachers perceive leadership from their principal, the less they change their teaching quality. This finding seems to contradict the findings of some research claiming that leadership from principals has a positive influence on teachers' learning (Supovitz et al., 2010; Thoonen et al., 2011). An explanation for this finding, which seems to be contradicting other research findings at first sight, might be that teachers from our study did not experience the items from our transformational leadership scale as supportive. This scale has been developed and used in a Western-European context (Geijsel et al., 2009). The way the items have been formulated might lead to an interpretation of pressure instead of support from the principal. For example, the item "As a precondition for catering to teachers' interests, the headmaster encourages teachers to attempt innovation" might not have been interpreted as 'encouragement', but as 'control', 'urging' or 'pushing' by the principal. Some research which is conducted in the Eastern context also confirms this negative relationship between principal leadership and teachers' learning in PD (Qian & Walker, 2013; Xin & Fred, 2014). Therefore, we suggest to develop a principal transformational leadership scale that is better aligned with the educational and cultural context in which it is used.

3.8.4 Implications for school principals

Based on our findings, we suggest three implications for practice of school principals. First, our results indicate that emotional pressure was negatively related to teachers' learning. Consequently, when school leaders wish to improve the quality of teaching for teachers, it might be recommendable that support of their teachers to cope with the stress is into place first. This support structure can include support of colleagues and school administration as well as teachers' autonomy in the workplace (Harmsen, Helms-Lorenz, Maulana, & van Veen, 2018). This support structure can provide teachers with enough mental space to learn and improve their qualities from PD programs.

Second, we have found a negative relationship between teachers' educational level

and their learning. School principals could provide more challenges to teachers with high educational level to not only make their work more fulfilling, but also stimulate their willingness to acquire new capacities to take up these challenges. These new challenges can be related to innovative pedagogies, providing help for their colleagues, or building an autonomy-supportive working environment.

Finally, our findings suggest that school principals not always seem to have a positive influence on teachers' implementation of new approaches from NBE. Possibly, principals could place teachers in a better position to meet further requirements of PD programmes. In addition, they could offer teachers sufficient scaffolding and autonomy when teachers participate in educational reforms. In this way, school teachers may benefit from the PD program that will help them be more innovative and forward-looking.

3.8.5 Limitations

One limitation we would like to address is that we used only quantitative methodologies to explore the relationship between influential factors and the change in teaching quality. However, as teachers' instruction is a complex behavior and various psychological and organizational factors affect teaching, we advise future studies should use a mix of quantitative and qualitative methodologies (e.g., in-depth face-to-face interviews) to provide a better understanding of the influence of these factors on teaching quality.

3.8.6 Concluding remarks

To conclude, our study has shown the negative influence of school leaders, emotional pressure, and teacher's educational level on the development of teaching quality during the NBE program. In particular, our result indicated that the support from Chinese school principals can be crucial for the improvement of teaching quality when teachers are involved in a PD program that emphasizes new teaching approaches. Principals can directly and indirectly support teachers to benefit from PD program and use their newly acquired knowledge and skills for their teaching practice.