# EXPLORING SECONDARY SCHOOL TEACHERS' CONSTRUCTIVIST BELIEFS USING TALIS 2013

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## ABSTRACT

A variety of educational reform efforts and the urgent need to develop students' 21st century skills have prompted school administrators and educators to explore a more constructivist-oriented approach to teaching and learning. Research suggests that choices of classroom practice are associated with teachers' beliefs. The author of this study analyzed the international data set of the Teaching and Learning International Study (TALIS) 2013 to examine the relationship between lower secondary school teachers' constructivist beliefs, their self-efficacy beliefs, degree of teacher co-operation, teacher background information, and the school principals' instructional leadership. A series of hierarchical linear modelling (HLM) studies were performed to examine the data set of three countries (South Korea, Finland, and Mexico). These countries represent the high and the low achievers in the global index of cognitive skills and educational attainment. An understanding of how constructivist beliefs associate with other factors will assist curriculum developers in designing quality teacher preparation and professional development programs. Additionally, a measure of how school principals' instructional leadership associates with teachers' beliefs will provide guidelines for administrators' and implications for future study on school leadership.

## 1. INTRODUCTION

The Organization for Economic Co-operation and Development (OECD) introduced the Teaching and Learning International Survey (TALIS), which is the largest international survey of teachers and school principals regarding their feelings, beliefs, and pedagogical practices in 2008. The complete data collection also includes information regarding employment, classroom, and school characteristics and school principals' management and leadership. The second and most recent survey, TALIS 2013 - which was available to public in 2014, included more than 6,600 lower secondary schools and 107,000 teachers from 34 countries and sub-national entities (OECD, 2014). Researchers believe that this information could help educators and administrators across nations in shaping the effective teaching practices and policies (OECD, 2014) and could provide the opportunity to see differences or similarities of each TALIS participating countries in terms of their challenges and teaching approaches (Jensen, Sandoval-Hernández, Knoll, & Gonzalez, 2012). A clear understanding of teachers' beliefs in teaching, as one of the most important psychological constructs (Pajares, 1992), would help educators understand how these beliefs associate with their instructional practices and it would further provide guidance in strengthening innovative instructions in classroom.

The conceptual framework of this study has evolved from the integration of several theories and concepts. The author proposed five constructs including 1) teachers' constructivist beliefs, 2) teachers' self-efficacy beliefs, 3) teachers' professional activities, 4) teachers' background, and 5) principals' instructional leadership (Figure 1.1.)

## 2. LITERATURE REVIEW

*2.1 Teachers' constructivist beliefs*

According to Piaget's cognitive development theory, students construct their knowledge through assimilation and accommodation; on the contrary, Vygotsky's social constructivism concept stated that an individual constructs his or her knowledge by interacting with others (Liaw, 2004). In a range of studies, researchers explained that constructivist learning approach, which is one of the learner-centered approaches, introduces a process that allow students to develop their own meaning of things. Students are allowed to be curious. They start developing new knowledge by asking questions, interacting with friends and teachers to gain more information, and interpreting the information into a concept that make sense to them by using their previous knowledge and experiences (Brooks and Brooks, 1999; Prawat, 1996; Thayer-Bacon, 2000; Windschitl, 1999a; Woolfolk, 2010). The process cannot be accomplished by the teacher-directed approach. It is necessary that the teacher takes a role of a facilitator who support students to explore, construct and re-construct information and finally to develop conclusions that are valid and unique to each of them (Richardson, 2003).

A number of studies investigated how science teachers adopted the constructivist instructional approach in their classrooms and how importance of this concept in the science education field (e.g., Cakir, 2008; Singer & Moscovici 2008; Taber, 2014; Witteck, Beck, Most, Kienast, & Eilks, 2014). Numerous researchers supported the transition of classroom practices from the teacher-directed approach, e.g. lecturing, to a more constructivist-oriented instruction, which ultimately enhance students' critical-thinking, problem-solving, and decision-making skills (e.g., Barak & Shakhman, 2007; Ford, 2010; Nadelson et al., 2013). As such, the constructivist instructional practices have become more dominant in public schools and teacher education programs (Bybee et al., 2006; Davis & Sumara, 2002; Fang & Ashley, 2004; Gordon & O'Brien, 2007; Marlowe & Page, 2005).

