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Professional development and teacher efficacy: evidence from the 2013 TALIS

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ABSTRACT
Using the 2013 Teaching and Learning International Survey (TALIS) data, this study explored the relationship between professional development (PD) and teacher efficacy. In particular, the analysis focused on how 4 aspects of PD (format, content, duration, and quality) are statistically related to the overall as well as the 3 subscales of teacher efficacy in classroom management, instruction, and student engagement. This study found PD programs (a) in the formats that promoted job-embedded, inquiry-oriented, and collaborative learning and (b) that offered contents for curriculum, instructional skills, school management, and technology were statistically correlated with the overall as well as the subscales of teacher efficacy in a positive way. As for PD duration and quality, this study found the length of PD and teacher-perceived quality of PD were positively associated with some of the 4 teacher efficacy variables.

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Professional development; teacher efficacy; 2013 TALIS; classroom management; student engagement; instruction

Introduction

Teacher efficacy is significantly related to teachers' instructional activities and student learning outcomes (Caprara, Barbaranelli, Steca, & Malone, 2006; Guo, Connor, Yang, Roehrig, & Morrison, 2012; Klassen & Tze, 2014; Tschannen-Moran & McMaster, 2009). While the existing literature on teacher efficacy has intensively focused on the concept itself and its consequences for teaching and learning (Soodak & Podell, 1996), less is known about effective approaches and strategies that could enhance teachers' efficacy for teaching (Klassen, Tze, Betts, & Gordon, 2011).

Professional development (PD) has been widely used to facilitate teachers' continuous learning and growth (Avalos, 2011; Guskey, 2002). A growing number of empirical studies support that PD could be an effective approach to enhancing teachers' efficacy for teaching (Brinkerhoff, 2006; Doğan & Yurtseven, 2018; Ross & Bruce, 2007; Tschannen-Moran & McMaster, 2009). While previous studies have established a plausible association between PD and teacher efficacy, they are limited in two ways. First, many available studies have conceptualized either PD or teacher efficacy using a singular or synthesized concept, which has limited the empirical understandings of the complicated relationship among

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different facets of PD and subscales of teacher efficacy. Specifically, the evidence is insufficient for how different aspects of PD, as opposed to a singular or synthesized PD concept, might be related to teacher efficacy in different instructional aspects. Second, a large portion of the existing literature evaluated small-scale PD programs in specific contexts. Such small-scale and context-dependent research evidence is neither adequate nor appropriate to inform large-scale PD policy reform and implementation.

Different formats and contents of PD, the duration of participating in each format and content, as well as teachers' perceived quality of PD each could be related to teacher efficacy for teaching, yet different in the extent of such relationship with the specific aspect of teacher efficacy for classroom management, student engagement, and instruction. A recent study by Doğan and Yurtseven (2018) was among the few that investigated how the PD format and duration might be related to teachers' instructional quality. However, their study conceptualized the PD format using three constructed variables as traditional, reform-based, and informal, which is still too general to inform the practice as to which specific type of PD and content helps develop teachers with various needs most effectively. To date, few studies have delved into such details.

To strengthen this line of research, we investigated one overarching research question: How might the nuanced PD features be statistically associated with the overall as well as the three subscales of teacher efficacy? It is worth noting that this is an exploratory study. Instead of testing specific hypotheses, we conducted a set of statistical analyses to explore the possibly significant correlations between the nuanced features of PD and the overall and the three subscales of teacher efficacy. Therefore, the research findings should not be used directly for policymaking. However, we argue, such exploration can deepen our understandings of the relationship between PD and teacher efficacy. Also, the research findings can serve as a reference for PD providers to design teacher learning and development programs to improve the targeted subscales of teacher efficacy.

Literature review

The present study is situated in three overlapping bodies of literature. The studies on the concept of teacher efficacy helped ground the Teaching and Learning International Survey's (TALIS) measures of this concept on relevant theories. The studies regarding the impact of PD on teacher efficacy sharpened our research focus. The studies on additional factors that can influence teacher efficacy helped generate a list of variables that we controlled in our models when examining the association between PD and teacher efficacy.

Teacher efficacy

Teacher efficacy refers to "the extent to which the teacher believes he or she has the capacity to affect student performance" (Berman, Wallin McLaughlin, Bass-Golod, Pauly, & Zellman, 1977, p. 137). On the basis of the early definition (Berman et al., 1977), many subsequent studies have further explored the concepts and constructs of teacher efficacy (Klassen et al., 2011; Tschannen-Moran & Hoy, 2001). For instance, influenced by

the social cognitive theory (Bandura, 1977), Dembo and Gibson (1985) conceptualized teacher efficacy as a concept with two dimensions: personal teaching efficacy, and general teaching efficacy. Other researchers (e.g., Goddard, Hoy, & Hoy, 2004) distinguished efficacy held by individual teachers and by a group of teachers, and name them as self-efficacy and collective efficacy, respectively. Still others (e.g., Guskey & Passaro, 1994) constructed teacher efficacy as beliefs either self-controlled or influenced by external factors.

The constructs mentioned above have contributed to the conceptual development of teacher efficacy. However, they do not focus on teacher efficacy about core teaching practices that are pivotal to student learning. The study of Tschannen-Moran and Hoy (2001) was an attempt to address this limitation. Drawing on the factor analysis of 224 teachers' responses to a questionnaire on teacher efficacy, Tschannen-Moran and Hoy proposed that teacher efficacy revolved around three core teaching practices, namely, classroom management, instruction, and student engagement.

Relevant learning theories support Tschannen-Moran and Hoy's (2001) construct. Learning is a complex process which entails students' behavioral participation, cognitive development, and affective engagement (Fredricks, Blumenfeld, & Paris, 2004). First, effective classroom management not only can help establish an orderly and supportive environment for students to behave appropriately in classroom activities, but also can serve as a foundation for eliciting students' cognitive and affective engagement (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). Teachers' instructional strategies, which need to be designed around learning contents, are mainly targeted at advancing students' cognitive development. Well-designed instructional strategies can attract students to participate in learning activities attentively and in the long term nurture students' positive attitudes towards learning (Christensen & Menzel, 1998). Teachers also need to use a variety of approaches to help students form an active, positive, and developmental attitude towards learning. Teachers' efforts at enhancing students' affective engagement can have a positive impact on students' behavioral and cognitive engagement as well (Skinner & Belmont, 1993).

Due to the focus on the core teaching practices that are pivotal for supporting student learning, Taschannen-Moran and Hoy's (2001) construct of teacher efficacy has been used in many and various contexts, such as the United States (Ryan, Kuusinen, & Bedoya-Skoog, 2015), Canada (Ross & Bruce, 2007), Turkey (Bümen, 2009), and Iran (Karimi, 2011).

