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Material, Human, and Social Capital in the Professional Learning Community and Correlations With Teacher/School Characteristics

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This study examines the practices and perceptions of Canadian teachers (N = 172) from the provinces of Québec and New Brunswick with respect to the professional learning community (PLC) in light of several sociodemographic and socioprofessional characteristics of the teachers and those of their school. Factor analyses and correlation tests were thus conducted to determine factor validity and the presence of between-factor connections. The conceptual framework was composed of three groups of predictive factors, namely, material and school-based (material capital), human (human capital), and social (social capital) conditions. This study will enrich the knowledge base on PLCs by describing certain positive and negative correlations and will also contribute to school practices and decisions to prepare and improve the development of Professional learning communities (PLCs) and guide them toward total sustainment.

Cette étude porte sur les pratiques et les perceptions d'enseignants canadiens (N = 172) provenant du Québec et du Nouveau-Brunswick à l'égard de la communauté d'apprentissage professionnelle (CAP) et ce, en lien avec plusieurs de leurs caractéristiques sociodémographiques et socioprofessionnelles et de celles relatives à leur école. Des analyses factorielles et des tests de corrélation ont été effectués pour examiner la validité factorielle et les liens entre les facteurs. Le cadre conceptuel est composé de trois groupes de facteurs, à savoir les conditions matérielles et institutionnelles (capital matériel), humaines (capital humain) et sociales (capital social). Cette étude enrichit la base de connaissances sur les CAP en décrivant certaines corrélations positives et négatives et contribue également aux pratiques et aux décisions prises dans les écoles afin de préparer et d'améliorer le développement des CAP, et ce, pour amener celles-ci vers la maturité.

Following publication of *The Fifth Discipline: The Art and Practice of the Learning Organization* (Senge, 1990), Wenger's work on communities of practice (1998) led several authors to encourage schools to become Professional learning communities (PLCs; Fullan, 1993; Mitchell & Sackney, 2000; Seashore & Leithwood, 1998). This movement has since generated considerable interest and subsequent research exploring the advantages of collective intelligence and a shared vision to support sustainable reforms through rapid and adaptable solutions (Giles & Hargreaves, 2006; Sengeet al., 2000).

The PLC constitutes an effective work method to improve teachers' practices, increase their

autonomy, and stimulate their development and professional competencies. Recognized for its numerous positive effects, this organizational approach has been and continues to be applauded by educators, leaders, and researchers alike (Warwas & Helm, 2018).

The PLC work model is known to have a positive impact on teaching practices (Boyle et al., 2005; Goddard et al., 2007), sense of collective efficacy (Olivier & Hipp, 2006), commitment (Lee et al., 2011), and professional growth (Enthoven & De Bruijn, 2010; Supovitz, 2002), which all contribute to improving student learning and achievement (DuFour & Eaker, 1998; Hord & Sommers, 2008; Tschannen-Moran, 2009; Vescio et al., 2008; Wahlstrom & Louis, 2008). In addition, learning communities can also promote student inclusion to ensure that no one is left behind (UNESCO, 2020). However, in order to reach maturity and achieve the anticipated goals and results, the PLC must go through several stages of development (initiation, implementation, and institutionalization) that correlate positively with teacher professionalism (Cansoy & Parlar, 2017).

Although studies abound on the subject of the PLC, several limitations have been observed. Some authors have criticized the PLC for being too atheoretical because of the difficulty transferring the knowledge into action (in teaching practices, for example) to inform and to guide educators (Hannula & Harviainen, 2016). Moreover, early studies referred to a theoretical "confusion" regarding Organizational Learning in that teachers and their administrators were unable to translate this abstract concept into structures and processes to actually serve schools (Darling-Hammond, 1996; DuFour & Eaker, 1998; Fullan, 2000).

As regards the work of teachers in PLCs specifically, studies are lacking on the individual and contextual effects of PLC initiation and development (Giles & Hargreaves, 2006; Stoll et al., 2006). Hallinger et al. (2016) argued that literature reviews had a tendency to not consider the subject of leadership and the contextual particularities. These authors recommended exploring the connection between these two elements. Because this also directly concerns teachers, as the context is shared with their principals, this observation raises the following question: Which sociodemographic and socioprofessional characteristics of the teachers and those of their school are associated with their perceptions and practices in a PLC?

Literature Review

Research on PLCs is divided into several categories. Some authors have identified three main currents, namely, PLC construction, its contexts and conditions, and its effects (Hairon et al., 2017); others have grouped the literature according to: (1) the PLC's characteristics (Hindin et al., 2007); (2) the learning processes within the PLC (Admiraal et al., 2012); (3) the effects of PLC teams on student outcomes (Lomos et al., 2011; Sigurðardóttir, 2010; Visscher & Witziers, 2004); and (4) the effect of the principal's leadership on PLC success (Clausen et al., 2009; Mullen & Hutinger, 2008).