Although there is a range of empirical studies examined the influence of constructivist instruction practices on student learning achievement, there is still a gap in the body of knowledge regarding how the constructivist beliefs of the teachers associated with other factors, especially those in the educational system, and how these factors associated with each other. Few studies have reported variables that associate with constructivist beliefs, for example, teacher self-efficacy (Nie, Tan, & Liau, 2013), and administrative and community support (Beamer et al., 2008; Yore, Anderson, Shymansky, 2005).
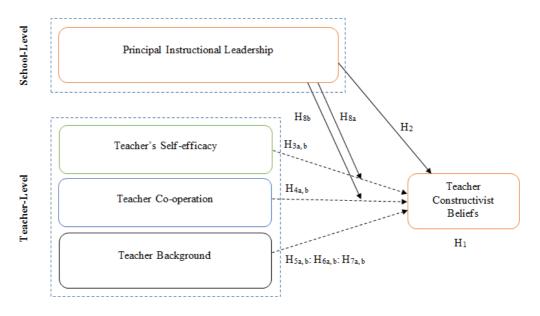


Figure 1.1. Conceptual framework and proposed hypotheses

*2.2 Teachers' self-efficacy beliefs*

The teacher self-efficacy, or teacher efficacy, is defined as the degree to which a teacher believes in his or her own ability to complete an assigned goal that required several activities such as planning, organizing, and teaching (Bandura, 1977; Bandura, 2006). Consistently, Protheroe (2008) described teacher efficacy as a sense of confidence in the teachers themselves to engage students and promote the students' learning. A range of studies have reported determinants of teacher self-efficacy, such as prior teaching experience, training and development, school culture (Bandura, 1993; Protheroe, 2008), teaching practices (Vieluf, Kunter, & Vijver, 2013; Smylie, 1988), constructivist instructional practices (Nie et al., 2013), and attitudes toward the use of innovative instructional practices (Guskey, 1988).

Numerous empirical studies investigated whether there is an association between teachers' constructivist beliefs and teacher efficacy. Appleton and Kindt (2002) revealed that whenever science teachers do not feel confident in their knowledge, they tend to use a more traditional teacher-directed instructional practice, such as lecturing. On the contrary, if the teachers feel confident in their content of knowledge, they are more likely to experiment with innovative instructional practices (Protheroe, 2008).

The main goal of constructivist instruction is that it provides a safe learning environment for learners to engage in knowledge constructions. Hence, this approach relies heavily on the teacher's ability to facilitate learning with understanding. Teachers with insufficient knowledge content and sense of confidence tend to find it difficult to adopt this approach in their classrooms practices.

### 2.3 Teachers' collaboration and cooperation

The term "collaboration" has been defined in many ways since this term has been widely used in many fields. Schrage (1991) described collaboration as "the process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have come to on their own. Collaboration creates a shared meaning about a process, a product, or an event." (p. 40). According to Goddard, Goddard, and Tschannen-Moran's study (2007), teachers collaborate and cooperate, as part of their professional activities, in several ways: 1) they exchange their teaching materials, 2) they develop curriculum and lesson plans together, and 3) they discuss the progress of their students. In the educational context, teachers' collaboration can "promote the most effective teaching possible for the greatest number of students" (Pugach & Johnson, 1995, p. 178). Dewey (1963) described how teachers and school librarians collaborated at work in order to integrate their expertise with an aim to foster students to reach their full potential. In the educational context, collaboration would ultimately increase the quality of teaching since it increased the possibilities of new way of teaching (Haycock, 1998). Teachers collaborated by sharing experience, sharing responsibilities, and conceptualized together (Dewey, 1963; Goddard, Goddard, & Tschannen-Moran, 2007).

### 2.4 Principal Instructional Leadership

Instructional leadership was defined as the influence of a school principal on school management in terms of teaching practices and curriculum with an aim to improve student achievement (Flath, 1989). Blase & Blase (2000) explained that school principal with a high level of instructional leadership tend to initiate and support learning communities. In order to emphasize the high-quality teaching, school principals with instructional leadership would give instructional feedbacks to teachers, model an effective instructional and encourage teachers to use assessment (Blase & Blase, 2000).

