

Factors of a school organization impacting on teacher collegial interaction: evidence from lower secondary schools in England, Finland, South Korea, and the USA

Joo-Ho Park*, Hyungshim Jang, Jeon-Yi Lee, In-Bal Song, JiYeon Lee

Abstract— This study investigated the influence of between-school differences in participative school climate, time and money as learning supports, frequency of teacher appraisal, school socioeconomic status, and school size on individual teacher's collegial interaction within the same school. Nationally multi-level data for 8,869 teachers and 551 principals in 551 lower secondary schools in England, Finland, South Korea, and the USA were analyzed using hierarchical linear modeling (HLM) regressions. In all four countries analyzed, a participative school climate was significantly positively associated with teacher collegial interaction as well as its two sub-dimensions: exchange and coordination for teaching and professional collaboration. However, support in the form of extra compensation did not have a statistically significant effect on teacher collegial interaction in any of the four countries, while the influence of other school-level features (frequency of teacher appraisals, school socioeconomic status, and school size) was not consistent across countries.

Keywords—teacher's collegial interaction, school organization

I. INTRODUCTION

IN most countries, teacher professional development and teacher learning are seen as a key vehicle for educational reform [1], [2]. Nevertheless, a number of previous studies have reported disappointing results of teacher professional development activities, which are often characterized as being ineffective [3]–[5]. In this respect, emphasis has been placed on the importance of a collaborative element in teacher professional development [6].

Overall, in the case of studies focused on school-level factors such as school principals [7]–[9], climate of trust [9], and school physical and social environment [10], [11], most findings were approached and founded either from an analysis of individual teacher perceptions without closely examining between-school variances or from an inquiry limited to the qualitative aspects of school contexts. As a result, with regard to the impact of school-level factors on teacher collegial interaction leading to professional development, empirical evidence is still thin, except for the principal leadership effect.

At the level of methodology, there is also a paucity of empirical research to examine if and to what extent the heterogeneity of schools affects teacher collegial interaction within a school.

In this vein, the primary purpose of this study is to examine if and to what extent the heterogeneity of schools (individual school differences in participative school climate, time, and money as intentional learning support; frequency of teacher appraisals; school socioeconomic status; and school size) impact teacher participation in collegial interaction within the same school. This study compares data from teacher and principal responses from lower secondary schools from the four countries (England, Finland, South Korea, and USA) participating in the OECD Teaching and Learning International Survey (TALIS) 2013. The reason these four nations were chosen for the present study is because they have been regarded as “reference societies” for other nations in terms of trying to learn from their school systems or reform ideas for student achievement. For instance, both Finland and South Korea have emerged as new reference societies, due to their high performance evidenced by PISA and TIMSS studies, while England and the US have traditionally been important reference societies in global educational discourse as they have made initiatives regarding educational theory and practice [12].

As far as we know, this is the first attempt to investigate the factors that impact on the extent of teacher collegial interaction at the school level in an international comparison. Specifically, this study examines the factors at the school level in order to shed light on the key variables that are effective in promoting teacher collegiality for professional development. Moreover, by doing so, a better understanding of exactly how school variables affect teacher collegiality would provide educational policymakers and school reformers with useful policy implications regarding the design and implementation of successful professional learning or development models.

II. THEORETICAL FRAMEWORK

A. Teacher collegial interaction as a professional development activity

There are a number of different types of professional development activities teachers engage in. These include formal activities such as conferences, institutes, and workshops, as well as informal activities such as study groups, research teams, mentoring, and electronic networking [13]. However,

* Joo-Ho Park, Hyungshim Jang, Jeon-Yi Lee, In-Bal Song, JiYeon Lee are with College of Education, Hanyang University, Seoul, Korea.

*Corresponding Email: jhpark1028@hanyang.ac.kr.

conventional forms of teacher professional development, which consist of workshops, university programs, or short-term courses, are contextually isolated from the daily work of teachers [2]. The most commonly criticized aspect of conventional professional development activities is that they focus on memorizing only content knowledge and drilling teaching skills without deep understanding or contextualizing practices [14], [15].

Given the limitations of traditional forms of professional development, analyzing the concept and nature of teacher professional learning [14], [15] and mapping a model of teacher professional growth and learning [18] have been conducted to obtain a greater understanding of the efficacy of teacher professional development. In this vein, a new paradigm of professional development has appeared and is underscored by focusing on teacher workplace learning or collaborative activities [2], [19], [20].

Teacher collegial interaction has evolved into two distinctly different forms: cooperation and collaboration within schools. Cooperation means that teachers reach some mutual agreement, but their work together does not have a formal outcome, while collaboration signifies that teachers engage in joint planning, implementation, and evaluation [21]. More specifically, Little [22] distinguishes the types of collegial interaction of teachers within their own schools: the standard joint work commonly called collaboration but also less intense forms of interaction, such as storytelling, help, or sharing. In a similar vein, Hord [21] determined that there is a distinction between the cooperative activities of teachers and collaborative activities within a school. According to his findings, as opposed to collaboration, teacher cooperation assumes that each teacher with separate and autonomous practices agrees to work together with other teachers to make her or his private work more successful. Teacher collaboration implies that they share responsibility or decision-making about their common practices. Compared to teacher cooperative activities, their collaborative activities are more rigorously interdependent of each other, but are less common forms of interaction in many schools [1]. Empirically, the OECD Teaching and Learning International Survey (TALIS) 2013 measured the extent of “cooperation among teachers” composed of two dimensions (exchange and coordination for teaching and professional collaboration) similar to “the classification of teacher collegial activity” proposed by Hord [21].

B. The importance of organizational dimensions for teacher collegial interaction

Today, it is imperative that teacher collegial interaction leading to professional development be fostered and facilitated in schools [19] because teaching as a profession can no longer be practiced in isolation [23], [24]. However, the autonomy and independence of individual teachers in making decisions about instruction and pedagogy for their own students is generally high [1], [25]. There is thus a strong tendency for creating a school culture of individualism based on teacher separation and isolation that hinders professional interdependence [26], [27]. Therefore, considering the strong tendency of a school culture of individualism, the organizational dimensions that affect teacher collegial interaction to foster professional development

need to be identified. Furthermore, since teacher collaborative activities as workplace learning are concerned with organizational behavior, their facilitation depends on organizational dimensions such as the school culture or climate, working conditions, and principal leadership [28].