Despite substantial research on the subject, there continues to be a lack of contextual data (on teachers and their school) in terms of how PLCs are introduced, developed, and nurtured to fruition. This study will therefore contribute by providing much needed quantitative knowledge on these aspects.

Contextual Factors Favoring PLC Initiation, Development, and Sustainment

Several factors contribute to the development of the PLC, such as the characteristics of the

location where it is developed (Warwas & Helm 2018), the staff's experiences, and the school's size and socioeconomic status (Sukru Bellibas et al., 2017). Concerning these elements, this section presents the conditions (material and institutional, human, and social) underlying the introduction, development, and maintenance of a PLC.

Material and Institutional Conditions

Material and school-based resources constitute the prerequisite conditions that enable collaboration among teachers. This involves providing the necessary time and workspace to facilitate productive collaborative work. The time spent in the PLC meetings must therefore be included in, rather than added to, the teachers' work schedule (De Neve & Devos, 2017; Owen, 2014).

Successful development of the PLC thus depends, first and foremost, on these crucial material resources to support its initiation and growth. That said, although these resources are vital, they alone cannot fully sustain development. Moreover, principals have often been criticized for providing only the physical amenities (material and temporal resources, task organization, among others) and not introducing pro-active strategies and practices to stimulate teacher autonomy, instill a climate of trust, and foster a culture of collaboration (Cranston, 2011).

Collaborative activities that promote interactions and dialogue among teachers are also important in the healthy development of any PLC. Indeed, in effective schools where quality collaborations are evidenced between teachers of the same grade level (horizontal collaboration), the teachers have been shown to improve more rapidly (Vescio et al., 2008).

The PLC is recognized as having a notable impact on the collaborative actions of its members (Stoll et al., 2006; Vescio et al., 2008). These group activities may include in-class observations, the study of relevant literature, the review of video-taped lessons, the development of new teaching support measures, the search for novel teaching ideas (Philips, 2003), action-research initiatives, and targeted classroom observations to stimulate reflective dialogue on teaching and learning (Tam, 2015).

Human Conditions

The PLC develops successfully when teachers are motivated (Prenger, Poortman, & Handelzalts, 2017) and are committed as a group to improving student learning, collaborative learning, reflective dialogue, and the sharing of common values and vision (Ning et al., 2016; Warwas & Helm, 2018). Growth is also possible within the PLC through professional development and requires that the teachers have common goals and build team activities to reach these goals (Olivier, 2003). In other words, in the effective PLC, each member invests in collaborations for the ultimate benefit of their students (DuFour, 2004; Hord, 2004).

Reviewing teaching practices should also become the norm, as group reflection on which methods and pedagogical structures work and which don't is crucial to the members' improvement and effectiveness (Huffmann & Hipp 2003). Further to this, reflective dialogue taking place in the PLC is generally in the form of conversations during which knowledge is exchanged and developed to improve understanding and problem solving (Mercer, 2008). This dialogue, so vital in teachers' teamwork activities, is a veritable platform where they can share and process experiences, conceptualizations, and learning related to issues in their practice (Horn & Little, 2010). Tensions with regard to the various roles and discussions (Schaap et al., 2012) can

also influence PLC development.

Finally, in an effective PLC, an elaborated mental model is shared by working together on the issue of school improvement (Decuyper et al., 2010). In addition to leadership and structured activities, this common goal contributes to enhancing teacher satisfaction levels (Prenger et al., 2017). Teacher supervision, through collaborative, positive, and shared leadership, also helps the school members to learn, work together, innovate, explore, reflect, and provide collective input (Chen et al., 2016).

Social Conditions

To break the isolation and to form effective PLCs, schools must also establish support structures based on respect, caring, justice, and trust among its stakeholders. Only with trust can relationship gaps between principals and their teachers be abated and interactions encouraged (Van Maele et al., 2014). Indeed, in schools where the culture promotes openmindedness and trust, teachers have been shown to create new learning activities and have greater access to opportunities for professional growth (Hargreaves, 2003). In fact, compared to many other factors, trust has been shown to be the predictive factor with the greatest effect on PLC development (Gray et al., 2016). Referred to as the *catalyst* (Bryk et al., 1999) or the *glue* that binds the PLC (Cranston, 2011), this variable stimulates collaboration and nurtures the teachers' will to improve professionally. In their analysis of the connections between the various partners in the process (colleagues, parents, and principals), Yin et al. (2019) found that trust between colleagues had a positive influence on teacher professional learning. In this perspective, teachers must be able to openly communicate with each other as well as with the other persons invested in the process.