A range of empirical studies have confirmed the association between school principal practices and the students' achievement. Several studies have confirmed a small to moderate effect of school principal practices on student achievements (Hallinger, 2005; Hendriks & Steen, 2012; Huber & Muijs, 2010; Leithwood, Harris, & Hopkins, 2008; Robinson, Lloyd, & Rowe, 2008). Additionally, numerous empirical studies reported that the instructional leadership has positive effect on teacher practices and student achievement (Blase & Blase, 1999; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Seashore Louis, Dretzke, & Wahlstrom, 2010; Robinson, Lloyd, & Rowe, 2008). Researchers have reported a list of school principals' strategies that had a positive effect on teachers' motivation, satisfaction, sense-of-security, teacher efficacy, and self-esteem. The strategies include providing feedbacks to teachers, soliciting opinions for improvement, modeling effective teaching practices, and giving compliments to teachers (Blase & Blase, 2000). Robinson et al. (2008) further stated that the impact of instructional leadership on student achievement was three to four times larger than that of other leadership practices.

Teddlie (2005) investigated the association between instructional leadership and teacher efficacy and professional development. A recent study of Gumus, Bulut, and Bellibas (2013) examining the relationship between instructional leadership and teacher collaboration in Turkish primary schools. There are more than a hundred empirical studies investigating determinants of instructional leadership (e.g., school principal gender, experience, professional development, etc.) and the effect of instructional leadership on student achievement and the organization (e.g., school mission, curriculum) (Hallinger, 2005).

Although, researchers have concluded that school principals influenced their students' achievement through having an effect on teachers' behaviors, beliefs, and classroom practices (Hendriks & Steen, 2012; Leithwood et al., 2008), there is still a discrepancy in knowledge regarding how these variables interact to each

other and whether or not the influences are mediated or moderated by other factors in school system, such as teacher practices, school environment, and national characteristics (Huber & Muijs, 2010).

This quantitative study aims to investigate the associations between teachers' constructivist beliefs, self-efficacy beliefs, professional activities, and school principals' instructional leadership. The study was guided by three research questions:

1. Do teachers' constructivist beliefs vary across schools?
2. What factors have direct relationships with teachers' constructivist beliefs?
3. Does principal instructional leadership moderate the relationships between teacher-level predictors, namely self-efficacy and teacher co-operation, and constructivist beliefs?

## 3. METHODOLOGY

A cross-national data set of "the Teaching and Learning International Study" (TALIS) 2013 from OECD was used to examine the associations among teachers' constructivist beliefs, self-efficacy beliefs, professional activities, and the school principals' instructional leadership. The IDB analyzer was used to generate SPSS data files and to produce unbiased descriptive data for three countries, including South Korea, Finland, and Mexico.

Since teachers were nested within schools, a series of hierarchical linear modelling (HLM) studies was employed to analyze the data. Outputs from HLM would allow researchers to understand the variations among schools (if there is any) and to test whether principals (school level) had a direct or moderating effect on teachers' beliefs and practices (individual level). Researchers specified the school estimate weights (level 2) as the product of the school base weight and the school non-response adjustment factor. According to the OECD (2014), the TALIS 2013 data set employed two-stage stratified cluster sampling. Firstly, 200 lower secondary schools per country were selected using probability proportional to size technique. Then, a minimum of 20 teachers, who teach regular classes, and a school principal were randomly selected (OECD, 2014). This study's sample consisted of 3 countries: South Korea, Finland, and Mexico.

## 4. RESULTS

The following tables (Tables 1.2 and 1.3) show the descriptive statistics of the main variables which consisted of 27 teacher- and principal-level measuring items. The analysis includes a sample of 2,933 teachers in 177 schools in South Korea, 2,722 teachers in 145 schools in Finland, and 3,138 teachers in 187 schools in Mexico. The teacher respondents' ages ranged from 22 to 62 years with an average age of 43 years ($M = 42.50$, $SD = 9.13$) in South Korea, 19 to 67 with an average age of 44 years ($M = 44.04$, $SD = 10.07$) in Finland, and 19 to 75 with an average age of 42 years ($M = 42.34$, $SD = 10.07$) in Mexico. Teacher respondents in South Korea reported having an average of 16.58 years ($SD = 9.83$) of working experience as a teacher, while teacher respondents in Finland and Mexico reported having an average of 15.51 years ($SD = 9.64$) and 16.37 years ($SD = 9.65$), respectively.