Professional development and teacher efficacy

Mounting evidence supports that PD programs can exert positive impacts on teachers, including strengthening teachers' professional knowledge, enhancing their teaching capacities, and nurturing desired professional dispositions in them (Avalos, 2011). Teacher efficacy, defined as a set of beliefs about to what extent they can influence student learning, is an important component of teachers' professional capacities and dispositions. A growing number of empirical studies has indicated an association between PD programs and teacher efficacy. In particular, the existing literature has revealed that four aspects of PD programs, namely, the format, content, duration, and quality, might be related to teacher efficacy. Below, we draw on relevant studies to illustrate such associations.

PD format and teacher efficacy

First, PD programs in the format that is inquiry oriented, connected to practice, and catalytic to collaboration among participants are prone to enhance teachers' efficacy for teaching (Cantrell & Hughes, 2008; Powell-Moman & Brown-Schild, 2011; Vavasseur & Kim MacGregor, 2008). For instance, Mintzes, Marcum, Messerschmidt-Yates, and Mark (2013) studied how a 3-year PD program influenced 116 US teachers' efficacy beliefs. Their findings suggested that the format of a professional learning community which comprised demonstration of exemplary examples, lesson study, and workshops had enhanced teachers' efficacy for teaching. Similarly, Karimi (2011) examined the association between PD's format and teacher efficacy in Iran, and he found that five formats of PD, namely, in-service training, fellow observation/assessment, development/improvement process, mentoring, and study groups, had enhanced the participating teachers' efficacy beliefs. Studies conducted in several other national contexts, such as Turkey (Bümen, 2009) and Singapore (Chong & Kong, 2012) reached similar conclusions. However, what the existing literature has not yet answered sufficiently is: statistically speaking, to what extent different formats of PD programs are associated with teachers' efficacy beliefs for specific subscales of teacher efficacy, such as classroom management, instruction, and student engagement.

PD content and teacher efficacy

Content is another aspect that could alter PD's impact on participating teachers' efficacy. Ross and Bruce (2007) found that redefining classroom success in PD had contributed significantly to the participating teachers' efficacy beliefs for classroom management in their investigation of 106 Canadian teachers' experiences. Similarly, Bümen (2009) found that a PD program focused on the topics of instructional grouping and project-based learning had significantly enhanced 38 Turkish teachers' efficacy beliefs for teaching. In another study conducted in the United States, Overbaugh and Lu (2008) analyzed the impact of a PD focusing on technology use in instruction. On the basis of the data collected from 377 teachers, they found that the technology-related content offered by the PD program had enhanced the participating teachers' efficacy beliefs for using technologies in their future practices. The previous studies have helped us understand the association between some PD contents (e.g., technology use, classroom management) and teacher efficacy. However, some other increasingly emphasized contents in PD programs, such as teaching in multicultural or multilingual setting, how to teach students cross-curricular skills, and their association with teacher efficacy, have barely been examined.

PD duration and teacher efficacy

As compared to the studies on PD format and content, there seem to be fewer studies on the relationship between PD duration and teacher efficacy. Furthermore, the available studies have produced mixed findings. Some studies found that the length of PD programs was positively associated with teacher efficacy (e.g., Martin, McCaughtry, Hodges-Kulinna, & Cothran, 2008; Watson, 2006). For instance, Watson (2006) found that adding a 1-year online course to a 5-day face-to-face PD program had helped the participating teachers maintain a high level of efficacy beliefs in the long run. However, such positive correlation could be weakened when a more nuanced measure of teacher efficacy was

used. For instance, Lakshmanan, Heath, Perlmutter, and Elder (2011) found that a 3-year PD program had significantly improved the participating teachers' efficacy beliefs for enacting the instructional strategies taught in the PD program, but the program had barely changed the participating teachers' efficacy beliefs about whether their enactment of the instructional strategies could improve student learning. The unclear association between PD duration and teacher efficacy calls for more studies on this topic.

PD quality and teacher efficacy

The fourth aspect of PD is its quality. In theory, the higher the quality of a PD program is, the more significant impact it would have on teacher efficacy. But to date, only a few studies have investigated this assumed correlation with empirical evidence, perhaps due to the contentious debates on what "quality" means and how to measure it (e.g., Overbaugh & Lu, 2008; Tran, 2014). The study of Tran (2014) is one of those few attempts. She used teacher perception as an indicator of PD quality and found a positive correlation between the perceived quality of a PD program focusing on content and pedagogy and the participant teachers' efficacy for teaching. More empirical studies are needed to extend our understandings of the relationship between PD quality and teacher efficacy.

In sum, the existing literature has successfully identified four critical aspects of PD (i.e., format, content, duration, and quality) that are consequential to teacher efficacy. However, the previous studies only focused on limited dimensions of the complex relationship between PD and teacher efficacy, and most conclusions were drawn from one single PD program or aspect situated in a specific context. There does not exist a study that uses large-scale, cross-national datasets to explore the nuanced relationships between PD and teacher efficacy.

Other factors that are related to teacher efficacy

In addition to PD, a range of other factors at the individual, school, and society levels could also influence teacher efficacy. For instance, Gabriele and Joram (2007) explored the antecedent of teacher efficacy. They concluded that teachers' years of teaching experiences was an important predictor of teacher efficacy. Adams and Forsyth (2006) found that a set of school conditions, such as supportive school structure and organizational capacity, was positively, yet, the proportion of low-socioeconomic-status (SES) students was negatively associated with teachers' efficacy for teaching. Cheung (2008) studied the antecedent of teacher efficacy in China. She found that because of the traditional Confucian beliefs about teaching, Chinese teachers were still highly respected, which contributed to Chinese teachers' development of their efficacy beliefs for teaching. In short, teacher efficacy can be influenced by a variety of demographic, institutional, and cultural factors. Therefore, we controlled these already identified and potentially influential factors in our analysis as much as we could, hoping to sort out the association between PD and teacher efficacy.

Research questions and conceptual framework

The review of the literature has sharpened our focus to be on one overarching research question: Whether and to what extent is PD statistically correlated with teacher

efficacy? In particular, this study is aimed to examine how PD format, content, duration, and quality are statistically correlated with overall teacher efficacy as well as the three subscales of it (i.e., classroom management, instruction, student engagement). On the basis of the literature review reported above, we have established a conceptual framework to navigate our inquiries (Figure 1). The framework guides the investigation of the relationship among different formats, contents, duration, and perceived quality of PD and teacher efficacy by controlling national, school, and teacher variations using a large-scale, cross-national dataset.

