The Relationships among Senior High School Teacher Perceptions on Professional Learning Community, Self-efficacy, School Type, and Gender

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Abstract
Teacher's professional learning community (TPLC) and self-efficacy(SE) are considered to enhance student learning in various dimensions. Teacher perceived PLC and SE might be influenced by school contexts and teachers' demographic factors. This study investigated the relationships between teacher's professional learning community (PLC), self-efficacy (SE), school type, and gender in Taiwan context. The findings are expected to provide valuable information in this field and to enhance understanding of PLC and self-efficacy in different cultural contexts. Descriptive statistics, t-test, product-moment correlation, and multiple regression analysis were applied to analyze the data. The findings indicated that a significant difference was found between public school teachers and private school teachers in two PLC dimensions, core element and human and social resources, and in one SE dimesnion, classroom management. Another significant differences were found between male teachers and female teachers in three SE dimensions, teaching strategy, classroom management, and student involvement. However, no significant differences was found between both in PLC dimesnions. Moreover, perceived PLC and SE were positive correlated. Perceived PLC could predict perceived SE. These results suggested that PLC appears to play a role in teachers' reported levels of SE and provided initial evidence that the variation between schools in PLC may be explained by the SE.
Keywords: Gender, school type, self-efficacy, professional learning community, senior high school teacher

1. Introduction
Teacher's professional learning community (TPLC) is considered a systematic and effective way to improve teacher qualities and student learning in various dimensions (Thompson, Gregg, & Niska, 2004). Establishing a TPLC can contribute to several potential advantages for schools. Among them are the development of collective responsibility of teachers for student learning performance and instructional performance of teachers; the enhancement of personal commitment to their work; the establishment of values, norms and beliefs in the instrumental control mechanism for student achievement; and the establishment of flexible boundaries for greater organizational learning (Kruse & Louis, 1993).

TPLCs are characterized by supportive and shared leadership, shared values and vision, reflective dialogue, collective learning and application, supportive conditions, shared personal practice, and results orientation (DuFour, DuFour, & Eaker, 2008; Hord, 1997; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). These characteristics emerge when a group of teachers collaboratively and critically exchange their instructional practices in an ongoing, reflective, inclusive, learning-oriented, and growth-promoting way to support innovation and knowledge sharing (Mitchell & Sackney, 2000; Stoll & Louis, 2007).

Teacher efficacy research has been divided into two strands. One is the RAND strand has commonly divided teacher efficacy into the dimensions of General and personal teacher efficacy. The general teacher efficacy refers to teachers' beliefs about how teachers in general can influence on student learning whereas personal teacher efficacy is a more individual and specific belief about the efficacy of their own teaching. The second strand of teacher efficacy research, sometimes called the Bandura strand, defines teacher efficacy as a type of self-efficacy (Malinen & Savolainen, 2012). The present study follows Bandura's definition of teacher efficacy as a type of self-efficacy.

Studies conducted in various national contexts have shown that teachers' perceived self-efficacy, defined as teachers' perceptions of their own ability to bring about desired student outcomes, are a critical factor in the improvement of teaching and student learning(Caprara, Barbaranelli, Steca, & Malone, 2006; Geijsel, Sleegers, Stoel, & Krüger, 2009; Takahashi, 2011; Tschannen-Moran & Woolfolk Hoy, 1998). Teachers' perceived self-

efficacy influence the amount of effort teachers put into teaching, their willingness to adopt new teaching strategies, and their ability to persevere in the face of challenges (Bandura, 1997).

Because of the unprecedented K-12 educational reforms recently implemented in Taiwan, PLCs have received considerable attention, especially at secondary school levels. Taiwanese government is encouraging different school levels to build open and collaborative PLCs to promote teacher involvement and to enable continuous improvement in their professional skills. Increasing numbers of teachers are seeking to upgrade their professional competencies by attending PLCs within their own schools. PLCs are believed to enhance teachers' self-efficacy, however, few empirical studies investigated the relationship between PLC and SE.