Certain intrinsic human factors such as motivation and beliefs have also been shown to influence behaviors (Stephan & Uhlaner, 2010; Verheul et al., 2002). It is also important to note that the emotional security perceived when sharing personal and confidential information, together with collective responsibility and mutual trust, are undeniable factors favoring discussion (Admiraal et al., 2012; Hord, 2004), and that a lack of social support reportedly hinders the sharing of knowledge in schools (Prenger et al., 2017).

Teachers' perceptions of their efficacy (particularly as a group) can also affect the social conditions associated with PLCs. Collective efficacy is defined as "a group's shared belief in their conjoint capabilities to organize and execute the course of action required to produce given levels of attainments" (Bandura, 1997, p. 477). Among the school's characteristics, the teachers' sense of collective efficacy is now considered to be a significant predictor of academic achievement (Schechter & Tschannen-Moran, 2006), as it strongly influences how teachers teach, manage their classrooms, and motivate their students (Goddard & Goddard, 2001).

Conceptual Framework

This study is based on the following concepts: (1) the PLC and (2) the conditions (material, institutional, human, and social) involved for successful initiation, development, and sustainment of the PLC, which have been our focus in our recent work on PLCs (Bouchamma et al., 2014) and communities of practice (Bouchamma et al., 2018), in which we refer to the notion of *capital* as being divided into three categories, namely, material and human capital (Woolcock, 2001) and social capital (Bourdieu, 1979).

The Professional Learning Community

The PLC is defined as a work model for schools that centers on collaboration within the school team and encourages the collective undertaking of actitivies and reflection toward a common goal, which is the continuous improvement of student outcomes (Roy & Hord, 2006). Standing on various guiding principles (DuFour & Eaker, 1998), this instructional, results-oriented approach is characterized by shared leadership, experiences, and professional practices among its members; common values and visions; and group learning.

Required Conditions/Capital to Develop the PLC

The concept of capital (Bourdieu, 1980) is a relevant element to consider when studying school systems and is largely used in organizational theory (Cappelletti et al., 2010; Emirbayer & Johnson, 2008).

Economic/material Capital

In order to optimize the quality of the interactions between the members and enhance their productivity, the PLC must have access to necessary financial and material resources for support (Borzillo, 2007; Wenger & Snyder, 2000). These resources represent the economic capital, which includes such amenities as time and money. This capital encompasses all of a person's economic actions, revenues, and material resources (Bourdieu, 1979). In our study, it refers to the financial and material resources provided by the school district/commission, and Ministries of Education. Having economic capital provides easier access to the two other forms of capital, namely, human and social capital.

Human Capital

Human capital regards a person's qualifications and other characteristics that offer various advantages, whether personal, economic, or social. These qualifications and skills are mainly acquired but may also be innate; they include the individual characteristics, knowledge, qualifications, and competencies that facilitate the creation of personal, social, and economic well-being (Woolcock, 2001).

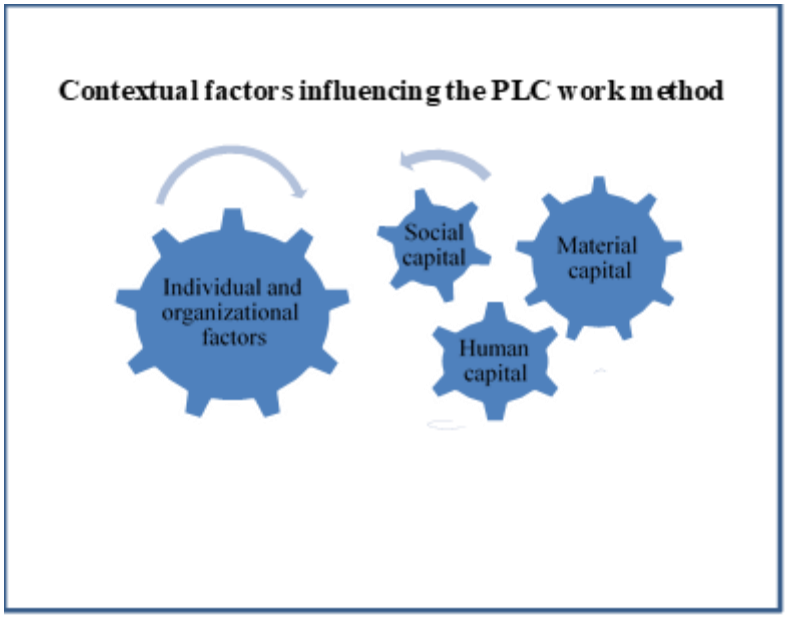
Social Capital

Social capital refers to all existing or potential resources associated with having a durable network of relationships, more or less established, connecting personal knowledge to that of others (Bourdieu, 1980).