Data and methods

Data source

In this study, we used the data from the 2013 TALIS administered by the Organisation for Economic Co-operation and Development (OECD). The focuses of 2013 TALIS included the learning environment, the working conditions, and practices of both administration and teachers in schools (OECD, 2014, p. 7). The 2013 TALIS study managed two questionnaires respectively for the principal and teachers at the same school and administered both surveys within 34 countries and regions for the "core" study at the lower secondary level. We used the public data from 32 countries (Appendix 1). Both the principal survey and the teacher survey were used.

In the technical report of 2013 TALIS, OECD articulated that the TALIS study adopted a two-stage stratified cluster sampling method. The technique first randomly selected 200 schools using probability-proportion-to-size method (the complete school list provided by the participating countries), and then randomly selected 20 teachers within each participating school (OECD, 2014). Thresholds were set at 5% to exclude special education schools during the selection stage and 75% for the satisfactory response rate. The final data included in this research are 104,358 teachers nested in 6,455 schools, and in 32 countries (see Appendix 1 for details).

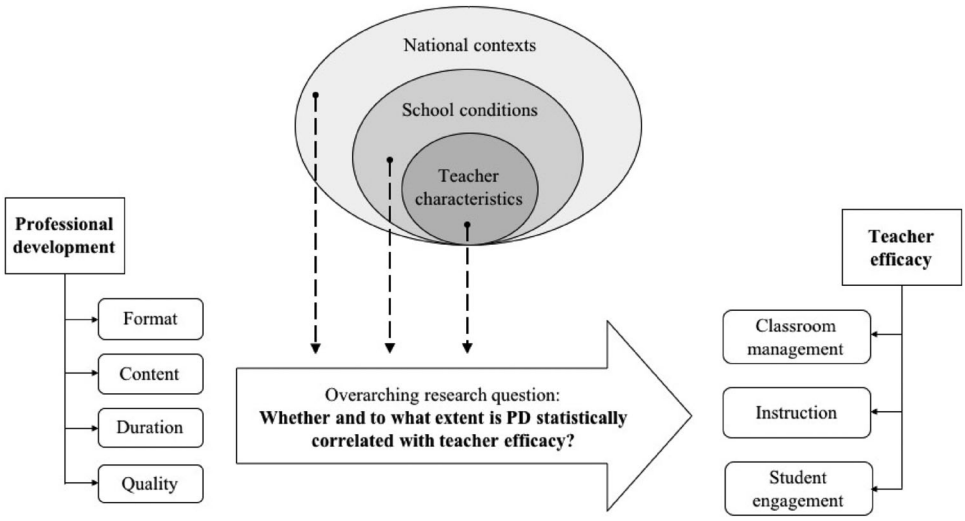

Figure 1. Conceptual framework.

Constructing dependent variables using two-order latent trait method

The construct of teacher efficacy is a two-order latent trait model that first fit the three subscales of teacher efficacy (i.e., classroom management, instruction, and student engagement) at the first order, and then linked the second-order overall teacher efficacy on the three subscales in the same model (De La Torre & Douglas, 2004; B. Muthén, 1984; L. K. Muthén & Muthén, 1998–2010). Latent trait analysis (LTA) is a form of factor analysis for binary (dichotomous) or ordered-category data (Langeheine & Rost, 2013). LTA tends to be used over confirmative factor analysis if the data set is large and the observed variables are categorical variables, which is the case for this study (Meade & Lautenschlager, 2004; B. Muthén, 1984). Mplus 7 software was used for the latent variable construction. Since observed variables have an ordinal 4-point Likert scale, it is recommended to specify variables as "Categorical" in Mplus 7 dealing with ordinal variables, so the weighted least squares means and variance adjusted (WLSMV) approach was adopted to fit the model when generating latent variables. It has been proved (e.g., Beauducel & Herzberg, 2006; Li, 2014) that the magnitude of the loadings can be more precisely estimated using WLSMV than maximized likelihood robust (MLR) when the variables are categorical.

Figure 2 illustrates specifically what variables from the 2013 TALIS teacher survey were used for the latent variable construct. The Cronbach alpha for the three sets of variables is above or close to 0.80 with pooled data, which meets the expectation for the rule of internal consistency that Cronbach alpha needs to be above 0.7 (Tavakol & Dennick, 2011). The two-order model fit indicators are good with comparative fit index (CFI) at 0.978 (> 0.95), Tucker Lewis index (TLI) at 0.971 (> 0.95), and root mean square error of approximation (RMSEA) at 0.021 (< 0.08). These parameters indicate a satisfactory model fit based on the rule of thumb (Hu & Bentler, 1999).

The two-order model measures teacher efficacy for classroom management, instruction, and student engagement respectively at the first order using the survey items listed at the bottom in Figure 2; then, the overall teacher efficacy latent variable is measured using the three latent variables constructed at the first order.

The model was estimated with four latent variables simultaneously, so it is more accurate and advanced than the sequential approach that would construct the three subscales of teacher self-efficacy separately, then using the three latent variables to construct the overall teacher efficacy (De La Torre & Douglas, 2004; B. Muthén, 1984; L. K. Muthén & Muthén, 1998–2010). Teachers' efficacy beliefs for classroom management is composed of four items, asking to what extent teachers can do the following: "control disruptive

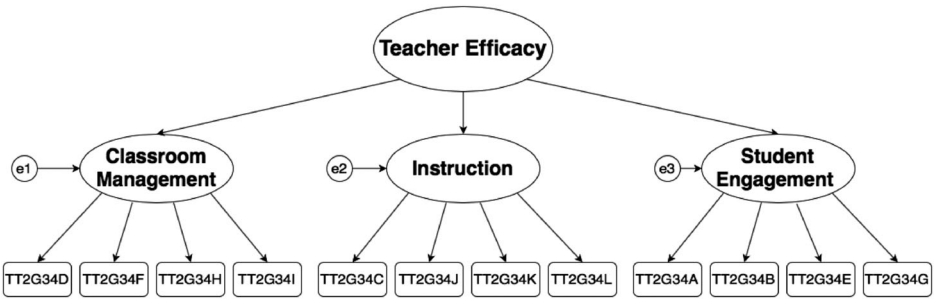

Figure 2. Two-order latent trait construct of teacher efficacy.

behavior in the classroom," "make expectations about student behavior clear," "get students to follow classroom rules," and "calm a student who is disruptive or noisy." The latent variable of teachers' efficacy beliefs for instruction is constructed by four questions asking to what extent teachers can do the following: "craft good questions for the students," "use a variety of assessment strategies," "provide an alternative explanation for example when students are confused," and "implement alternative instructional strategies in the classroom." The third subscale is teachers' efficacy beliefs for student engagement, which is constructed by items asking to what extent teachers can "get students to believe they can do well in school work," "help students value learning," "motivate students who show low interest in school work," and "help students think critically." All items are measured on a 4-point Likert response with 1 for *not at all*, 2 for *to some extent*, 3 for *quite a bit*, and 4 for *a lot*.