The researchers found a significant positive correlations between the teacher respondents' ages and their amounts of working experience as teachers in all three countries (South Korea: $r = .929$, $p < .001$; Finland: $r = .864$, $p < .001$; Mexico: $r = .832$, $p < .001$.).

Table 1.2
*Descriptive Analysis of Level-2 Variable Using Teacher Weights*

| Scale | Item | | Wording | South Korea (n = 75,056) | | Finland (n = 17,015) | | Mexico (n = 176,056) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| Constructivist Beliefs (TCONSB) | 32A | Beliefs | My role as a teacher is to facilitate students' own inquiry | 3.42 | 0.56 | 3.34 | 0.54 | 3.45 | 0.69 |
| | 32B | Beliefs | Students learn best by finding solutions to problems on their own | 3.41 | 0.60 | 2.99 | 0.59 | 3.28 | 0.76 |
| | 32C | Beliefs | Students should be allowed to think of solutions themselves | 3.41 | 0.56 | 3.21 | 0.54 | 3.48 | 0.65 |
| | 32D | Beliefs | Thinking and reasoning processes are more important | 3.16 | 0.68 | 3.22 | 0.60 | 2.98 | 0.81 |
| Self-efficacy (TSELEFFS) | 34D | To what extent | Control disruptive behavior in the classroom | 2.96 | 0.69 | 3.24 | 0.69 | 3.31 | 0.71 |
| | 34F | To what extent | Make my expectations about student behavior clear | 2.84 | 0.67 | 3.41 | 0.63 | 3.26 | 0.68 |
| | 34H | To what extent | Get students to follow classroom rules | 3.01 | 0.67 | 3.19 | 0.65 | 3.24 | 0.70 |
| | 34I | To what extent | Calm a student who is disruptive or noisy | 2.91 | 0.70 | 3.04 | 0.73 | 3.14 | 0.75 |
| | 34C | To what extent | Craft good questions for my students | 2.95 | 0.66 | 3.36 | 0.66 | 3.20 | 0.67 |
| | 34J | To what extent | Use a variety of assessment strategies | 2.79 | 0.67 | 2.83 | 0.75 | 3.18 | 0.69 |
| | 34K | To what extent | Provide an alternative explanation | 3.03 | 0.66 | 3.05 | 0.72 | 3.40 | 0.61 |
| | 34L | To what extend | Implement alternative instructional strategies | 2.75 | 0.71 | 2.93 | 0.78 | 3.26 | 0.67 |
| | 34A | To what extent | Get students to believe they can do well in school work | 2.98 | 0.66 | 3.18 | 0.69 | 3.31 | 0.70 |
| | 34B | To what extent | Help my students value learning | 2.99 | 0.67 | 3.08 | 0.73 | 3.38 | 0.65 |
| | 34E | To what extent | Motivate students who show low interest in school work | 2.70 | 0.72 | 2.81 | 0.78 | 3.12 | 0.85 |
| | 34G | To what extent | Help students think critically | 2.75 | 0.69 | 2.98 | 0.74 | 3.32 | 0.67 |
| Teacher co-operation (TCOOPS) | 33A | Frequently | Teach jointly as a team in the same class | 2.55 | 1.60 | 2.96 | 1.88 | 4.52 | 1.85 |
| | 33B | Frequently | Observe other teachers' classes and provide feedback | 2.66 | 0.85 | 1.57 | 1.12 | 2.13 | 1.56 |
| | 33C | Frequently | Engage in joint activities across different classes and age groups | 1.83 | 1.10 | 2.48 | 1.25 | 2.89 | 1.59 |
| | 33H | Frequently | Take part in collaborative professional learning | 2.43 | 1.24 | 2.08 | 1.18 | 3.54 | 1.34 |
| | 33D | Frequently | Exchange teaching materials with colleagues | 3.44 | 1.38 | 3.82 | 1.53 | 3.57 | 1.52 |
| | 33E | Frequently | Engage in discussions about the learning development of specific students | 2.59 | 1.38 | 5.24 | 1.06 | 3.68 | 1.42 |
| | 33F | Frequently | Work with teachers to ensure common standards for assessing student progress | 2.88 | 1.14 | 3.91 | 1.55 | 3.38 | 1.54 |
| | 33G | Frequently | Attend team conferences | 3.28 | 1.36 | 4.18 | 1.45 | 3.90 | 1.23 |