In a similar vein, Scribner [17] also argues that school-level factors such as leadership, patterns of resource allocation, faculty norms, and organizational structure play an important role in motivating teachers to engage in collegial interaction. That is, emphasis needs to be placed on creating work environments and organizational aspects that respect the professional role of teachers. In addition, organizational climate is concerned with aspects of an organization that shape the attitudes and behaviors of its members [28], [29]. Therefore, it is reasoned that as a school-level factor, school climate directly affects teacher attitudes and behaviors leading to collegial interactions.

Empirically, previous studies have reported on the important factors needed to foster the professional learning activities of teachers, such as job demands and job control, as working conditions [11], [30], social and cultural support [31], and strengthening the professional learning community [5], [32]. It has been specifically reported that instructional leadership by the principal plays a crucial role in improving school-based collaboration among teachers [7], [8], [33]. A detailed study of 542 teachers in 10 secondary schools in the Netherlands by Kwakman [11] investigated the extent to which personal factors, task factors, and work environment factors impact upon teacher participation in collaborative, individual, and instructional learning activities. In the same vein, Thoonen et al. [9] stressed that school organizational conditions such as participative decision-making and a climate of trust positively affect teacher engagement in professional learning activities. In addition, Jurasaitė-Harison and Rex [10] reported the fact that a school’s physical and social environment promotes teacher professional interaction.

C. The effect of school-level factors on teacher collegial interaction

Participative school climate. With regard to the determinants of teacher collegial interaction, this present study focuses on investigating previously unexplored aspects of school-level factors. First of all, participative school climate has become more crucial these days, not only as a way of improving the quality of decisions, but also as an ethical way of democratizing workplace conditions [34]. The literature has pointed out that a participative school climate offers a variety of benefits unachievable under a traditional bureaucratic structure [35]–[37]. The benefits of a participative school climate are in the same line as the usefulness of professional learning communities or learning organizations [38], [39].

The positive impact of a participative school climate on teacher professional learning has been supported by empirical studies [11], [38]. McLaughlin and Talbert [40] stressed that it is necessary for school administrators to form and keep a positive school climate that supports professional progress and growth. According to the results of previous studies, a participative school climate enables teachers to obtain information about their work and also motivates them to seek

additional knowledge about how to improve their classroom or school work [41]. Furthermore, Slegers, Bolhuis, and Geijssels [42] reported that a participative working climate reinforces teachers to internalize school goals as their personal goals, thereby motivating teacher learning. Supporting this view, Thoonen et al. [9] identified teacher motivation as being mediated by participative decision-making and positively affecting teacher engagement in professional learning activities. Based on the evidence of previous research, this study assumes that a participative school climate will positively affect teacher participation in collegial interactions with colleagues within the same school.

Other school conditions and demographic variables. First, a school-level factor adopted in this study is the allocation of time and money as intentional learning support in a school organization. School systems often provide resources in the form of release time, tuition credits, or conference fees to support teacher professional development [43]. Above all, appropriate time to engage in regular reflection, research, collaboration, and innovation is essential for teacher professional learning [44], [45]. A lack of time during the regular school day is the key barrier for teachers to go beyond surface level discussions or to engage in collaborative activities with their colleagues within schools. In this respect, Firestone and Pennell [30] indicate that time is a critical issue to enhance teacher collaboration within schools. Evidence from some studies also shows that in the case of a school that values teacher collaborative inquiry, permits joint-work among teachers, and allocates time for teachers, interdependent relationships among teachers are developed [23]. In addition, financial support encourages teachers to participate in professional development activities.

Second, an organizational factor that can affect the extent of teacher collegial interaction is teacher appraisal at the school. For example, Rosenholtz, Bassler, and Hoover-Dempsey [46] described how teacher evaluation functions as the organizational context of teacher learning. On the other hand, Duke [43] argues that accountability based on teacher evaluation and professional growth may be compatible in theory, but in practice too much confusion and role conflict arises to allow a functional blending of purpose. Teachers also frequently associate professionalism with a reasonable degree of autonomy. Therefore, in the case of exerting teacher appraisal in all schools, issues of autonomy and control arise [43]. In this respect, it is interesting to examine if the frequency of exerting teacher appraisal at each school influences teacher participation in collegial interaction for professional development.

Third, school socioeconomic status is an organizational factor that can be associated with extent of teacher collegial interaction. School socioeconomic status (SES) is most frequently examined as a school demographic variable [47]. However, the effect of school SES on teacher behavior is quite controversial. Warren [48] reported that most teachers in low SES schools usually recognize that their primary role is custodial rather than educative. In recognizing this custodial role in low SES schools, teacher efforts for professional growth may be substantially lowered. In contrast, Rosenholtz et al. [46]

identified the teachers of lower-SES schools as being more favorable toward collaborative learning and instructional coordination. Therefore, the literature leads to the conclusion that the general direction of a school SES is difficult to discern regarding the influence of teacher participation in collegial interaction.

Lastly, school size as an organization-level factor is associated with the extent of a teacher's interactions during school days [46], [49]. For instance, school size influences the number of contact hours so that teachers in smaller schools find it easier to be in contact with other competent faculty [50]. Furthermore, a considerable amount of research has reported that smaller schools provide a more collegial environment for the professional development of teachers [51], [52]. This literature leads to the conclusion that teachers in smaller schools are more engaged in interactions with their colleagues during school days. However, the general direction of a school's size on teacher's participation in collegial interaction is difficult to gauge simply because social interactions among teachers are different from their collegial interactions leading to professional development.

III. METHOD

A. Data and sample

Data for this study were taken from the Organization for Economic Cooperation and Development (OECD) Teaching and Learning International Survey (TALIS) 2013. The dataset used in this study, which is the second large-scale compilation of information about the work life of teachers, was surveyed from lower secondary schools across many countries. In terms of the sample size, approximately 550 lower secondary schools involving 8,900 teachers in England, Finland, South Korea, and the USA were analyzed in this study.