Teacher self-efficacy are context-specific. Teachers may feel efficacious for teaching certain subjects to certain students in certain settings while perceiving themselves as less efficacious under different circumstances (Malinen & Savolainen, 2012; Tschannen-Moran & Woolfolk Hoy, 2007). An empirical study indicated that one of circumstance factor, school type, affected teachers' perceived self-efficacy (Lin & Chao, 2014). Moreover, perceived self-efficacy might be influenced by teachers' demographic factors (Skaalvik &Skaalvik, 2010; Tschannen-Moran & Woolfolk Hoy, 1998). Similarly, teacher perceived PLC might be influenced by school contexts and teachers' demographic factors. One study indicated a significance was found between female teacher and male teacher in perceived PLC (Lin, 2013). This present study examined the relationship between perceived PLC and perceived self-efficacy, including correlation and prediction in Taiwan context. Moverover, this present study was interested in understanding whether gender and school type affect perceived PLC and SE. The findings are expected to provide valuable information in this field and to enhance understanding of PLC and self-efficacy in different cultural contexts.

2. Methodology

2.1. Participants

Five-hundred twenty senior high school teachers were randomly selected in central Taiwan to take part in this study. To ensure confidentiality, each questionnaire was completed anonymously. With a response rate of 95.96%, 499 teachers returned completed questionnaires, including 329 (65.93 %) female teachers and 170 (34.07%) male teachers. Of whom, 246 (49.30%) were public school teachers and 253 (50.70%) were private school teachers.

2.2. Instruments

2.2.1. Perceived PLC

One research instrument, the Perceived Professional Learning Communities Scale (PLCS) was developed based on the concepts of previous literature (Wu, 2011) to measure teacher- perceived PLC on three dimensions, namely, core elements, human and social resources, and structural conditions. Fourteen items in this PLCS were designed to measure three dimensions. The first dimension, core elements (10 items) measured the teachers in term of reflective dialogue, shared values and vision, shared practice, collective learning and application of learning. The second dimension, human and social resources (4 items) measured physical conditions and human capacities of the school, which encourage and sustain a collegial atmosphere and collective learning. The third dimension, structural conditions (5 items) measured supportive environment of internalized connection between teachers in academic work, such as time to meet and talk, physical proximity, interdependent teaching roles, and communication structures. Teachers were asked to rate the items on a four-point Likert scale anchoring at 1, 2, 3, and 4 (strongly disagree, disagree, agree, strongly agree).

The factor analysis made on data obtained by PLCS in the current application reveals that each item in all subscale dimensions produced factor loadings was.72. The overall internal consistency (Cronbach's α =. 96) for the scale in the current sample was good. The Cronbach's α for the three subscales ranged from .90 to .93, indicating good internal consistencies of the items within each subscale.

2.2.2 Perceived SE

Another one research instrument, the Perceived Self- Efficacy Scale (PSES), was Ohio State Teacher Efficacy Scale (OSTES) developed by Tschannen-Moran and Woolfolk Hoy (2001) and translated by Chen (2009) to measure a teacher-perceived SE on three dimensions, namely, teaching strategy, classroom management, and student involvement. 12 items in this scale were designed to measure three dimensions. The first dimension, teaching strategy (4 items), measured the teacher confidences in what constitutes successful teaching in their schools, what barriers or limitations must be overcome, and what resources are available to achieve success. The second, classroom management (4 items) was in conjunction with teachers' confidences in managing classroom, including dealing with student behavior problems, discipline, and management strategies. The third dimension, student involvement (4 items) was in conjunction with teachers' confidences in assisting student to involve learning including evoking learning motivation and learning confidence, and coordinating with parents to help student learning. Teachers were asked to rate the items on a nine-point Likert scale anchoring at 1~9 (from strongly disagree to strongly agree).

The factor analysis made on data obtained by PSES in the current application reveals that each item in all subscale dimensions produced factor loadings was .69. The overall internal consistency (Cronbach's α =. 93) for the scale in the current sample was good. The Cronbach's α for the three subscales ranged from .87 to .93, indicating good internal consistencies of the items within each subscale.