Table 1.3
*Descriptive Analysis of Level-2 Variable Using School Weights*

| Scale | Item | Wording | | South Korea (n = 707) | | Finland (n = 2,824) | | Mexico (n = 14,399) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| Principal's Instructional Leadership (PINSLEADS) | 21C | Frequently | Engage in - supporting co-operation among teachers | 2.95 | 0.70 | 2.58 | 0.58 | 2.93 | 0.72 |
| | 21D | Frequently | Engage in - teachers responsibility for improving teaching skills | 2.97 | 0.65 | 2.32 | 0.71 | 3.04 | 0.76 |
| | 21E | Frequently | Engage in - teachers responsibility for learning outcomes | 3.06 | 0.72 | 2.41 | 0.75 | 3.24 | 0.68 |

Table 1.4
*Results*

| | SOUTH KOREA | | | | FINLAND | | | | MEXICO | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixed Effect | Coefficient | Standard error | $t$-ratio | $p$-value | Coefficient | Standard error | $t$-ratio | $p$-value | Coefficient | Standard error | $t$-ratio | $p$-value |
| For INTRCPT1, $\beta_0$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{00}$ | 3.3594 | 0.0106 | 318.3770 | <0.001 | 3.1829 | 0.0092 | 344.3520 | <0.001 | 3.2962 | 0.0120 | 273.8910 | <0.001 |
|   PINSLEAD, $\gamma_{01}$ | 0.0268 | 0.0208 | 1.2890 | 0.1990 | 0.0112 | 0.0175 | 0.6420 | 0.5220 | -0.0276 | 0.0204 | -1.3500 | 0.1790 |
| For YRSEXP slope, $\beta_1$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{10}$ | -0.0016 | 0.0011 | -1.4920 | 0.1370 | -0.0024 | 0.0008 | -2.9790 | 0.0030 | 0.0037 | 0.0011 | 3.2740 | 0.0010 |
| For TSELEFFS slope, $\beta_2$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{20}$ | 0.1783 | 0.0255 | 6.9920 | <0.001 | 0.1624 | 0.0159 | 10.2060 | <0.001 | 0.1730 | 0.0256 | 6.7460 | <0.001 |
|   PINSLEAD, $\gamma_{21}$ | - | - | - | - | - | - | - | - | -0.1261 | 0.0435 | -2.8990 | 0.0040 |
| For TCOOPS slope, $\beta_3$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{30}$ | 0.0365 | 0.0144 | 2.5260 | 0.0120 | 0.0242 | 0.0086 | 2.7990 | 0.0050 | 0.0134 | 0.0111 | 1.2110 | 0.2280 |
|   PINSLEAD, $\gamma_{31}$ | - | - | - | - | - | - | - | - | 0.0254 | 0.0188 | 1.3540 | 0.1770 |
| For CLASSSIZ slope, $\beta_4$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{40}$ | -0.0005 | 0.0017 | -0.3160 | 0.7520 | -0.0013 | 0.0010 | -1.2650 | 0.2060 | -0.0004 | 0.0012 | -0.3490 | 0.7280 |
| For TIMETEAC slope, $\beta_5$ | | | | | | | | | | | | |
|   INTRCPT2, $\gamma_{50}$ | 0.0014 | 0.0009 | 1.5720 | 0.1180 | -0.0009 | 0.0006 | -1.4430 | 0.1490 | 0.0014 | 0.0008 | 1.8040 | 0.0730 |
| Random Effect | Variance Component | $\chi^2$ | p-value | | Variance Component | $\chi^2$ | p-value | | Variance Component | $\chi^2$ | p-value | |
|   INTRCPT1, $u_0$ | 0.0007 | 185.5679 | 0.2430 | | 0.0039 | 220.5164 | <0.001 | | 0.0040 | 244.0217 | 0.0010 | |
|   YRSEXP slope, $u_1$ | 0.0000 | 205.4071 | 0.0520 | | - | - | - | | 0.0000 | 211.0907 | 0.0620 | |
|   TSELEFFS slope, $u_2$ | 0.0205 | 198.3913 | 0.0990 | | - | - | - | | 0.0118 | 244.1260 | 0.0010 | |
|   TCOOPS slope, $u_3$ | 0.0057 | 281.2364 | <0.001 | | - | - | - | | 0.0020 | 286.2851 | <0.001 | |
|   CLASSSIZ slope, $u_4$ | 0.0000 | 171.2318 | >0.500 | | - | - | - | | 0.0001 | 224.2527 | 0.0160 | |
|   TIMETEAC slope, $u_5$ | 0.0000 | 266.9844 | <0.001 | | - | - | - | | 0.0000 | 184.7999 | 0.4080 | |
|   level-1, $r$ | 0.2061 | - | - | | 0.1476 | - | - | | 0.2419 | - | - | |
| Criteria fit | | | | | | | | | | | | |
|   Deviance | | | | 3894.5034 | | | | 2574.5106 | | | | 4627.53 |
|   # estimated parameters | | | | 29 | | | | 9 | | | | 31.00 |
|   AIC | | | | 3952.50 | | | | 2592.51 | | | | 4689.53 |
|   BIC | | | | 4126.03 | | | | 2645.69 | | | | 4877.13 |