B. Measures

With respect to the dependent variable for this study, we used the *Cooperation Among Teaching Staff* questionnaire from TALIS 2013 [53] as a continuous variable measuring the extent to which a teacher engages in intra-school collegial interaction with colleagues. This variable included eight items that consisted of two sub-factors: *exchange and coordination for teaching* (ECT) and *professional collaboration* (PC). To address the construct validation for the questionnaire of teacher collegial interaction consisting of two sub-factors and 8 items, a confirmatory factor analysis (CFA) was conducted for each country's data [53]. TALIS 2013 Technical Report (OECD, 2014) showed that the two correlated factors exhibited an acceptable model fit in most countries, such as England (CFI=.929; TLI=.889; RMSEA=.064; SRMR=.039), Finland (CFI=.962; TLI=.940; RMSEA=.048; SRMR=.029), and South Korea (CFI=.947; TLI=.918; RMSEA=.064; SRMR=.038). The reliability coefficients for ECT were .688 in England, .700 in Finland, .777 in S. Korea, and .769 in the USA. The reliability coefficients for PC were .605 in England, .627 in Finland, .678 in S. Korea, and .608 in the USA.

One of the main independent variables, the *Participative School Climate* questionnaire adapted from TALIS 2013 [53] was used to test the hypothesis for this study. This variable

measures the extent to which a teacher perceives her/his school as a participative climate. A teacher’s perception of how frequently the activities (e.g., this school provides staff with opportunities to actively participate in school decisions, this school provides parents or guardians with opportunities to actively participate in school decisions) took place in her/his school was used to create the variable. This variable ranged from zero (= I “strongly disagree”) to four (= I “strongly agree”). In addition, this variable was also aggregated into the school-mean in order to construct a measure of the extent to which teachers in a given school collectively perceive their school as a participative climate. The reliability coefficient for the *participative school climate* scale was above .90 in the four countries (Eng= .916, Fin= .911, S. Korea= .919, USA= .942).

In addition, other school characteristics were also taken into account to test the hypothesis for this study including *time support*: a continuous variable representing the percentage of teachers who are offered scheduled time during regular working hours for teacher professional development activities from their school. *Money support* was used as a continuous variable representing the percentage of teachers who are offered money support for teacher professional development activities from their school. *Teacher appraisals*: a continuous variable capturing the frequencies of formal teacher appraisals conducted in each school. *School SES*: a continuous variable indicating that a socioeconomic status is reverse coded, ranging from one (= “more than 60%” of the students are from socioeconomically disadvantaged homes in my class) to five (=“none” of the students are from socioeconomically disadvantaged homes in my class). *School size*: a continuous variable as a principal-reported item representing the number of teachers, was created by dividing the number of teachers in each school by 10 to make 10 teachers equal one-unit.

C. Analytic approach

Hierarchical linear modeling was used in this study [54] whereby both teacher-level and school-level variables were simultaneously considered to explain individual teacher’s collegial interactions with their colleagues. At level-1, for teacher *i* in school *j*, is specified as follows:

$$\text{Collegial Interaction}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender})_{ij} + \beta_{2j}(\text{Teaching Experience})_{ij} + r_{ij},$$

where β_{0j} is the mean outcome for a school *j*, and β_{aj} for $1 \leq a \leq 2$ is the slope for each level-1 variable; r_{ij} is the random error.

At level 2, the intercept, β_{0j} , is specified as follows:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Participative Climate})_j + \gamma_{02}(\text{Time Support})_j + \gamma_{03}(\text{Money Support})_j + \gamma_{04}(\text{Teacher Appraisals})_j + \gamma_{05}(\text{School SES})_j + \gamma_{06}(\text{School Size})_j + u_{0j},$$

where γ_{00} is the constant; γ_{0b} for $1 \leq b \leq 6$ is the slope for each level-2 variable. A random error, u_{0j} , was added to the model in light of the possibility that the mean of *collegial interaction* may vary randomly between schools due to some school-specific factors that are unique to individual schools.

The slopes in the level-1 equation were treated simply as fixed. Thus, the slopes are specified as follows:

$$\beta_{pj} = \gamma_{p0} \text{ for } 1 \leq p \leq 2.$$

All the level-1 and level-2 independent variables were grand-mean-centered, which makes the intercept, β_{0j} , the expected *collegial interaction* value when all the independent variables are set to equal to their grand means. Thus, one may interpret the intercept as the expected degree of teacher engagement in collegial interactions for typical teachers in typical schools in the sample.

IV. RESULTS

A. Descriptive analyses

Descriptive statistics for the variables at the teacher level used in our hierarchical linear modeling analyses of teachers’ collegial interactions are summarized in Table I. The first two rows compare the demographics of the teachers in four countries. The next three rows compare the country mean of the dependent variables. An interesting pattern is that the country mean of *teacher cooperative activities* is substantially greater than that of *teacher collaborative activities* in all the four countries examined, suggesting the possibility that cooperative activities for teaching are more common than professional collaborative activities.

TABLE I
DESCRIPTIVE STATISTICS AT THE TEACHER LEVEL

	England	Finland	S. Korea	USA
Female Teacher	0.64 (0.48)	0.72 (0.45)	0.69 (0.46)	0.67 (0.47)
Teaching Experience	2.49 (1.87)	3.08 (1.93)	3.31 (1.97)	2.79 (1.92)
Collegial Interaction	3.64 (0.87)	3.25 (0.85)	2.71 (0.83)	3.49 (1.04)
Exchange and Coordination for Teaching (ECT)	4.46 (1.04)	4.23 (1.04)	3.07 (1.01)	4.29 (1.29)
Professional Collaboration (PC)	2.81 (0.97)	2.27 (0.95)	2.35 (0.87)	2.69 (1.09)
<i>n</i>	2181	2635	2513	1540

Note. Unweighted mean. Standard errors are presented in parentheses

Table II shows the descriptive statistics for the independent variables at the school level used in our hierarchical linear modeling analyses of teacher collegial interactions. The first row compares the means of the main independent variable, *participative school climate* across the four countries. They indicate that teachers seldom perceive their schools as participative, and this result is consistent across countries. The next five rows illustrate the other school characteristics: time and money as intentional learning supports, frequency of teacher appraisals, school socioeconomic status, and school size. In terms of intentional learning support, the country mean of *time support* during regular working hours was the highest in the USA and England, and the lowest in South Korea. In addition, the country mean of *money support* was the highest in the USA and South Korea. In terms of *teacher appraisal*, schools in Finland conducted teacher appraisals the least frequently. In terms of *school socioeconomic status*, the USA had the largest

number of students from socioeconomically disadvantaged homes per school, while Finland had the least. This result with regard to *school socioeconomic status* is likely due to the fact that the USA has the highest poverty rate for children among OECD countries, while Finland has the lowest [55]. Finally, in terms of *school size*, the mean number of teachers per school was the highest in England.