Independent variables

Independent variables include four aspects of PD. In the teacher survey, there were questions asking whether teachers participated in any format of PD during the last 12 months, and about the content of the PD offered, the length of the participation in certain types of PD, and the teacher-perceived quality of the PD. The format of PD has been categorized as induction, job-embedded PD (e.g., mentoring), inquiry (e.g., doing research), fellow observation, and courses (e.g., seminar). For PD content, there was a set of questions asking about the topics and the contents covered in the PDs that the teachers participated in during the last 12 months. PD duration asked teachers how many days they spent for each format of PD. The perceived quality of PD asked about teachers' perception of the quality of the particular PD content.

Control variables

In addition to the variables of primary interest, we also included variables regarding teacher demographic backgrounds and school characteristics as control variables. Teacher characteristics include teachers' gender (1 for female and 0 for male), age, experience (years of experience in teaching), education (highest level of formal education), tenure (tenured as 1, untenured as 0), and employment status (1 for full-time with 90% or more of full-time hours, and part-time as 0). School characteristics include size (number of students enrolled), type (public coded as 1 and private coded as 0), the proportion of students that are minority students, from low socioeconomic families, and with special needs using five categories (1 for none, 2 for 1% to 10%, 3 for 11% to 30%, 4 for 31% to 60%, and 5 for more than 60%).

The aforementioned control variables have frequently been used due to their potential impact on schoolteachers' effectiveness (Goe, 2007; Kelly, 2012; Strong, 2011). The descriptive statistics for all the variables are presented in Appendix 2.

Data analysis

As mentioned above, the dataset we analyzed has three layers: Teachers (Level 1) are nested in schools (Level 2), and schools are nested in each country (Level 3). If using

ordinary least squares linear regression, the standard error for analyzing such a nested dataset is usually underestimated (Garson, 2013; Raudenbush & Bryk, 2002). In order to test whether a multilevel model is needed, we fitted an unconditional model and calculated intra-class correlation (ICC) to find how much variation was associated with school and country clusters. The design effect coefficient (deff = 1 + (average cluster size) −1 * ICC) (B. O. Muthén & Satorra, 1995) was also estimated to determine if a multilevel model was necessary (Peugh, 2010). The rule of design effect coefficient larger than 2 was applied to decide whether the variance was large enough at a higher level (Snijders & Bosker, 1999), so a multilevel model was needed (Maas & Hox, 2004).

In addition, the selection of the three-level model is also verified by the conceptual framework given that teacher efficacy is most likely endogenous to each school's and individual country's social context. Specifically, teacher efficacy could be correlated with particular cultural, social, and political aspects that are unique to each school and each country (Den Hartog, House, Hanges, Ruiz-Quintanilla, & Dorfman, 1999). For school level, we included control variables that have been often used for educational research including the school location, size, and student background. While for the country variation, since 2013 TALIS does not have any country-level variables, this study used a three-level model and included country-level random effect to account for country variation as random.

Moreover, because 2013 TALIS used a stratified sampling approach, weight is imperative to account for the unequal selection probability and response rate (Asparouhov, 2005). This study applied the teacher-level weight that is the final weight after adjusting teacher base weight, response rate, and school-level weight (OECD, 2014).

The four constructed teacher efficacy variables carry conceptual variations in its emphasis. We are interested in how the four aspects of PD are associated with teachers' overall efficacy beliefs for teaching, and also their efficacy beliefs respectively for managing classrooms, delivering instruction, and engaging students. Due to high correlational coefficients among the three subscales of teacher efficacy and the overall teacher efficacy, we fitted the model respectively with each efficacy variable as the dependent variable along with control variables added at responding levels. The independent variables included the format and content of PD in one model. We then fitted the duration and quality of PD separately because duration and quality of PD variables have a large portion of missing data.

There are two main methods of dealing with missing data. The first method is multiple imputation (MI), which simulates multiple sets of data. The process usually introduces random variation and generates several data sets, each with slightly different imputed values. The second method is to analyze the data as is with the missing value using maximum likelihood estimation. This method uses available data to compute the parameter that is most likely to have resulted in the observed data (Little & Rubin, 2014). This research used maximum likelihood estimation to handle the missing data.

Specifically, the teacher-level model for the study is as follows: where $(TE)_{ijk}$ is the score on each teacher efficacy for teacher *i* in school *j* in country *k*, π_{0jk} is the average score of teacher efficacy in school j within country *k*,, e_{ijk} is the teacher-level random effect, and σ^2 is the variability at the teacher level.

Level 1 model

$$TE_{ijk} = \pi_{0jk} + \pi_{1jk}\, PD + \pi_{2jk}\, Female + \pi_{3jk} Age + \pi_{4jk} Fulltime + \pi_{5jk}(Experience) + \pi_{6jk}(Tenured) + \pi_{7jk}\, Education + e_{ijk} e_{ijk} \sim N(0, \sigma^2) \quad (1)$$

Within the first-level model, π_{1jk} is the coefficient of the primary interest of PD in four different aspects (i.e., format, content, duration, and quality); π_{2jk} to π_{7jk} are the coefficients (effects) of the teacher backgrounds on teacher efficacy. We fitted three sets of models, respectively. The first model included the format and the content variables as the independent variable. The second model included the duration variables, and the third model had the quality variables. Ideally, we could include all four elements of PD in one model. However, since there are disproportional missing data for the duration and quality variables, it is not rational to decrease the power of analysis by including the quality and duration along with the content and the format.

Level 2 model

The responding school-level model for the study is as follows: Where β_{00k} is the school mean of teacher efficacy within country k, r_{0jk} is the school-level random effect, and τ_{00} is the variability between schools within each country.

$$\pi_{0jk} = \beta_{00k} + \beta_{01k} Public + \beta_{02k} Size + \beta_{03k}(Minority) + \beta_{04k}(SpecialEdu) + \beta_{05k}(LowSES) + r_{0jk} 0jk \sim N(0, \tau_{00}) \quad (2)$$

where $\beta_{01k} - \beta_{05k}$ are the coefficients of controlled school characteristics on teacher efficacy.

Level 3 model

$$\beta_{00k} = \gamma_{000} + u_{00k}$$
$$u_{00k} \sim N(0, \varphi_{000}) \quad (3)$$

Where γ_{000} is the grand mean (or intercept) of teacher efficacy, u_{00k} is the country-level random effect, and φ_{000} is the variation at the country level.