*4.1 Do the constructivist beliefs vary across schools?*

Based on the analysis results, researchers found no significant differences among South Korea teacher's constructivist beliefs, unlike teachers from Finland and Mexico. However, when looking at the school level, teachers' constructivist beliefs vary very little in all three countries, which can be interpreted that the variation in teacher's constructivist beliefs occurred within school rather than between schools. According to OECD (2009), teacher beliefs tend to be diverse within school because the teachers already formed their beliefs from previous working experience and stayed unchanged.

*4.2 What factors have direct relationships with teachers' constructivist beliefs?*

Teachers' self-efficacy (TSELFFS) have a significant positive relationship with the teachers' constructivist beliefs (TCONSB) (p<.001) for both high and low performing countries. Although teachers' self-efficacy was the major predictor in this study since it has the highest magnitude, researchers cannot draw conclusion that teachers' self-efficacy was the cause of the teachers' constructivist beliefs. Researchers would like to point out that for each different country the researchers used difference rating-scale items. The items that are identical among the three countries are 1) ability to craft good questions for my students, 2) ability to provide an alternative explanation, and 3) ability to help my students value learning.

The second factor that has a significant positive relationship with the teachers' constructivist beliefs is teacher co-operation (TCOOPS). However, this significant relationship only occurred in the high performing educational systems, South Korea and Finland (p = 0.012; p = 0.005, respectively). Therefore, teachers who have higher level of constructivist beliefs tend to engaged more in professional collaboration and exchange and coordination for teaching.

The third factor is years of working experience as a teacher (YRSEXP). Researchers found it to be interesting that while years of teaching experience for teachers in Mexico has a significant positive relationship with the level of the constructivist beliefs, those in Finland found to have reverse relationship. In other words,

senior teachers in Mexico appreciated constructivist beliefs more than novice teachers. At the same time, beginning teachers in Finland have a higher attitude toward constructivist beliefs than the experienced teachers.

Surprisingly, principal instructional leadership (PINSLEAD) has no significant relationship with any variation in teachers' constructivist beliefs among teachers and schools. The researchers speculate the explanation that the variation of teachers' constructivist beliefs occurred mostly within schools. As such, any constructs at the higher level has no or very small effect the variation of teachers' constructivist beliefs.