Figure 1 illustrates the PLC work process in the school setting. Material (or economic) capital is a necessary component of the process when initiating a PLC, as it opens the door to human and social capital.

Figure 1

How the PLC Works: Material, Human, and Social Capital



Methodology

Participants

The participants were teachers who worked in a PLC that had reached a state of advanced institutionalization (N = 172; 105 in Québec and 67 in New Brunswick). Thirty-two participants were men and 140 were women, with an average age of 34.66 years, an average of 11.21 years of teaching experience, and an average of 6.45 years in their current school at the time of the study.

Instruments

To gather the necessary information, we administered a questionnaire entitled *Teachers' practices, perceptions, and sense of efficacy in the PLC*, developed as part of a SSHRC project. Items were measured on a six-point Likert scale, from *Totally disagree* to *Totally agree*. The questionnaire was divided into four sections: teachers' sociodemographic and socioprofessional characteristics; those of their school; teachers' practices and perceptions regarding their PLC; and their sense of personal and collective efficacy toward their PLC. Table 1 presents a sample of items from this questionnaire.

Factor and Reliability Analyses

Using SPSS Statistics 22.0 software, we performed an exploratory factor analysis to identify the intercorrelated variables and specifically those we were able to measure as a unit. The FA extraction method used was the Principal Component Analysis and the rotation method was Varimax with Kaiser Normalization.

Table 1

Examples of Survey Items

Sections	Items
Teachers' practices regarding their PLC	In the main work group, the climate favors discussion and exchange.
Teachers' perceptions regarding their PLC	
Sense of self efficacy	I know how to work with my colleagues on a team. I know how to motivate my colleagues.
Sense of collective efficacy	We know how to integrate a member who does not understand teamwork. We know how to communicate strategies that are easy to apply.

The extraction method was based on an Eigenvalue greater than 1. To do so, we chose Total variance explained analyses to retain only those factors with an Eigenvalue greater than 1.0. In addition, the factors with less than three items were excluded and only those factors with a KMO index of more than 0.80 demonstrating highly significant inter-item correlations were retained.

The correlations were used to identify the connections between the factor analysis variables (representing the material, human, and social capital) as well as between a few teacher characteristics (sociodemographic and socioprofessional) and those of their school.

Results

Table 2 presents the correlations found between the variable associating the three capitals (material, human, and social) and the effects within the PLC in terms of the teachers' sociodemographic and socioprofessional characteristics and those of their school. Both the positive and negative correlations are evidenced. The individual and organizational factors, represented by numbers, are presented in the table's note.

Positive Correlations

Level of Collaboration

We observed a significant correlation between the teachers' level of collaboration and 19 factors among the 21 under consideration, namely, material capital (8 factors), human capital (8), social capital (2), and one factor pertaining to the effects (impact on the practices and perceptions).

Among the factors associated with material capital, our findings show that the more the level of collaboration increased, the more the following factors increased, with positive correlations with the eight factors, as follows: principles and objectives ($r = 0.53$, $p < 0.01$); practices in the PLC ($r = 0.52$, $p < 0.01$); practices in the field (classroom and school) ($r = .25$, $p < 0.01$); objectives ($r = .33$, $p < 0.01$); structural conditions favoring collaboration ($r = .41$, $p < 0.01$); conditions favoring teamwork ($r = .40$, $p < 0.01$); human and material resources ($r = .17$, $p < 0.05$); and knowledge on improving teamwork ($r = .69$, $p < 0.001$).

Six of the factors pertaining to human capital correlated positively with collaboration. The