Results

Table 1 includes the result of unconditional models, which indicates that there is 26% of variation in overall teacher efficacy that is related to the cross-country difference. For the subscales of teacher efficacy, 17%, 26%, and 29% of the variation in teacher efficacy for classroom management, instruction, and student engagement are related to the country-level variation, respectively. About 6% to 8% of the variation in outcomes is related to the school-level difference. The result indicates that a multilevel model is essential to fit the data because the ICC and design effect coefficient are relatively large for both school and country levels.

Table 2 has the statistics for the model with PD format and content as independent variables. This model has about 5% to 8% of the variance explained by the added predictors at the teacher level compared to the baseline model, and about 2% to 3% of variance is explained by the variables added at the school level. The comparison of models by

Table 1. Unconditional model results.

	Classroom management Variance	Instruction Variance	Student engagement Variance	Overall teacher efficacy Variance
σ^2	3.087	2.906	2.835	2.470
τ_{00}	0.338	0.292	0.324	0.281
φ_{000}	0.723	1.327	1.109	0.948
ICC				
School	0.082	0.065	0.076	0.076
Country	0.174	0.293	0.260	0.256
deff (school)	3.543	5.282	4.794	4.742
deff (country)	258.106	204.309	240.174	240.340
Deviance	285,228.428	278,811.800	280,821.955	269,128.771
parameters	4	4	4	4
N (schools)	6,453	6,453	6,453	6,453
N (teachers)	100,850	100,850	100,850	100,850

deviance indicates that conditional models are better than the unconditional model with a *p* value smaller than 0.001.

PD format and teacher efficacy

Though we fit the first model with PD format and PD content, we report the result separately in order to highlight the nuanced relationships between PD format/content and teacher efficacy. This section has the results regarding how the PD format is associated with teacher efficacy. Table 3 has the results for the relationship between PD format and teacher efficacy.

School induction

Formal induction program is positively associated with teachers' efficacy for classroom management ($\beta = 0.093$, $p < 0.01$), instruction ($\beta = 0.093$, $p < 0.001$), student engagement ($\beta = 0.099$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.095$, $p < 0.001$). The induction for school administrative affairs has a significantly positive correlation with teachers' efficacy for classroom management ($\beta = 0.070$, $p < 0.01$), instruction ($\beta = 0.084$, $p < 0.01$),

Table 2. Professional development format and content model index.

	Classroom management	Instruction	Student engagement	Overall teacher efficacy
σ^2	2.944	2.724	2.620	2.283
τ_{00}	0.328	0.283	0.317	0.274
φ_{000}	0.701	1.252	1.060	0.907
Variance explained by added predictors				
Teacher	0.046	0.063	0.076	0.076
School	0.031	0.031	0.022	0.025
Model comparison with baseline model				
Deviance	282,627.269	275,552.195	275,46.025	265,695.292
parameters	30	30	30	30
Chi-square	2,601.159	3,259.605	3,275.930	3,433.479
p value	<0.001	<0.001	<0.001	<0.001
Model sample size				
N (schools)	5,857	5,857	5,857	5,857
N (teachers)	82,543	82,543	82,543	82,543

Note: The model was run respectively with one of the teacher efficacy variables along with the control variables including teacher gender, age, experience, education, tenured, school location, size, public schools, schools' proportion of special-need, low-income, and minority students.

Table 3. Professional development format and teacher efficacy results.

PD Format	Classroom management	Instruction	Student engagement	Overall teacher efficacy
Induction				
Formal induction	0.093**	0.093***	0.099***	0.095***
	(0.029)	(0.023)	(0.025)	(0.024)
Induction for admin	0.070**	0.084**	0.037*	0.064***
	(0.016)	(0.028)	(0.019)	(0.010)
Informal induction	−0.032	0.009	0.066	0.014
	(0.017)	(0.017)	(0.050)	(0.019)
Job-embedded PD				
Mentoring	0.405***	0.359***	0.358***	0.374***
	(0.065)	(0.044)	(0.067)	(0.055)
Peer coaching	0.099***	0.111**	0.052***	0.087***
	(0.019)	(0.035)	(0.015)	(0.015)
Professional learning community	0.065**	0.038	0.067*	0.056*
	(0.021)	(0.055)	(0.042)	(0.039)
Inquiry				
Degree	−0.013	0.172**	0.124*	0.095*
	(0.022)	(0.064)	(0.054)	(0.037)
Research	−0.014	0.156***	0.148***	0.097*
	(0.076)	(0.044)	(0.029)	(0.049)
Fellow observation				
School visit	0.079	0.019	0.068**	0.055*
	(0.042)	(0.022)	(0.023)	(0.027)
Institution visit	0.010	0.072	0.080	0.054
	(0.030)	(0.029)	(0.042)	(0.028)
Courses				
Workshop	−0.034	0.023	0.038	0.009
	(0.031)	(0.029)	(0.076)	(0.035)
Seminar	−0.014	0.036	0.050	0.024
	(0.035)	(0.041)	(0.026)	(0.034)
In-service training courses	0.124	0.107	0.141	0.124
	(0.084)	(0.091)	(0.096)	(0.090)

Note: The model was run respectively with one of the teacher efficacy variables along with the control variables including teacher gender, age, experience, education, tenured, school location, size, public schools, schools' proportion of special-need, low-income, and minority students. Standard error in parentheses.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

student engagement ($\beta = 0.037$, $p < 0.05$), and the overall efficacy for teaching ($\beta = 0.064$, $p < 0.001$).

Job-embedded PD

The participation in mentoring has been found to have the largest correlational coefficient with teachers' efficacy for classroom management ($\beta = 0.405$, $p < 0.001$), instruction ($\beta = 0.359$, $p < 0.001$), student engagement ($\beta = 0.358$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.374$, $p < 0.001$). Peer coaching is also significantly correlated with teachers' efficacy for classroom management ($\beta = 0.099$, $p < 0.001$), instruction ($\beta = 0.111$, $p < 0.01$), student engagement ($\beta = 0.052$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.087$, $p < 0.001$). Professional learning community (PLC) has been found to be positively correlated with teachers' efficacy for classroom management ($\beta = 0.065$, $p < 0.01$), student engagement ($\beta = 0.067$, $p < 0.05$), and the overall efficacy for teaching ($\beta = 0.056$, $p < 0.05$).