Furthermore, the researchers found that class size (CLASSSIZ) and time spent on actual teaching (TIMETEAC) have no significant relationship with teachers' constructivist beliefs in all three countries. The level of willingness to adopt the idea of constructivist beliefs were similar among three counties regardless of their class size or actual instructional time.

*4.3 Does principal instructional leadership moderate the relationship between teacher-level predictors, namely self-efficacy and teacher co-operation, and constructivist beliefs?*

Blase and Blase (2000) indicated that principal instructional leadership positively influenced classroom practices and beliefs among classroom teachers. While this may be true in Blase and Blase (2000) researchers found no significant relationship between principal instructional leadership (PINSLEAD) and the teachers' constructivist beliefs, but in the case of Mexico, principal instructional leadership simply moderated a negative relationship between teachers' self-efficacy and teachers' constructivist beliefs. This implies that the action of principal instructional leadership inadvertently impeding the effect of teachers' self-efficacy on constructivist beliefs. In contrast, this case would not applicable to those in high performing countries where principal's influence have no impacts on teacher's self-efficacy. Also, this lack of impact by principal instructional leadership was found in the case of teachers' cooperation and teacher's constructivist belief as well. Indeed, the researchers found that teachers in higher performing systems are likely to be more independent in their beliefs. The constructivist beliefs among teachers in South Korea and Finland relied mainly on the individual teachers' confidence in their teaching ability and their level of co-operation with colleagues.

## 5. DISCUSSION AND IMPLICATIONS

According to the relationships found between self-efficacy and teachers' constructivist beliefs in this study, researchers found that focusing only on the development of content knowledge and general pedagogy is insufficient. Teacher education should develop teacher preparation program that not only increase the level of self-efficacy but also introduce the context that founded on the constructivist instructional approach. While several researchers indicated that training and development can improve teachers' self-efficacy (Bandura, 1993; Protheroe, 2008), inquiry-based learning is a fundamental of constructivist approach. Hence, teacher education program should allow pre-service teachers to be trained and to develop their own repertoire in the context of inquiry-based learning. Similarly, in the case of in-service teacher, the teacher professional development should allow teachers to have an opportunity to have a hands-on experience in student-centered environments. These will not only challenge the in-service teachers' existing beliefs, but also to increase their awareness of the innovative instructional method. Additionally, the support (e.g., time allocation for teachers) for and commitment to the innovative instructional approach by school administrators are important to ensure the prolonged engagement of the teachers in the professional development programs.

Based on the results in the high performing systems (South Korea and Finland), the level of teacher co-operation and the teachers' self-efficacy are significantly associated. The teachers who reported engaging in activities such as exchanging instructional materials with colleagues, engaging in discussion about student learning, or participating in team conference are likely to have a high level of constructivist beliefs, and vice versa. Considering this finding, teachers should participate more in professional activities. Goddard, Goddard and Tschannen-Moran (2007) suggested that these particular activities help teachers comprehending their teaching knowledge and improve their teaching practices. Additionally, school principals and administrators can help increase the level of teachers' cooperation by 1) setting a side time for teacher beyond teaching hours so that the teachers can work with their colleagues, 2) allocating budget, technology, and location to facilitate teacher collaborative work, 3) communicating goals and values so the teachers understand that collaboration is part of their regular practices, and 4) promoting collaboration plan and rewarding teachers' collaboration.

Furthermore, teachers in the high performing systems (South Korea and Finland) should be empowered and provided with high level of autonomy since the principal instructional leadership was not directly or

indirectly related with their constructivist beliefs. Interventions from school administrators should be maintained at a low degree in order to allow their high quality workforce to work on curriculum development and teaching practices effectively. On the contrary, school administrators in Mexico could help their teachers to adopt the constructivist approach faster by demonstrating a high degree of instructional leadership. As such, the critical step is to improve the quality of instructional leadership among school principals.

## 6. RESEARCH IMPLICATIONS

For future study, researchers should consider the possibility of introducing new covariates in order to explore the variation of teachers' beliefs within and between schools. Researchers can also explore other variable possibilities to gain a more in-depth analysis of teachers' and countries characteristics. Another possibility is to conduct a qualitative study to understand the cause and effects in these relationships.

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