Table 2

Factor Analysis Variable Correlations with Teacher/School Characteristic

Individual and organizational factors*	1	2	3	4	5	6	7	8
Material capital								
Principles and objectives	.53**	.24**	.10	.02	-.15	.04	-.07	.08
Practices in the PLC	.52**	.26**	.05	-.03	-.14	.03	-.03	.09
Field practices	.25**	.24**	.08	.08	.03	.18*	-.05	.16*
Objectives	.33**	.00	.15	.11	.20*	.06	-.10	.20**
Structural conditions favoring collaboration	.41**	.11	.16*	.07	-.19*	.05	-.13	.18*
Conditions favoring teamwork	.40**	.13	-.04	-.04	-.19*	.13	-.09	.00
Human and material resources	.17*	.67	.04	.00	-.03	.08	.17*	.09
Knowledge on improving teamwork	.69***	.05	-.06	-.05	-.07	.02	.01	-.14
Human capital								
Justice	.38**	.10	.19*	.09	-.23**	-.04	-.11	.10
Caring	.44**	.20**	.67***	-.07	-.08	-.07	-.07	.04
Teacher professional development	.41**	.14	.19*	.10	-.23**	.10	-.13	.13
Classroom management and learning	.41**	.23**	.11	.00	-.12	.11	-.08	.10
Teacher personal development	.31**	.14	.15	.06	-.22**	.15	-.13	.13
Psychological and structural challenges	-.10	-.06	.02	.01	.04	-.07	.12	.01
Shared leadership	.40**	.11	.16*	.11	-.16	.01	-.08	.08
Transformational leadership	.34**	.14	.23**	.08	-.23**	.01	-.14	.11
Pedagogical leadership	.21*	.02	.18*	.06	-.20*	.16	-.11	.18*
Social capital								
Sense of personal efficacy	.34**	.08	.06	.06	-.10	.10	-.05	.10
Sense of collective efficacy	.46**	.06	.01	-.07	-.18*	.07	-.08	.13
Ideal vertical collaboration	.16	-.01	-.16	-.20*	-.16	.05	-.05	.06
Effects								
Impact on the practices and perceptions	.38**	.04	.12	.09	-.22*	.00	-.16*	.08

***p < 0.001. **p < 0.01. *p < 0.05

Note. 1 = level of collaboration; 2 = team heterogeneity; 3 = teaching experience (number of years); 4 = experience in the school (number of years); 5 = grade level taught; 6 = number of students being taught; 7 = size of the school; 8 = language diversity

more collaboration increased, the more the following factors increased: justice ($r = .38$, $p < 0.01$); caring ($r = .44$, $p < 0.01$); teacher professional development ($r = .44$, $p < 0.01$); classroom management and learning ($r = .41$, $p < 0.01$); teacher personal development ($r = .31$, $p < 0.01$); shared leadership ($r = .40$, $p< 0.01$); transformational leadership ($r = .34$, $p < 0.01$); and finally pedagogical leadership ($r = .21$, $p < 0.05$).

For social capital and its two factors, namely, sense of personal efficacy and sense of collective efficacy, the more collaboration increased, the more each factor increased (personal efficacy: $r = .34$, $p < 0.01$; collective efficacy: $r = .46$, $p < 0.01$).

Finally, a significant correlation was observed between level of collaboration and effects, as the more collaboration increased, the more a positive impact on the practices and perceptions was observed ($r = .38$, $p < 0.01$).

Team Heterogeneity

Significant yet less pronounced correlations were also found between team heterogeneity and five factors, three of which were associated with material capital. The more the level of heterogeneity increased in the PLC, the more the following factors increased: principles and objectives ($r = .24$, $p < 0.01$); practices within the PLC ($r = .26$, $p < 0.01$); field practices ($r = .24$, $p < 0.01$); caring ($r = .20$, $p < 0.01$); and classroom management and learning ($r = .23$, $p < 0.01$).

Teaching Experience

Significant correlations were noted between teaching experience and six human capital factors. Again, the more teaching experience increased, the more the increase was noticeable for these factors:

- justice ($r = .19$, $p < 0.05$);
- caring ($r = .19$, $p < 0.05$);
- teacher professional development ($r = .19$, $p < 0.05$);
- shared leadership ($r = .16$, $p < 0.05$);
- transformational leadership ($r = .23$, $p < 0.01$); and
- pedagogical leadership ($r = .18$, $p < 0.05$).

Grade Level

Significant correlations were observed between the grade level taught and eight factors: three pertained to material capital, four to human capital, and one to effects (impact on the practices and perceptions). The higher the grade level, the greater the number of team objectives ($r = .20$, $p < 0.05$).

Number of Students

A significant correlation was found between the number of students being taught and one material capital factor, namely, practices in the field. The greater the number of students, the greater the number of collaborative practices in the classroom and the school ($r = .18$, $p < 0.05$).

Language Diversity

Notable correlations were also found here involving four factors, with three related to material capital and one to human capital. The greater the number of francization students, the more an increase was noticeable in:

- the collaborative practices taking place in the school ($r = .16$, $p < 0.05$);
- the number of team objectives ($r = .20$, $p < 0.01$);
- the structural conditions favoring collaboration ($r = .18$, $p < 0.05$); and
- the pedagogical leadership exercised ($r = .18$, p 0.05).

Negative Correlations

Experience in the School

We observed that the greater the number of years of experience in the school, the more vertical collaboration tended to decrease ($r = -.20$, $p < 0.05$).