TABLE II
DESCRIPTIVE STATISTICS AT THE SCHOOL LEVEL

	England	Finland	S. Korea	USA
Participative Climate	2.68 (0.25)	2.78 (0.25)	2.74 (0.21)	2.66 (0.30)
Time Support	0.58 (0.14)	0.38 (0.15)	0.25 (0.13)	0.61 (0.17)
Money Support	0.04 (0.06)	0.04 (0.06)	0.20 (0.11)	0.20 (0.17)
Teacher Appraisals	16.86 (3.67)	7.72 (2.38)	17.03 (3.57)	13.56 (4.39)
School SES	3.35 (0.77)	3.84 (0.32)	3.61 (0.38)	2.62 (0.87)
School Size	7.54 (2.83)	3.34 (1.42)	4.09 (1.54)	5.07 (3.22)
<i>n</i>	146	146	161	98

Note. Unweighted mean. Standard errors are presented in parentheses

B. Hierarchical linear model regression analyses

Table III reports the results from our hierarchical linear model. The model includes an array of control variables at the teacher level to determine if the significant effect of participative school climate and other school characteristics in teacher collegial interaction still holds after they are simultaneously taken into account. Specifically, a one-unit increase in the *participative school climate* measure is significantly related to an expected increase in *teacher collegial interaction* by .601 in England, .430 in Finland, .522 in South Korea, and .460 in the USA. In other words, teachers become more likely to establish collegial relationships with their colleagues in a school situation where there is a higher climate of participation. In addition, a one-unit increase in *time support* for teacher professional development activities is significantly related to an expected increase in teacher collegial interaction in three countries (.927 in Finland, .425 in South Korea, and .648 in the USA), except England. The result suggests that teachers become more likely to interact with other teachers in a school situation where there is scheduled time as an intentional learning support. However, a one-unit increase in *money support* for teacher professional development activity was not significantly related to teacher collegial interaction, and this result was consistent across countries. Moreover, a one-unit increase in the frequency of exerting the *teacher appraisals* measure was significantly related to an expected increase in teacher collegial interaction by .019 in England and .048 in the USA. Furthermore, a one-unit increase in the *school socioeconomic status* measure was significantly related to an expected decrease in teacher collegial interaction by .105 in England and .194 in Finland. Finally, an increase of 10 teachers in the *school size* measure was significantly related to an

expected increase in teacher’s collegial interaction in three countries (.047 in Finland, .068 in South Korea, and .062 in USA) except England.

TABLE III
SCHOOL-LEVEL FACTORS ON TEACHER COLLEGIAL INTERACTION:
HIERARCHICAL LINEAR MODELING ANALYSES, AFTER CONTROLLING FOR A
RANGE OF VARIABLES

	England	Finland	S. Korea	USA
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Fixed effect				
Intercept, γ_{00}	3.636** (.025)	3.26** (.024)	2.702** (.021)	3.326** (.047)
Level 2				
Participative Climate, γ_{01}	.601** (.109)	.430** (.105)	.522** (.126)	.460* (.181)
Time Support, γ_{02}	.223 (.203)	.927** (.174)	.425* (.234)	.648* (.304)
Money Support, γ_{03}	.228 (.569)	0.007 (.422)	-.025 (.244)	.354 (.319)
Teacher Appraisals, γ_{04}	.019* (.008)	-0.014 (.011)	.001 (.007)	.048** (.013)
School SES, γ_{05}	-.105** (.036)	-.194* (.082)	-.071 (.079)	-.102 (.067)
School SIZE, γ_{06}	.008 (.010)	.047* (.018)	.068** (.020)	.062** (.016)
Level 1				
Gender, γ_{10}	.012 (.048)	.112** (.035)	.038 (.043)	-0.021 (.064)
Teaching Experience, γ_{20}	-0.001 (.012)	-0.001 (.008)	-0.016 (.010)	-0.021 (.016)
Level-2 <i>df</i>	139	139	154	91
Level-1 <i>df</i>	2033	2487	2350	1440
Random effect	Var.(χ^2)	Var.(χ^2)	Var.(χ^2)	Var.(χ^2)
Intercept, u_{0j}	.025 (222**)	.049 (362**)	.027 (291**)	.109 (328**)
Level-1 random error, r_{ij}	.717	.615	.641	.810

Note. Coeff. = unstandardized coefficient; SE= robust standard error; Var. = variance. Independent variables are grand-mean-centered. Appropriate sampling weights were applied to the dataset. * $p \leq .05$. ** $p \leq .01$.

In this study, teacher collegial interaction is composed of two dimensions: *exchange and coordination for teaching* (ECT) and *professional collaboration* (PC). Thus, an attempt is made to examine the impact of participative school climate and other school characteristics on these two sub-dimensions of teacher collegial interaction in a more specific manner. The score of each dimension and all other continues variables was converted into a z-score and then analyzed to make a statistical comparison of the impact of the school-level determinants on these two sub-dimensions of teacher collegial interaction. Table IV presents the results from the hierarchical linear models for ECT. Table V presents the results from the hierarchical linear models for PC.