Inquiry

Attending a degree program is positively associated with teachers' efficacy for instruction ($\beta = 0.172$, $p < 0.01$), student engagement ($\beta = 0.124$, $p < 0.05$), and the overall efficacy for

teaching ($\beta = 0.095$, $p < 0.05$). The research inquiry is also positively associated with teachers' efficacy for instruction ($\beta = 0.156$, $p < 0.001$), student engagement ($\beta = 0.148$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.097$, $p < 0.05$).

Fellow observation

School visit has a positive relationship with teachers' efficacy for student engagement ($\beta = 0.068$, $p < 0.01$) and the overall efficacy of teaching ($\beta = 0.055$, $p < 0.05$).

Courses

Attending the PD courses such as workshops, seminars, and in-service training courses has not been found to have a positive correlation with teacher efficacy.

PD content and teacher efficacy

Table 4 includes the results regarding how PD content is associated with the overall and the three subscales of teacher efficacy.

Content knowledge

Specifically, teachers' participation in PD on subject knowledge is positively associated with their efficacy for classroom management ($\beta = 0.086$, $p < 0.05$), student engagement ($\beta = 0.104$, $p < 0.001$), and the overall efficacy of teaching ($\beta = 0.084$, $p < 0.01$). The PD on curriculum is also helpful for teachers' efficacy for classroom management ($\beta = 0.110$, $p < 0.001$), instruction ($\beta = 0.071$, $p < 0.05$), student engagement ($\beta = 0.074$, $p < 0.05$), and the overall efficacy of teaching ($\beta = 0.085$, $p < 0.001$). However, we did not find a positive association between learning for evaluation and teacher efficacy.

Instructional skills and student support

PD on individualized learning is positively associated with teachers' efficacy for classroom management ($\beta = 0.133$, $p < 0.001$), instruction ($\beta = 0.179$, $p < 0.001$), student engagement ($\beta = 0.137$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.150$, $p < 0.001$). PD on teaching cross-curricular skills is positively associated with teachers' efficacy for classroom management ($\beta = 0.099$, $p < 0.05$), instruction ($\beta = 0.123$, $p < 0.001$), student engagement ($\beta = 0.135$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.119$, $p < 0.001$). PD on student career guidance and counseling is also positively associated with teachers' efficacy for classroom management ($\beta = 0.086$, $p < 0.001$), instruction ($\beta = 0.111$, $p < 0.001$), student engagement ($\beta = 0.176$, $p < 0.01$), and the overall efficacy of teaching ($\beta = 0.124$, $p < 0.001$). PD on teaching in a multicultural or multilingual setting is positively associated with teachers' efficacy for instruction ($\beta = 0.110$, $p < 0.001$), student engagement ($\beta = 0.145$, $p < 0.05$), and the overall efficacy for teaching ($\beta = 0.094$, $p < 0.05$). PD on pedagogical competencies has been found to be positively associated with teachers' efficacy for instruction only ($\beta = 0.048$, $p < 0.01$).

Management skills

Learning of content on school administration is positively associated with teachers' efficacy for classroom management ($\beta = 0.167$, $p < 0.01$), instruction ($\beta = 0.094$, $p < 0.05$),

Table 4. Professional development content and teacher efficacy results.

PD Content	Classroom management	Instruction	Student engagement	Overall teacher efficacy
Content knowledge				
Subject content	0.086*	0.061	0.104***	0.084**
	(0.037)	(0.039)	(0.020)	(0.031)
Curriculum	0.110***	0.071*	0.074*	0.085***
	(0.018)	(0.031)	(0.030)	(0.017)
Student evaluation	0.035	0.047	−0.014	0.023
	(0.049)	(0.020)	(0.057)	(0.041)
Instructional skills and student support				
Individualized learning	0.133***	0.179***	0.137***	0.150***
	(0.026)	(0.033)	(0.023)	(0.026)
Cross-curricular skills	0.099*	0.123***	0.135***	0.119***
	(0.041)	(0.022)	(0.041)	(0.029)
Student career guidance and counseling	0.086***	0.111***	0.176**	0.124***
	(0.019)	(0.032)	(0.067)	(0.033)
Teaching in a multicultural or multilingual setting	0.027	0.110***	0.145*	0.094*
	(0.044)	(0.027)	(0.068)	(0.044)
Pedagogical competencies	−0.099	0.048**	0.032	−0.007
	(0.045)	(0.016)	(0.021)	(0.022)
Teaching students with special needs	0.073	0.007	0.027	0.036
	(0.042)	(0.023)	(0.031)	(0.023)
Management				
School administration	0.167**	0.094*	0.132*	0.131**
	(0.055)	(0.040)	(0.059)	(0.050)
Student behavior	−0.025	−0.128	−0.076	−0.077
	(0.033)	(0.083)	(0.070)	(0.060)
Technology and skills				
New technologies	0.120***	0.084***	0.111***	0.105***
	(0.024)	(0.016)	(0.026)	(0.017)
Developing cross-occupational competencies	0.062	0.167***	0.175***	0.135***
	(0.062)	(0.018)	(0.011)	(0.027)
Information and communication technology	0.018	0.054	−0.038	0.011
	(0.044)	(0.042)	(0.020)	(0.032)

Note: The model was run respectively with one of the teacher efficacy variables along with the control variables including teacher gender, age, experience, education, tenured, school location, size, public schools, schools' proportion of special-need, low-income, and minority students. Standard error in parentheses.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

student engagement ($\beta = 0.132$, $p < 0.05$), and the overall efficacy for teaching ($\beta = 0.131$, $p < 0.01$).

Technology and skills

There is a positive association between PD on new technologies and teachers' efficacy for classroom management ($\beta = 0.120$, $p < 0.001$), instruction ($\beta = 0.084$, $p < 0.001$), student engagement ($\beta = 0.111$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.105$, $p < 0.001$). A positive association has also been found between PD on cross-occupational competencies and teachers' efficacy for instruction ($\beta = 0.167$, $p < 0.001$), student engagement ($\beta = 0.175$, $p < 0.001$), and the overall efficacy for teaching ($\beta = 0.135$, $p < 0.001$).

PD duration/quality and teacher efficacy

The 2013 TALIS study only collected data for how many days teachers participated in certain PD programs such as workshops, seminars, school visits, institutional visits, and

in-service training courses. The available data indicated that the more school visits and in-service training teachers attended, the higher efficacy they would have for instruction and student engagement. However, the effect size was as small as 0.003.