Grade Level Taught

The higher the grade level, the more the structural conditions favoring collaboration decreased ($r = -.19$, $p < 0.05$), as did the conditions favoring teamwork ($r = -.19$, $p < 0.05$).

Five factors were associated with human capital; the higher the grade level, the more the following tended to decrease:

- justice ($r = -.23$, $p < 0.01$);
- teacher professional development ($r = -.23$, $p < 0.01$);
- teacher personal development ($r = -.22$, $p < 0.01$);
- transformational leadership ($r = -.23$, $p < 0.01$); and
- pedagogical leadership ($r = -.20$, $p < 0.05$).

One factor correlated with social capital: the higher the grade level being taught, the more the sense of collective efficacy decreased ($r = -.18$, $p < 0.05$).

School Size

The larger the school, the more the impact on the practices and perceptions decreased ($r = -.16$, $p < 0.05$). A significant correlation was thus observed between the size of the school and one factor related to material capital, namely, material and human resources ($r = .17$, $p < 0.05$).

One factor correlated with effects: the higher the grade level, the more the impact on the practices and perceptions decreased ($r = -.22$, $p < 0.05$).

Discussion

The focus of this study was the predictive factors associated with the material, human, and social capital in the PLC and how these variables related to the teachers' sociodemographic and socioprofessional characteristics and those of their school. Factor analyses and subsequent correlational testing enabled us to observe 38 positive correlations and 11 negative ones between the 21 factor analysis variables and the eight characteristics defining the teachers and their school. A more thorough discussion of these positive and negative correlations follows.

Positive Correlations

Level of Collaboration

Our results reveal a significant correlation between the teachers' level of collaboration and a large number of factors (19 among the 21 under consideration): material capital (8 factors), human capital (8), social capital (2), and one factor pertaining to the effects (impact on the practices and perceptions).

Among the factors associated with material capital, our findings show that the more the level of collaboration increased, the more certain factors increased. Indeed, positive correlations with eight factors were observed, as follows: principles and objectives; practices in the PLC; practices in the field (classroom and school); objectives; structural conditions favoring collaboration; conditions favoring teamwork; human and material resources; and knowledge on improving teamwork.

Our results thus suggest that collaboration cannot exist without its three pillars (material, human, and social capital) and to successfully develop, material capital alone is not enough but must be completed with human and social capital. Our findings also indicate that the more the level of collaboration increased, the more the sense of personal and collective efficacy grew. Studies on the subject show that teacher collective efficacy strongly influences their teaching practices, their classroom management and motivation strategies (Goddard & Goddard, 2001), and their students' outcomes, which supports our findings (Bandura, 1997; Goddard & Goddard, 2001; Goddard et al., 2000; Goddard, & Skrla 2006; Hoy et al., 2002).

Our results are consistent with the main factors identified in the literature as contributing to successfully establishing and sustaining collaboration between teachers. These factors are related to the school system (Chen & Mitchell, 2015), the school, the principals, and the teachers, and may include: material and temporal resources; the common mission, vision, values, and educational objectives of the members; a safe and nurturing environment for the members that is crucial for successful interactions, collaborations, and productivity; the members' willingness to participate; and the climate of trust (Bouchamma et al., 2020).

For any PLC to succeed, collaboration and the pursuit of common goals are key conditions. The sharing of winning professional practices by teachers strongly encourages the emergence of this culture of collaboration (Wahlstrom & Louis, 2008), which evolves through various actions, both structural (group agenda for easier planning) and human (mutual respect). In addition, the PLC proposes a collective approach in which shared views and values are developed and collaboration is favored over competition (DuFour & Eaker, 1998).

The collaborative practices taking place in the PLC also help develop stable databases. Therefore, by using and sharing these data, the members acquire a common language to discuss and develop winning teaching strategies to improve student learning.

Finally, in a major study on the most effective organizational conditions to enhance teacher learning and collaboration (Ford & Ware, 2018), the socio-psychological theory was used to explain how the actions of the principal support the psychological needs of their teachers as learners. It is in this perspective that our study delved into the psychological and structural challenges faced by principals and analyzes the latter's sense of efficacy. Here, we found no positive correlation. It would thus be of interest to further examine this dimension by using the Self-determination theory to analyze the teacher self-regulatory climate. This theory is defined as

a series of normative and organizational conditions that meet the teachers' psychological, learning, and development needs.

Team Heterogeneity

We observed that the greater the level of heterogeneity among the team members in the PLC, the stronger the correlation with principles and objectives, practices within the PLC, practices in the field, caring, and classroom management and learning.