TABLE IV

SCHOOL-LEVEL FACTORS ON EXCHANGE AND COORDINATION FOR TEACHING (ECT): HIERARCHICAL LINEAR MODELING ANALYSES, AFTER CONTROLLING FOR A RANGE OF VARIABLES

	England	Finland	S. Korea	USA
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Fixed effect				
Intercept, γ_{00}	-0.084 (.046)	-0.207** (.038)	-0.210* * (.047)	-0.226* * (.063)
Level 2				
Participative Climate, γ_{01}	.138** (.031)	.088** (.026)	.137** (.035)	.114* (.052)
Time Support, γ_{02}	.038 (.032)	.091** (.026)	.043 (.039)	.078 (.050)
Money Support, γ_{03}	.036 (.033)	.016 (.025)	-0.015 (.033)	.049 (.052)
Teacher Appraisals, γ_{04}	.073* (.029)	-0.044 (.025)	.005 (.031)	.186** (.054)
School SES, γ_{05}	-.071* (.034)	-.057* (.026)	-.035 (.040)	-.062 (.056)
School SIZE, γ_{06}	.026 (.032)	.146** (.026)	.220** (.040)	.238** (.050)
Level 1				
Gender, γ_{10}	.103* (.055)	.302** (.041)	.154** (.052)	.077 (.064)
Teaching Experience, γ_{20}	-0.017 (.026)	.002 (.019)	-0.010 (.024)	-0.041 (.031)
Level-2 <i>df</i>	139	139	154	91
Level-1 <i>df</i>	2033	2487	2350	1440
Random effect	Var. (χ^2)	Var. (χ^2)	Var. (χ^2)	Var. (χ^2)
Intercept, u_{0j}	.014 (179**)	.035 (259**)	.029 (271**)	.099 (312**)
Level-1 random error, r_{ij}	.967	.844	.920	0.811

Note. Coeff. = standardized coefficient; SE= robust standard error; Var. = variance. Appropriate sampling weights were applied to the dataset. * $p \leq .05$. ** $p \leq .01$.

Similar patterns were found regarding *participative school climate* in most countries. More specifically, *participative school climate* was significantly associated with both ECT and PC. Although the magnitude of the effect varied, the effect of *participative school climate* appears quite robust in terms of its significant positive association with the degree of intra-school ECT and PC across countries. In addition, an interesting pattern found was that ECT (Fin: $\gamma_{06}=.146$, S. Kor: $\gamma_{06}=.220$, USA: $\gamma_{06}=.238$) was more robustly significantly related to *school size* than that of PC in most countries examined, suggesting the possibility that ECT is vitalized in more or less larger scale schools than PC. Similar patterns were also found regarding *teacher appraisals*. Specifically, ECT (Eng: $\gamma_{04}=.073$, USA: $\gamma_{04}=.186$) was more robustly significantly associated with *teacher appraisals* compared to PC (USA: $\gamma_{04}=.170$), indicating that ECT is more encouraged than PC as the frequency of teacher appraisals in each school becomes higher. On the other hand, it appeared to be very clear that PC (Fin: $\gamma_{02}=.391$, S. Kor: $\gamma_{02}=.391$, USA: $\gamma_{02}=.109$) is highly associated with allocation of *time support* for teacher professional development in all countries compared to that of ECT (Fin: $\gamma_{02}=.091$).

TABLE V

SCHOOL-LEVEL FACTORS ON PROFESSIONAL COLLABORATION (PC): HIERARCHICAL LINEAR MODELING ANALYSES, AFTER CONTROLLING FOR A RANGE OF VARIABLES

	England	Finland	S. Korea	USA
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Fixed effect				
Intercept, γ_{00}	.019 (.050)	.085 (.044)	-0.095* (.048)	-0.009 (.058)
Level 2				
Participative Climate, γ_{01}	.182** (.038)	.133** (.036)	.126** (.037)	.117* (.047)
Time Support, γ_{02}	.022 (.039)	.194** (.036)	.091** (.042)	.109** (.045)
Money Support, γ_{03}	-0.016 (.042)	-0.019 (.034)	.012 (.035)	.052 (.047)
Teacher Appraisals, γ_{04}	.063 (.035)	-0.020 (.035)	.005 (.034)	.170* (.049)
School SES, γ_{05}	-.121** (.042)	-.066* (.035)	-.032 (.043)	-.089 (.051)
School SIZE, γ_{06}	.022 (.040)	-0.026 (.035)	-0.010 (.043)	.087 (.046)
Level 1				
Gender, γ_{10}	-0.085 (.054)	-0.096* (.041)	-0.093 (.051)	-0.126* (.061)
Teaching Experience, γ_{20}	.016 (.026)	-0.003 (.019)	-0.059* (.024)	-0.027 (.030)
Level-2 <i>df</i>	139	139	154	91
Level-1 <i>df</i>	2033	2487	2350	1440
Random effect	Var. (χ^2)	Var. (χ^2)	Var. (χ^2)	Var. (χ^2)
Intercept, u_{0j}	.057 (288**)	.114 (508**)	.046 (319**)	.078 (282**)
Level-1 random error, r_{ij}	.904	.826	.880	.735

Note. Coeff. = standardized coefficient; SE= robust standard error; Var. = variance. Appropriate sampling weights were applied to the dataset. * $p \leq .05$. ** $p \leq .01$.

It is therefore possible to say that teachers are more likely to engage in PC with their colleagues in a school situation where they receive a scheduled time during regular working hours. Moreover, PC (Eng: $\gamma_{05} = -0.121$, Fin: $\gamma_{05} = -0.066$) is more related to *school socioeconomic status* compared to that of ECT (Eng: $\gamma_{05} = -0.071$, Fin: $\gamma_{05} = -0.057$), suggesting the possibility that teachers are more likely to engage in PC as the number of students from socioeconomically disadvantaged homes in schools becomes larger. Furthermore, an interesting pattern found was that ECT (Eng: $\gamma_{10}=.103$, Fin: $\gamma_{10}=.302$, S. Kor: $\gamma_{10}=.154$) was more robustly significantly related to *female teachers*, while PC (Fin: $\gamma_{10} = -0.096$, USA: $\gamma_{10} = -0.126$) was more robustly significantly related to *male teachers* in most countries examined, suggesting the possibility that female teachers are less likely to engage in PC with their colleagues in a school situation where they receive scheduled time during regular working hours.