For the model regarding the relationship between teacher-perceived PD quality and teacher self-efficacy, the results indicate that the teacher-perceived quality of PD on pedagogical competencies is positively associated with teachers' efficacy for student engagement ($\beta = 0.124$, $p < 0.001$). The quality of PD on cross-occupational competencies is positively associated with teachers' efficacy for instruction ($\beta = 0.294$, $p < 0.01$), student engagement ($\beta = 0.392$, $p < 0.01$), and the overall efficacy for teaching ($\beta = 0.296$, $p < 0.01$). The teacher-perceived quality of PD on new technologies is positively associated with teachers' efficacy for classroom management ($\beta = 0.337$, $p < 0.01$), instruction ($\beta = 0.278$, $p < 0.05$), and the overall efficacy ($\beta = 0.237$, $p < 0.05$).

Discussion

Our analysis of the 2013 TALIS dataset was focused on the nuanced relationships among four aspects of PD and the overall teacher efficacy as well as teacher efficacy for managing the classroom, delivering instruction, and engaging students. This study framed PD as a whole experience through a multidimensional and comprehensive lens, with the belief that PD is a complicated process that involves the delivery of different contents through varied approaches. Specifically, this study framed PD with the focus on the format, the content offered in the PD, the duration, and the teacher-perceived quality for PD, which moves PD research beyond the scope of current evidence that focused on a particular PD program or aspect. We also contribute to the field by using the large-scale international data set; the nuanced investigation of PD in an international context is even more valuable to see how some best practices are universal.

This study delved into the realm by investigating teacher professional development (format, content, duration, and quality) and its association with three essential aspects of (classroom management, student engagement, and instruction) and the overall teacher efficacy in an international context. By applying rigorous statistical methods with a large-scale data set, we found, in general, PD in the formats that were embedded in teachers' daily practices (e.g., mentoring), encouraged teachers' inquiries into teaching (e.g., doing research), and supported teachers' collaborative learning (e.g., peer coaching) would lead to the increased overall as well as the three subscales of teacher efficacy. This finding resonates with many previous studies on how teachers learn and develop (Bümen, 2009; Chong & Kong, 2012; Hairon & Dimmock, 2012; Karimi, 2011).

The other important findings are from the PD content model, in which PD with content learning, instructional skills, school management, and new technology is positively related to teacher efficacy to varied extents. Among the content, the PD for instructional skills such as pedagogical competencies, approaches to individualized learning, teaching in a multicultural or multilingual setting, and teaching cross-curricular skills and the PD for career guidance have significant correlations with teacher efficacy. The findings provide the evidence that it is essential to provide PD for understanding the individual student and with skills for teaching students with diverse backgrounds and needs, which reflects the increasingly changing composition of students globally as we embrace student diversity in different contexts. In addition, resonating to the previous research

(Overbaugh & Lu, 2008), we also found PD for new technology is crucial for teacher efficacy. However, the PD on evaluation, ICT, and special education has been found to have limited correlations with teacher efficacy, although PD on the special education topic might benefit teachers to engage all kinds of students.

Given the exploratory nature of this study, the research findings do not have direct implications for policymaking. However, we argue, the list of PD coefficients revealed by our study can serve as a reference for PD providers to design teacher learning and development programs to improve the targeted subscales of teacher efficacy. For instance, if a PD program is aimed to enhance participating teachers' efficacy for classroom management, the program providers may consider using the format of mentoring, focusing on the content of individualized learning, and assuring participants' perceived quality of the PD throughout the process, because these characteristics of PD have been found to be highly associated with teacher efficacy for classroom management. Using the correlation coefficients reported in this study, PD providers can also configure PD programs that are aimed at enhancing teacher efficacy for instruction, student engagement, and/or the overall efficacy for teaching.

However, these coefficients should be used cautiously because PD programs usually have multiple objectives at the same time. Furthermore, many other factors, such as the availability of time and funding, and the context-embedded understandings of what should be prioritized in learning and teaching, can significantly influence the design and uses of PD programs as well. These conditions and factors should be taken into consideration when developing a PD program. We hope that the nuanced knowledge about the relationship between PD and teacher efficacy as contributed by our study can strengthen the knowledge base for informing the practices of PD for teachers.

This study explains how teachers' participation in different formats and contents of PD might be related to the overall teacher efficacy and the three subscales of it. However, caution should be applied when considering the scope of this study. PD is only one factor that could influence teacher efficacy. Teacher efficacy is also related to individual teachers' psychological and emotional conditions (Bandura, 1977; Collie, Shapka, & Perry, 2012). In addition, schools are organizations that involve complicated procedures and possess varying recourses, culture, and structures, which all simultaneously impact people on site (Dorfman et al., 1997; Hinde, 2005; Senge, 1995). Meanwhile, different nations/societies have different cultural beliefs about education, teachers, and teaching (Den Hartog et al., 1999; Shen, 2005), and those beliefs could also influence teacher efficacy. This study tried to involve a broad spectrum of measurable factors individually and organizationally in the three-level model, but there is still a significant portion of variance left unexplained. These factors are likely some psychometric and intrinsic features possessed by individual persons which are still not measurable. It is worth noting that these not-easy-to-measure factors also play important roles in influencing teachers' efficacy beliefs and their practices (Opdenakker & Van Damme, 2006).

As a second limitation of this study, the correlations described here have an obvious recursive nature where teachers' participation in PD affects teachers' efficacy beliefs, and in return teachers' efficacy beliefs may influence the extent to which the teachers participate in PD. The 2013 TALIS surveys assessed teachers' perceptions, beliefs, and practices only at one time point. The TALIS study is administered every 5 years. So far, only two rounds of the survey have been administered, one in 2008 and the other in 2013.

Therefore, for now, it is practically difficult to conduct a recursive analysis due to the lack of a set of longitudinal and dynamic data responses to track the trajectory of the mutual effect between teachers' participation in PD and their efficacy beliefs.

In addition, even though our original plan was to treat the other two aspects of PD, the duration and the quality, as equally important as the format and the content after the literature review, the analysis of the data revealed that there were too much data missing in the 2013 TALIS dataset for these two sets of variables. Therefore, we did not include these two sets of variables along with the content and the format variables in one model for the analysis because it is irrational to do so compromising the power of analysis with too much missing data. Even though we estimated the model using the variables for the duration and the quality, we were not confident to allocate equal weight to these two dimensions. Caution is needed when interpreting the result due to the disproportional missing data for the duration and the quality variables, which could cause significant estimation bias.