2.3. Data analysis

The statistical program SPSS 20.0 for windows was used for data analysis. First of all, three composite scores of core elements, human and social resources, and structural condition were computed for each respondent by adding the scores on the19, 10, 4, and 5 items in the perceived PLC scale respectively measuring total PLC, core elements, human and social resources, and structural condition. Similarly, a total perceived SE score as well as three additional composite SE scores were computed by adding the scores on the 12, 4, 4 and 4 items, respectively, measuring total SE, teaching strategy, classroom management, and student involvement. Descriptive statistics and product moment correlation coefficients were then computed for all variables in order to examine relationships among teacher gender, perceived PLC and SE. In addition, a series of t-tests was used to compare teacher gender (male, female) as an independent variable on the categories of perceived PLC and SE as dependent variables. Finally, regression analysis was used to test with teaching strategies, classroom management, and student involvement as dependent variables and core element, human and social resources, structural condition, and gender as independent variables to determine if the teacher perceived PLC predicted perceived SE.

3. Results

All statistical tests used to address the questions in this study used .05 as the minimum alpha level. The following tables present some descriptive statistics about variables as well as highlights from the inter-correlations matrix of the variables and the results of the independent sample t-test, Pearson's product-moment correlation, and multiple regression analysis run in this study.

3.1 difference analyses in school type and gender on teacher-perceived PLC and SE

Table 1 showed difference analysis results, which indicated that significant differences between public school teachers and private school teachers in two PLC dimensions, core element (t=-2.57, p＜.05) and human and social resources (t=-2.57, p＜.05). However, no significant differences was found between male teachers and female teachers in PLC dimesnions.

Table 1 t-tests of gender and school level on dimensions of perceived PLC

Dimension	male(n=170)		female(n=329)			Public (n=246)		private(n=253)		
	M	SD	M	SD	*t*	M	SD	M	SD	*t*
core element	3.22	.55	3.24	.50	-.48	3.17	.50	3.29	.525	-2.57[*]
H & S resources	3.04	.55	2.98	.58	1.09	2.94	.57	3.08	.56	-2.57[*]
S conditions	3.08	.55	3.06	.50	.49	3.06	.50	3.08	.54	-.32

*p＜.05

Table 2 showed difference analysis results, which indicated that significant differences were found between male teachers and female teachers in three SE dimensions, teaching strategy (t=4.32, p＜.001), classroom management (t=2.80, p＜.01), and student involvement (t=3.57, p＜.001). Table 2 also indicated a significant difference was found between public school teachers and private school teachers in one SE dimesnion, classroom management (t=2.29, p＜.05).

Table 2 t-tests of gender and school level on dimensions of perceived SE

Dimension	male(n=170)		female(n=329)			Public (n=246)		private(n=253)		
	M	SD	M	SD	*t*	M	SD	M	SD	*t*
Teaching strategy	7.15	1.00	6.74	1.02	4.32[***]	6.94	1.06	6.79	1.05	1.51
Classroom management	7.27	1.19	6.96	1.16	2.80[**]	7.17	1.16	6.93	1.23	2.29[*]
Student involvement	7.01	1.02	6.65	1.10	3.57[***]	6.79	1.07	6.73	1.14	.62

***p＜.001. **p＜.01. *p＜.05.

3.2 Correlational analysis between perceived PLC and SE

Table 3 showed the correlational analysis results, which indicated that, at overall level, PLC was significantly and positively correlated with SE (r=.28, p＜.001). At the core element level, PLC had a significant positive relationship with teaching strategy (r=.24, p＜.001), with classroom management (r=.21, p＜.001), and with

student involvement (r=.23, p＜.001). At the human and social resources level, PLC had a significant positive relationship with teaching strategy (r=.21, p＜.001), with classroom management (r=.18, p＜.001), and with student involvement (r=.22, p ＜ .001). At the structural condition level, PLC had a significant positive relationship with teaching strategy (r=.24, p＜.001), with classroom management (r=.22, p＜.001), and with student involvement (r=.20, p＜.001).

In summary, positive correlations were found among the three PLC dimensions, (core element, human and social resources, and structural conditions) and among the three SE dimensions (teaching strategy, classroom management, and with student involvement).