V. DISCUSSION AND CONCLUSION

As an exploratory attempt, this study examined the influence of participative school climate and other school features on school-based teacher’s collegial interaction based on extensive nationally-representative data across four countries: England,

Finland, South Korea, and the USA. Firstly, the result of analyzing data from the lower secondary schools of all four countries offers support for our assumption that participative school climate positively affects teacher participation in collegial interactions with their colleagues within the same school. More specifically, the influence of participative school climate is statistically significant on two sub-dimensions of collegial interactions in all four countries. This result identifies the fact that the teachers of secondary schools more enthusiastically engage in *exchange and coordination for teaching* (ECT) and *professional collaboration* (PC) with their colleagues when their school's climate becomes more participative. This finding is in the same line as the previous literature [11], [38] that a participative school climate positively affects the professional learning of teachers.

Secondly, regarding the analysis of intentional teacher learning support on the extent of school-based teacher collegial interaction, what we found interesting in this present study was that the effect of both extra time and money as organizational school features was contrary to each other. Our present study reveals that the support of extra money was not statistically significant to the extent of collegial interaction among lower secondary school teachers from all four countries. This fact shows that the factor of financial support is less important to teacher collegial interaction within schools. In contrast, the extent of teacher participation in traditional programs of professional development usually identified as in-service training such as workshops or short-term courses may be affected by the support of extra money.

More specifically, what we found most interesting in this present study was that the effect of scheduled time as an intentional learning support during the regular school day was more statistically significant in terms of PC than ECT requiring relatively less interdependence. However, in the case of England, our present study reveals that the allocation of scheduled time was not statistically significant to the extent of teacher collegial interaction including its two sub-dimensions: ECT and PC. This result suggests that the nature of teacher collegial interaction leading to professional development may be markedly different between England and the other three countries. The existence of this difference is supported by Webb, et al. [56] who argued that with regard to teachers' conception of their professionalism, it is predicated on teacher autonomy and engagement in lifelong learning and collaboration with collegial teachers in Finland, whereas in England the development of teachers' professionalism at the policy level is characterized by the ability to demonstrate sets of government-determined competencies and skills at particular points throughout their career.

Thirdly, another result of the present study reveals that the teachers in the lower secondary schools in both England and the USA are more engaged in collegial interactions with their colleagues in a school context where teacher appraisal is more frequently exerted. More specifically, in the findings of our study, these teachers participate more in both ECT and PC with their colleagues when teacher appraisal is more frequently exerted at their schools. Reviewing the findings of our current study in both England and the USA, it is assumed that existing

school policy or reform based on teacher appraisal has been more positively effective and an influence on secondary school sites. However, in the case of both Finland and South Korea, the frequency of teacher appraisal at the level of each school did not significantly affect teacher collegial interaction and its two sub-factors.

Regarding the impact of the frequency of teacher appraisal in our current study, the difference between the sampled countries can be speculated from the fact that the purpose of teacher appraisal, its context, and teacher evaluation policy for professional development are generally different in these four countries. As a specific example, the neo-liberal policies of marketization have led to educational reforms in the USA and England, whereas constructivist theories of learning have led to similar educational reforms in Finland [56]. In addition, teacher appraisal in the context of all schools leads to issues of teacher autonomy and control [43]. Regarding teacher appraisal at school, teachers differently perceive the impact of autonomy or control in their country's policy context. Therefore, their perception is also different across the sampled countries. More specifically, the purpose of conducting teacher appraisal in South Korea mainly focuses on grading teachers within each school for their promotion or additional pay for performance rather than leading to their professional development. Moreover, the practice of teacher appraisal in South Korea is in the same context across most secondary schools because it is not only regulated by law, but the teachers unions or associations are also strongly opposed to different types and frequencies at the level of each school or state. As mentioned above, in the case of Finland, there is virtually no formal control system governing teachers' work at each school, and their evaluation is also lacking [57]. The fact that the frequency of teacher appraisal as a school-level variable does not statistically impact on teacher collegial interaction can be explained by the distinctive policy contexts in Finland and South Korea.

Fourthly, regarding the influence of school SES, the larger ratio of students from socioeconomically disadvantaged homes (lower school SES) in both England and Finland had a statistically significant effect on the extent of teacher collegial interaction as well as both ECT and PC, whereas the cases of South Korea and the USA were not statistically significant to these variables. In terms of reflecting this result, the teachers in the lower secondary schools in both England and Finland are more active in collegial interactions within their schools when there are a greater number of students from socioeconomically disadvantaged homes. Judging from this result, it raises the possibility that the teachers in both England and Finland are more responsive to issues of dealing with educational problems that may arise from low income families at their schools. Specifically, the results of Finland are likely due to the salient characteristic (e.g., the focal point aimed at by the Aquarium Project, which focused on building collaborative networks among teachers to share their experiences and teaching methods with their colleagues in applying the new curriculum to their schools) of its educational culture where less competition and more collaboration in terms of instructional methods has been emphasized at the school [58]. Compared to South Korea and the USA, it is also assumed that some educational interventions

for minority students (e.g., students from low income families, students with disabilities or disadvantages, and immigrant students) in both England and Finland are more collaboratively put into practice by the teachers in lower secondary schools. This result offers empirical support for the finding by Rosenholtz et al. [46] that teachers in lower-SES schools are more favorable to collaborative learning and instructional coordination.

Regarding the influence of school SES on teacher collegial interaction and its two sub-dimensions, the difference between the sampled countries can be summarized as follows. First, the different educational policy focus (i.e., to what degree they focus more on either student excellence or dealing with student differences) lies on their students from lower income families. Second, it is due to what extent the teachers from each nation show different level of concern toward the educational benefits of their students from socioeconomically disadvantaged homes. Therefore, the primary focus of each nation's educational policy for students from socioeconomically disadvantaged homes brings out the different level of concern teachers have toward their students' educational benefits. As a result, it appears that these teachers seem to show different levels of willingness when they work together collaboratively while dealing with these students' educational concerns. In this vein, the findings of the present study indicate that lower secondary school teachers from both South Korea and the USA, compared to teachers from England and Finland, show less of a tendency to work collaboratively when they deal with the educational affairs of students from socioeconomically disadvantaged homes.