Heterogeneity ensures that the PLC members do not necessarily automatically adopt the same pedagogical practices, have the same level of determination to reach their goals, and try new approaches, nor do they face the same challenges or manifest the same sense of efficacy. This diverseness in terms of experiences, representations, knowledge, motivations, emotions, views, and practices is not only inevitable but also necessary to create and support dialogue and results-oriented collaboration (Nogueira, & da Silva, 2016).

Furthermore, when the more seasoned members in the PLC share their successful teaching practices and techniques, this action may inspire their less experienced colleagues. In return, newly hired members can provide a fresh perspective and the latest theoretical knowledge with the group. In other words, a PLC that is heterogeneous is in fact advantaged by having a mix of different yet complementary strengths, weaknesses, and experiences. Despite their diverse contexts, the teachers in a PLC nevertheless all share the same mission, which is the acquisition of knowledge and skills to improve their professional practices and ultimately, their students' learning and achievement (Bouchamma et al., 2020).

Team heterogeneity becomes problematic when it hinders the formulation of specific objectives to guide the group's activities. Indeed, in a study by Bouchamma et al. (2016), heterogeneity appeared to divide the group according to grade level (elementary, secondary, job training, adult education). Total homogeneity is therefore unrealistic. As too much heterogeneity (particularly in terms of teaching level) can prevent some team members from working on similar content or goals, other factors such as experience, teaching status (tenured/non-tenured), number of years of experience, and training acquired can actually benefit the dynamics within the group and enrich both discussion and learning, as was observed by Bouchamma et al. (2016) in their action-research training project in teacher supervision using the PLC in a professional practice community setting in which the participants, despite their heterogeneous profile, were able to progress at their own pace toward the attainment of their goals.

Teaching Experience

Our findings reveal that the more experienced teachers were more likely to practice justice, caring, shared leadership, and transformational leadership. They also demonstrated the desire to share their past experiences with their peers to help transform their schools. And because these seasoned educators were well aware that teacher training had evolved significantly, they both wanted and welcomed professional development opportunities and activities.

Collaborative work is certainly not the first path most newly-inducted teachers would choose, as most begin their careers in "survival mode"—an adaptation period extending from a few months (Lamontagne, 2008) to up to three years (Huberman, 1995). This stage is characterized by their coming to terms not only with the differences between what they learned at university and the daily reality in the classroom, but also with the responsibility of their actions (Gingras &

Mukamurera, 2008), not to mention the new surroundings and processes and the constant adjustments they must make in their chosen profession. They must concentrate on the curriculum, on lesson planning, and on other related tasks. It is only after the initial shock of Year One that they are able to fully focus on such important activities as long-term planning and the learning-related objectives and individual needs of their students (Marshall et al., 1990, in Fantilli & McDougall, 2009). In short, during this period, new teachers must adapt to the rigors of the profession, seek acceptance by their peers in their new environment, and hone their craft during a time when trial and error is part of their rite of passage (Gingras & Mukamurera, 2008, p. 204).

Number of Students and School Size

The greater the number of students being taught, the greater was the number of (field) practices taking place in the classroom and the school. The items associated with this factor were: observing their colleagues teach, participating in co-teaching, and mentoring.

A significant positive correlation was also observed between the size of the school and the material and human resources, as the larger the school, the more material and human resources increased.

In small-sized schools, bureaucracy is less evidenced, the principal's interventions are faster to meet the teachers' needs, parent and community participation is more significant, and there is greater accountability (the actions undertaken and each member's practices are more easily observable) (Riggen, 2013) to support mobilization. It thus appears only logical that education authorities would provide larger schools with a greater amount of material and human resources. That said, how resources are allotted and vary from one school to the next should not depend solely on the number of learners but rather, more importantly, on the specific needs expressed based on solid data, notably regarding the number of students with visual, hearing, physical, or intellectual challenges, those with gender issues and ethnocultural and language differences, and those in isolated regions, among others.

Language Diversity

Our results demonstrate that the greater the number of students in francization, the more collaborative practices in the field, team objectives, and pedagogical leadership were shown to increase.

It must be emphasized that this research domain is in its baby steps. The rare studies on PLCs in a context of diversity show that working in a PLC makes it possible to reinforce professional relationships by acknowledging the subjectivity and the differences at play and by addressing the needs of every member so as to mobilize, support, and nurture the group's capabilities to ultimately improve awareness of and openness to cultural diversity (Bjartveit & Kinzel, 2019).

In their study, Bjartveit and Kinzel (2019) demonstrated how individual commitment to the relational practices within the PLC and discussions on the subject of cultural diversity in early education helped educators share their subjective perspective, their field experiences, and what they learned through research on the subject. The members were therefore able to work together to define and explore ways to co-plan transcultural study programs. This study thus confirms that a growing diversity must involve well-supported collaboration practices.