Table 3 Pearson's product-moment correlation between perceived PLC and perceived SE (n=499)

PLC SE	Core element	Human and social resources	structural conditions	overall
Teaching strategy	.24***	.21***	.24***	.26***
Classroom management	.21***	.18***	.22***	.23***
Student involvement	.23***	.22***	.20***	.25***
overall	.26***	.23***	.25***	.28***

***$p＜.001$.

3.3 The prediction of perceived SE from perceived PLC

Table 4 showed the results of regression analyses of the prediction of perceived SE from each dimension of perceived PLC. At teaching strategy level, perceived SE was significantly associated with core element dimension (β=.16; p＜.05). The PLC dimensions explained 7% of the variance in perceived SE at this level (R=.26; R²=.07 and F(3,495)=11.87; p＜.001). At classroom management level, the table showed analysis result, which indicated that perceived SE were significantly associated with dimension of structural conditions (β=.14; p＜.05). The PLC dimensions explained 5% of the variance in perceived SE at this level (R=.23; R²=.05 and F(3,495)=9.19; p＜.001). At student involvement level, the table showed analysis result, which indicated that perceived SE were significantly associated with dimension of core element (β=.16; p ＜ .05). The PLC dimensions explained 6% of the variance in perceived SE at this level (R=.25; R²=.06 and F(3,495)=10.82; p ＜.001).

Table 4 Multiple regression analyses of dimensions of perceived PLC predicting SE (N=499)

SE PLC	teaching strategy			Classroom management			Student involvement		
	B	S.E.	*β*	*B*	S.E.	*β*	*B*	S.E.	*β*
constant	5.06***	.31		5.23***	.35		5.00***	.32	
core element	.32*	.14	.16*	.25	.16	.11	.34*	.15	.16*
H & resources	-.01	.13	-.00	.01	.15	.01	.14	.14	.07
S conditions	.26	.14	.13	.32*	.16	.14*	.08	.15	.04

$R=.26$, $R^2=.07$ $R=.23$, $R^2=.05$ $R=.25$, $R^2=.06$
$F(3,495)=11.87$ $F(3,495)=9.19$ $F(3,495)=10.82$
$p=.000$ $p=.000$ $p=.000$

4. Conclusion and Discussion

The literature suggests that teacher perceptions of PLCs, individual characteristics, and school factors may affect perceived SE. To examine these hypotheses, the study analyzed the relationships among perceived PLC, SE, school type, and gender from 499 senior high school teachers in Taiwan. On the basis of the data analyzed, the present results suggested the following aspects of interest. First, a significant difference was found between public school teachers and private school teachers in two PLC dimensions, core element and human and social resources. The finding revealed that private school teachers had higher level perceptions on reflective dialogue, shared values and vision, reflective dialogue, collective learning and application, supportive conditions than public school teachers. In general, private school teachers were asked have more teaching efficacy and collecting learning and applicaction than public school teachers in Taiwan. This might be the reason, that private school teachers perceived higher level in dimensions of core element and human and social resources. However, a significant difference was found between public school teachers and private school teachers in one SE dimesnion, classroom managemen. Public school teachers had higher level perception on classroom management. This might be the reason, that public senior high school students have higher academic achievements and better behavior manners than counterpats.

Second, significant differences were found between male teachers and female teachers in three SE dimensions, teaching strategy, classroom management, and student involvement. The finding revealed male teachers had more confidences in constituting successful teaching, managing classroom, and assisting student to involve learning. However, no significant differences was found between male teachers and female teachers in PLC dimesnions.

Third, perceived PLC and SE were positive correlated. Perceived PLC could predict perceived SE. These results first suggested that PLC appears to play a role in teachers' reported levels of SE and provided initial evidence that the variation between schools in PLC may be explained by the SE. Teacher perceived PLC was higher in the schools where SE was higher. Conversely, where perceived PLC was lower, teachers perceived SE was lower.This finding provided empirical data gained from Taiwan supported SE and PLC mutually influence. Several Studies indicated that continuous professional development of teachers is regarded as crucial in improving the quality of education. Through PLC, teachers will broaden and deepen their professional knowledge and practicum experience; changebeliefs, values, and perspectives; enhance faculty relationships. This might cause the change of SE.

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