Finally, the result of the present study reveals that the teachers of all three countries except England are more likely to interact with their colleagues in a school situation as school size increases. Specifically, in opposition to the scheduled time as discussed above, the result of the present study shows that the effect of school size is more statistically significant for ECT than PC. This finding implies that bigger schools provide a friendly environment for promoting teachers' collegial activities leading to their professional development such as having reflective dialogues, exchanging pedagogical beliefs and subject matter knowledge, and exchanging teaching methods or materials for their students. This is in opposition to the results of previous studies [51], [52] where the smaller schools provided a more collegial environment to improve professional development for teachers. Judging from this difference, it is assumed that as experts of subjects in educational practices, the teachers in smaller schools are more separated from one another in classroom practice and isolated within their classrooms than those of larger schools.

In conclusion, teacher professional development has been a key common agenda for educational reform to improve school systems in many countries worldwide [1], [2]. More specifically, teacher collegial interactions within their own school context have received growing attention as a more authentic form of teacher professional development activities in most countries [2], [15], [20]. In this vein, the contribution of our present study for both the theory and practice of international teacher education is two-fold. First, at the level of theory and research method, this study examines a previously

unexplored aspect of major school-level factors using HLM analyses in which teacher engagement in collegial interaction with their colleagues is effectively promoted and facilitated. In particular, even though there are substantial differences among these four countries in terms of socio-cultural background and educational policy related to teacher professionalism, this finding provides insight that establishing a participative school climate can be a useful strategy to foster teacher professional development across many countries, especially without bringing any issue of teacher control. In addition, regarding the effect of other school conditions and demographics (the allocation of extra time, the frequency of exerting teacher appraisals, school socioeconomic status, and school size), this present study found that the influence of each school-level feature is not identical on school-based teacher collegial interaction and its two sub-dimensions. The inconsistent influence of each school-level feature on ECT and PC across the four countries examined can be explained by the socio-cultural and educational policy differences between each country. As a result, at the level of international teacher education practice, the results of this study provide useful policy implications for accomplishing teacher professional development and school change in each country.

REFERENCES

- [1] Meirink, J. A., Imants, J., Meijer, P. C., & Verloop, N. (2010). Teacher learning and collaboration in innovative teams. *Cambridge Journal of Education*, 40(2), 161-181.
- [2] Villegas-Reimers, E. (2003). *Teacher professional development: an international review of the literature*. UNESCO: International Institute for Educational Planning.
- [3] Hanushek, E. A. (2005). *Economic outcome and school quality: educational policy service*. Paris, France: International Institute for Educational planning and International Academy of Education.
- [4] Organization for Economic Cooperation and Development [OECD]. (2013a). *Teaching and Learning International Survey (TALIS) 2013 conceptual framework*. Paris, France: OECD.
- [5] Smylie, M. A., Lazarus, V., & Brownlee-Conyers, J. (1996). Instructional outcomes of school-based participative decision making. *Educational Evaluation and Policy Analysis*, 18(3), 181-198.
- [6] Youngs, P., & King, M. B., (2002). Principal leadership for professional development to build school capacity. *Educational Administration Quarterly*, 38(5), 643-670.
- [7] Beredson, P. V., & Johansson, O. (2000). The school principal's role in teacher professional development. *Journal of In-Service Education*, 26(2), 385-401.
- [8] Payne, D., & Wolfson, T. (2000). Teacher professional development-The principal's critical role. *NASSP Bulletin*, 84(13), 13-21.
- [9] Thoonen, E. E. J., Slegers, P. J. C., Oort, F. J., Peetsma, T. T. D., & Geijsel, F. P. (2011). How to improve teaching practices: the role of teacher and motivation, organizational factors, and leadership practices. *Educational Administration Quarterly*, 47(3), 496-536.
- [10] Jurasaitė-Harbison, E., & Rex, L. (2010). School culture as contexts for informal teacher learning. *Teaching and Teacher Education*, 26(2), 167-277.
- [11] Kwakman, K. (2003). Factors affecting teachers' participation in professional learning activities. *Teaching and Teacher Education*, 19(2), 149-170.
- [12] Sellar, S., & Lingard, B. (2013). Looking East: Shanghai, PISA 2009 and the reconstitution of reference societies in the global education policy field. *Comparative Education*, 29(4), 464-285.
- [13] Garet, M., Porter, A., Desimone, L., Birman, B., Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal*, 38(4), 915-945.
- [14] Cohen, D. K., McLaughlin, M. W., & Talbert, J. E. (Eds.) (1993).