Negative Correlations

We observed 10 negative correlations between nine of the 21 variables resulting from the factor analysis and three teacher/school characteristics, namely, experience in the school, grade level taught, and size of the school.

Experience in the School

Research shows that teachers improve faster in schools where vertical collaboration is evidenced (Stoll et al., 2006; Vescio et al., 2008). That said, the teacher with the most teaching experience in a school was less inclined toward vertical collaboration (the more years they were in the school, the less they collaborated with teachers of other grades). And although the newly inducted teachers beginning their career were more inclined to collaborate, their collaboration was more flexible and more vertical in nature, compared to their more experienced colleagues who preferred working with same-level peers.

Grade Level

It must be pointed out that we defined grade level using a continuous variable rather than divide it into elementary and secondary, due to the differences between the Québec and francophone New Brunswick school systems. In Québec, elementary education covers grades 1 through 6, with secondary education lasting five years. In the francophone sector of New Brunswick, students generally attend the same elementary school, from kindergarten through 8th grade before transitioning to secondary school where they complete grades 9 through 12.
Of interest is that grade level taught correlated negatively with eight factors: two related to material capital, five to human capital, and one to effects.

In material capital, we found that the higher the grade level taught, the more the structural conditions favoring collaboration decreased, as did the conditions favoring teamwork.

Among the factors related to human capital, the higher the grade level taught, the more the following decreased: justice practices, teacher professional and personal development, transformational and pedagogical leadership, and the effect variable, involving the positive impact on practices and perceptions.

For the two factors associated with social capital, our findings show that the higher the grade level taught, the more the sense of collective efficacy tended to decrease.

These results indicate significant differences between elementary and secondary schools, which could be explained in part by the organizational structure of these schools. For example, three elementary teachers teaching the same grade level who work together in a PLC will probably be more effective and productive than will three high school teachers who teach the same subject but in different grades.

Schechter (2008) found that the level of commitment of elementary teachers was significantly and positively related to organizational learning theory. It would thus be of interest to analyze this particular variable in elementary and secondary education but separately, which was not done in this study.

School Size

The larger the size of the school, the more noticeable was the decrease in the impact on the practices and perceptions. The consultation process in large schools notably has its share of challenges, particularly for principals who must delegate responsibility for the PLC to teacher-leaders while focusing on their own management duties, which requires a significant amount of effort and organization.

In addition, the greater the number of students in the school, the less teachers correlated with the positive impact on the practices and perceptions. The difficulty consulting with the teachers was indeed more prevalent in larger schools.

In their meta-analysis of 57 empirical studies on the effects of school size, Leithwood and Jantzi (2009) revealed that the staff's attitude toward their school and what was being taught was more positive in smaller schools, which supports our findings. Interpersonal relationships between teachers, consultants, administrators, and students were also more positive in these smaller schools than in larger schools. Moreover, the small schools were more inclined to optimize conditions to favor socialization and to nurture a strong sense of belonging to the school. In short, in our study, it was easier to introduce collaborative learning models (the PLC) in smaller schools than in larger ones (Kuziemko, 2006; Leithwood & Jantzi, 2009).

Conclusion

A review of the literature on the subject enabled us to develop and administer a teacher questionnaire, and following factor and reliability analyses, to identify 21 predictive factors associated with teacher characteristics and those of their school.

Our study concludes with a few political and practical considerations and implications for future research.

In Québec, unfortunately, the education reform launched in 1997 failed to meet its anticipated goals, as its application in the classroom was unsuccessful, particularly in terms of improving teaching practices and student learning (Cardin et al., 2013). These observations are not new, as more than 25 years ago several authors predicted that without solid professional interaction networks, government initiatives and proposals for structural changes would neither translate to nor sustain any tangible pedagogical and curricular improvements in the classroom (Fullan, 1995). It is precisely for this reason that considering the different contextual variables presented in this study is imperative in any important decision-making process. Ideally, structural changes must be proposed by those on the front lines, namely, the teachers in the PLC, who know and experience this reality on a daily basis.

It goes without saying that for teachers to be able to collectively discuss how to improve teaching and learning, the role of the principal must also change and evolve. The school leader must become an agent of change who effectively orchestrates the material capital (by allowing material resources, workspace, and time), human capital (by promoting a culture of collaboration), and social capital (by validating and supporting the work teachers do in their PLCs).

We believe that it is both important and highly timely that education research be extended to what is being achieved in the PLC and how the work is connected to other teacher and school characteristics, such as PLC-related training, student graduation data, the curricula being taught in our schools, and the reality of public versus private schools, among others.

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Note

1. The ideas and opinions expressed in this article are those of the author and do not necessarily represent the view of UNESCO.

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