Three directions of future research should be considered. The first direction is to delve deeper into the relationship between the four features of PD, considering that this study has found them highly correlated. The second direction should investigate such a relationship in each national context and provide further evidence on what specific format of PD and what particular content would make more contributions to the targeted subscale(s) of teacher efficacy in different contexts. The countries that have high student performance would be able to shed light on the specific approaches to advancing teachers' learning and development through PD. Third, as the TALIS 2013 dataset has a large portion of missing data on PD duration and quality, future studies, especially the large-scale, cross-national ones, should consider generating statistically usable data on these two important features of PD to enable meaningful analyses of how PD duration and quality might be correlated with teacher efficacy and other important outcomes of PD programs.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendices

Appendix 1. Core samples in 2013 TALIS

Country	School Unweighted Sample Size	Percent	Teacher Unweighted Sample Size	Percent
Australia	123	1.91	2,059	1.97
Brazil	1,070	16.58	14,291	13.69
Bulgaria	197	3.05	2,975	2.85
Chile	178	2.76	1,676	1.61
Croatia	199	3.08	3,675	3.52
Czech Republic	220	3.41	3,219	3.08
Denmark	148	2.29	1,649	1.58
Estonia	197	3.05	3,129	3.00
Finland	146	2.26	2,739	2.62
France	204	3.16	3,002	2.88
Israel	195	3.02	3,403	3.26
Italy	194	3.01	3,337	3.20
Japan	192	2.97	3,484	3.34
Korea	177	2.74	2,933	2.81
Latvia	116	1.80	2,126	2.04
Malaysia	150	2.32	2,984	2.86
Mexico	187	2.90	3,138	3.01
Netherlands	127	1.97	1,912	1.83
Norway	145	2.25	2,981	2.86
Poland	195	3.02	3,858	3.70
Portugal	185	2.87	3,628	3.48
Serbia	191	2.96	3,857	3.70
Singapore	159	2.46	3,109	2.98
Slovak Republic	193	2.99	3,493	3.35
Spain	192	2.97	3,339	3.20
Sweden	186	2.88	3,319	3.18
United States	122	1.89	1,926	1.85
England (United Kingdom)	154	2.39	2,496	2.39
Flanders (Belgium)	168	2.60	3,129	3.00
Dhabi (United Arab Emirates)	166	2.57	2,433	2.33
Alberta (Canada)	182	2.82	1,773	1.70

(*Continued*)

Continued.

Country	School Unweighted Sample Size	Percent	Teacher Unweighted Sample Size	Percent
Romania	197	3.05	3,286	3.15
Total	6,455	100	104,358	100

Note: source: OECD TALIS database, sample size is unweighted.

Appendix 2. Descriptive statistics for all variables

	n	*M*	*SD*	*SE*	max	min
Dependent Variables: Teacher Self-efficacy						
Class management	104,358	0.004	0.492	0.002	0.625	−2.011
Instruction	104,358	−0.017	0.360	0.001	0.501	−1.496
Student engagement	104,358	0.001	0.514	0.002	0.737	−1.841
Overall self-efficacy	104,358	−0.005	0.317	0.001	0.509	−1.453
Independent Variables						
PD Format						
Formal induction	101,901	0.482	0.500	0.002	1	0
Informal induction	101,258	0.431	0.495	0.002	1	0
Mentored	101,205	0.147	0.354	0.001	1	0
Mentoring	100,157	0.135	0.341	0.001	1	0
In-service training	101,693	0.164	0.37	0.001	1	0
Professional learning community	101,743	0.356	0.479	0.002	1	0
Peer coach	101,707	0.303	0.46	0.001	1	0
School visit	101,717	0.173	0.378	0.001	1	0
Institution visit	101,711	0.129	0.335	0.001	1	0
Degree	101,816	0.207	0.405	0.001	1	0
Research	101,729	0.333	0.471	0.001	1	0
Workshop	101,776	0.697	0.460	0.001	1	0
Seminar	101,710	0.423	0.494	0.002	1	0
PD Content						
Subject content	82,928	0.745	0.436	0.002	1	0
Curriculum	82,869	0.574	0.495	0.002	1	0
Student evaluation	82,865	0.593	0.491	0.002	1	0
Pedagogical competencies	82,888	0.695	0.461	0.002	1	0
Individualized learning	82,850	0.428	0.495	0.002	1	0
Teach students with special needs	82,869	0.324	0.468	0.002	1	0
Teach in a multicultural or multilingual setting	82,866	0.166	0.372	0.001	1	0
Teach cross-curricular skills	82,868	0.403	0.491	0.002	1	0
Student behavior	82,861	0.448	0.497	0.002	1	0
School management	82,867	0.193	0.395	0.001	1	0
Information and communication technology	82,866	0.541	0.498	0.002	1	0
New technologies	82,871	0.416	0.493	0.002	1	0
Student career guidance and counseling	82,865	0.236	0.425	0.001	1	0
Developing cross-occupational competencies	82,865	0.236	0.425	0.001	1	0
PD Duration						
Workshop	66,828	9.870	24.628	0.095	365	0
Seminar	39,814	4.246	10.955	0.055	365	0
School visit	15,851	3.311	9.749	0.077	365	0
Institution visit	11,819	3.753	13.528	0.124	365	0
In-service training	14,945	11.891	32.569	0.266	365	0
PD Quality						
Subject content	61,069	3.246	0.630	0.003	4	1
Curriculum	56,737	3.176	0.653	0.003	4	1
Student evaluation	46,581	3.174	0.693	0.003	4	1
Pedagogical competencies	48,114	3.145	0.698	0.003	4	1
Individualized learning	44,002	3.106	0.738	0.004	4	1
Teach students with special needs	36,329	3.095	0.716	0.004	4	1
Teach in a multicultural or multilingual setting	15,603	3.038	0.773	0.006	4	1
Teach cross-curricular skills	34,540	3.061	0.702	0.004	4	1
Student behavior	26,197	3.030	0.754	0.005	4	1
School management	13,441	3.020	0.776	0.007	4	1

(*Continued*)

Continued.

	n	*M*	*SD*	*SE*	max	min
Information and communication technology	32,662	3.064	0.690	0.004	4	1
New technologies	18,967	3.066	0.712	0.005	4	1
Student career guidance and counseling	33,685	3.063	0.737	0.004	4	1
Developing cross-occupational competencies	19,044	3.129	0.720	0.005	4	1
Control Variables						
Teacher Level						
Female	104,355	0.68	0.466	0.001	1	0
Age	104,269	42.512	10.538	0.033	76	18
Fulltime	102,136	0.796	0.403	0.001	1	0
Experience	97,773	16.139	10.382	0.033	58	0
Tenured	102,464	0.816	0.388	0.001	1	0
Education	102,464	0.816	0.388	0.001	1	0
School Level						
Public	6,116	0.858	0.350	0.004	1	0
Size	6,025	658.305	493.801	6.362	4335	3
Minority	6,002	1.873	1.046	0.013	5	1
Special	6,039	2.155	0.667	0.009	5	1
Low SES	6,032	2.839	1.085	0.014	5	1