- Teaching for understanding: Challenges for policy and practice.* San Francisco: Jossey-Bass.
- [15] Darling-Hammond, L., & McLaughlin, M. W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan*, 76(8), 597-604.
- [16] Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research*, 81(3), 376-407.
- [17] Scribner, J. P. (1999). Professional development: Untangling the influence of work context on teacher learning. *Educational Administration Quarterly*, 35(2), 238-266.
- [18] Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, 33(8), 3-15.
- [19] Cochran-Smith, M., & Lytle, S. (2001). Beyond certainty: Taking an inquiry stance on practice. In A. Lieberman and L. Miller (Eds.), *Teachers caught in the action: Professional development that matters* (pp. 45-58). New York: Teachers College Press.
- [20] Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103(6), 1013-1055.
- [21] Hord, S. (1986). A synthesis of research on organizational collaboration. *Educational Leadership*, 43(5), 22-26.
- [22] Little, J. W. (1990). The persistence of privacy: Autonomy and initiative in teachers' professional relations. *Teachers College Record*, 91(4), 509-536.
- [23] Louis, K. S., Marks, H. M., & Kruse, S. (1996). Teacher's professional community in restructuring schools. *American Educational Research Journal*, 33(4), 757-798.
- [24] Stoll, L., & Louis, S. K. (2007). *Professional learning communities: Divergence, depth, and dilemmas*. Maidenhead, UK: Open University Press.
- [25] Archbald, D., & Porter, A. (1994). Curriculum control and teachers' perceptions of autonomy and satisfaction. *Educational Evaluation and Policy Analysis*, 16(1), 21-39.
- [26] Lortie, D. C. (2002). *Schoolteacher: A sociological study* (2nd ed.). Chicago, IL: University of Chicago Press.
- [27] Sarason, S. B. (1996). *Revisiting the culture of the school and the problem of change*. New York, NY: Teachers College Press.
- [28] Conley, S., & Muncey, D. E. (1999). Organizational climate and teacher professionalism: Identifying teacher work environment dimensions. In D. L. Fisher, & B. J. Fraser (Eds.), *School climate: Measuring, improving and sustaining healthy learning environments* (pp. 103-123). Philadelphia, PA: Falmer Press.
- [29] O' Driscoll, M. P., & Evans, R. (1988). Organizational factors and perceptions of climate in three psychiatric units. *Human Relations*, 41(5), 371-388.
- [30] Firestone, W. A., & Pennell, J. R. (1993). Teacher commitment, working conditions, and differential incentive policies. *Review of Educational Research*, 63(4), 489-525.
- [31] Greenglass, E. R., Burke, R. J., & Konarski, R. (1997). The impact of social support on the development of burnout in teachers: Examination of a model. *Work and Stress*, 11(3), 267-278.
- [32] King, M. B. (2002). Professional development to promote schoolwide inquiry. *Teaching and Teacher Education*, 18(3), 243-257.
- [33] Cha, Y.-K., & Ham, S.-H. (2012). Constructivist teaching and intra-school collaboration among teachers in South Korea: an uncertainty management perspective. *Asia Pacific Education Review*, 13(4), 635-647.
- [34] Murphy, J., & Beck, L. G. (1995). *School-based management as school reform: Taking stock*. Thousand Oaks, CA: Corwin.
- [35] Bacharach, S. B., Bamburger, P., Conley, S. C., & Bauer, S. (1990). The dimensionality of decision participation in educational organizations: The value of a multi-domain evaluative approach. *Educational Administration Quarterly*, 26(2), 126-167.
- [37] Smylie, M. A. (1992). Teacher participation in school decision-making: Assessing willingness to participate. *Educational Evaluation and Policy Analysis*, 14(1), 53-67.
- [38] Bryk, A., Camburn, E., & Louis, K. S. (1999). Professional community in Chicago elementary schools: Facilitating factors and organizational consequences. *Educational Administration Quarterly*, 35(5), 751-781.
- [39] Lavie, J. M. (2006). Academic discourses on school-based teacher collaboration: Revisiting the arguments. *Educational Administration Quarterly*, 42(5), 773-805.
- [40] Talbert, J. E., & McLaughlin, M. (1994). Teacher professionalism in local school contexts. *American Journal of Education*, 102(2), 123-53.
- [41] Rowan, B., Raudenbush, S. W., & Cheong, Y. F. (1993). Teaching as a nonroutine task: Implications for the management of schools. *Educational Administration Quarterly*, 29(4), 479-500.
- [42] Slegers, P., Bolhuis, S., & Geijsel, F. (2005). School improvement within a knowledge economy: Fostering professional learning from a multidimensional perspective. In N. Bascia, A. Cumming, A. Datnow, K. Leithwood, & D. Livingstone (Eds.), *International handbook of educational policy* (pp. 527-543). Dordrecht, Netherlands: Kluwer.
- [43] Duke, D. L. (1995). The move to reform teacher evaluation. In D. L. Duke (Ed.), *Teacher evaluation policy from accountability to professional development*. Albany, NY: State University of New York Press.
- [44] DuFour, R. P. (1997). The school as a learning organization: recommendations for school improvement. *NASSP Bulletin*, 81(588), 81-87.
- [45] Lashway, L. (1998). Creating a learning organization (*ERIC Digest*). Eugene, OR: ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED420897)
- [46] Rosenholtz, S. J., Bassler, O., & Hoover-Dempsey, K. V. (1986). Organizational conditions of teacher learning. *Teaching and Teacher Education*, 2(2), 91-104.
- [47] Hoover-Dempsey, K. V., Bassler, O. C., & Brissle, J. S. (1987). Parent involvement: contributions of teacher efficacy, school socioeconomic status, and other school characteristics. *American Educational Research Journal*, 24(3), 417-435.
- [48] Warren, R. L. (1975). Context and isolation: The teaching experience in an elementary school. *Human Organization*, 34(2), 139-148.
- [49] Lee, V. E., Bryk, A. S., & Smith, J. B. (1993). The organization of effective high schools. In L. Darling-Hammond (Ed.), *Review of research in education* (Vol. 19, pp. 171-267). Washington, DC: American Educational Research Association.
- [50] Bridges, E. M., & Hallinan, M. T. (1978). Subunit size, work system interdependence, and employee absenteeism. *Educational Administration Quarterly*, 14(2), 24-42.
- [51] Newmann, F. M. & Wehlage, G. G. (1995). *Successful school restructuring: A report to the public and educators*. Madison, WI: Center on Organization and Restructuring of Schools.
- [52] Richmond, J. (1992). The concept of the small secondary school. *Educational Studies*, 18(3), 267-275.
- [53] Organization for Economic Cooperation and Development [OECD]. (2014). *TALIS 2013 technical report*. Paris, France: OECD.
- [54] Raudenbush, S. W., & Bryk, A. S. (1992). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.
- [55] Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York: Teachers College Press.
- [56] Webb, R., Vulliamy, G., Hämäläinen, S., Sarja, A., Kimonen, E., & Nevalainen, R. (2004). Pressures, rewards and teacher retention: A comparative study of primary teaching in England and Finland. *Scandinavian Journal of Educational Research*, 48(2), 169-188.
- [57] Simola, H. (2005). The Finnish miracle of PISA: Historical and sociological remarks on teaching and teacher education. *Comparative Education*, 41(4), 455-470.
- [58] Organization for Economic Cooperation and Development [OECD]. (2012). Finland: A non-competitive education for a competitive economy, Lesson from PISA for Japan.