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The Hierarchical Effects of Individual and Organizational Variables on Elementary School Teachers' Lifelong Learning Competence

Young-Sun Shin[a], JuSung Jun[b,*]

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Abstract

The purpose of this study was to analyze the hierarchical effects of individual and organizational variables on elementary school teachers' lifelong learning competence. The participants in this study comprised 1,077 teachers in service in 70 public elementary schools in Seoul, Korea. In this study, 70 schools were sampled using multi-stage stratified sampling, and 10 to 20 teachers were randomly selected for each school. The collected data was analyzed using hierarchical linear modeling. There are three major findings. First, gender, lifelong learning experience, learning agility, learning motivation, and positive psychological capital among the individual variables had meaningful positive effects on lifelong learning competence. Second, knowledge sharing among the organizational variables had meaningful influence on lifelong learning competence. Finally, interactions between gender and knowledge sharing and between learning motivation and learning organization culture had statistically meaningful effects.

Keywords: Lifelong Learning Competence, Individual Variable, Organizational Variable, Hierarchical Effect

Introduction

The fourth Industrial Revolution, characterized by artificial intelligence, robotics, biotechnology, big data, virtual reality, etc., signals the upheaval of the future world that we and subsequent generations will face. International organizations such as the UNESCO, the OECD, the EU, and the World Bank are emphasizing lifelong learning as the core competence of our times (Kim, Jeon, & Park, 2014; Hager & Halliday, 2006).

As the demand for and interest in lifelong learning increased in Canada, Europe, and Turkey, several researchers conducted academic discussions and empirical research on lifelong learning competence from the early 2010s, specifying indicators in such studies and tools as the European Lifelong Learning Indicators project (Hopkins, Cartwright, & Schoof, 2010), the scale of Key Competences for Lifelong Learning (Sahin, Akbasli, & Yelken, 2010), the Composite Learning Index (Canadian Council of Learning, 2010), Teachers' Lifelong Learning Competencies (Selvi, 2011), and Lifelong Learning Competence Scale (Uzunboylu & Hursen, 2012).

These studies suggest that changing schools as organizations is necessary for meeting contemporary demands of societies and that teachers also need to have the competence as lifelong learners to adapt to rapid social changes and perform their jobs effectively. In a lifelong learning society, teachers as self-directed learners must learn on their own with their own goals and have the competence to continue learning without giving up. Teachers with lifelong learning competence can become sensitive to changes in knowledge societies, both self-directing their own learning to enhance their performance as teachers but also developing lifelong learning capabilities in their students (Selvi, 2011).

In prior studies related to teachers' lifelong learning competence, both organization- and individual-level factors affect lifelong learning competence. First, among individual-level variables that affect lifelong learning competence, adult learners' gender, age, academic background, and lifelong learning experience affect their participation in lifelong learning activities and lifelong learning competence (Kim et al., 2014; Lee, Jo, & Yun, 2017; Lim, 2016). In addition, teachers' teaching careers influences their core teaching competence (Y. S. Kim, 2013; Lee, Choi, & Jang, 2009), learning motivation is the most important factor for individual learning (Kim, Kim, & Kang, 2009), and lifelong learning motivation influences lifelong learning competence through empowerment (Lee, Hu, Park, & Lee, 2017). Positive psychological capital, which has been gaining interest recently, is a powerful influence on the transfer of learning (Hyun, Riu, & Park, 2016, 10). Because future societies require new values, learning agility—the competence to learn from experience and to quickly respond to changes—is being considered a future core competence (Im, Wee, & Lee, 2017). In light of this previous research, it can be predicted that individual-level variables such as gender, education, age, teaching career, lifelong learning experience, learning agility, learning motivation, and positive psychological capital can affect the lifelong learning competence of elementary school teachers.

In addition to the individual-level variables mentioned above, researchers have identified organization-level variables that affect teachers' lifelong learning competence. Some researchers (Cutler, 2003; Gupton, 2010; Park, 2010) reported a positive correlation between a school principal's educational leadership and the school's lifelong learning outcomes, and they also found that desirable school organization cultures improved teachers' professionalism, learning, and self-directed learning ability. Because knowledge sharing within an organization helps to develop organizational learning and learning competence (M. S. Kim, 2013; Kim, 2015; Song & Chermack, 2008), in order to promote knowledge sharing, it is necessary to increase the group identity within the organization and establish trust among members (Kim, 2015). These studies show that organization-level variables such as the principal's educational leadership, learning organization culture, and knowledge sharing will likely influence the lifelong learning competence of elementary school teachers. Therefore, research on teachers' lifelong learning competence of teachers needs to address characteristics of both teachers and their schools.

[a] Young-Sun Shin, Soongsil University Korea. E-mail: sys65@sen.go.kr
[b,*] Corresponding Author: JuSung Jun, Soongsil University, Department of Lifelong Education, 369 Sangdo-Ro, Dongjak-Gu, Seoul, 06978, Korea. E-mail: jnet@ssu.ac.kr

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Prior researchers on lifelong learning competence mostly approached the topic from a single dimension rather than considering the hierarchical nature of various variables. As members of schools, teachers grow and develop as they are influenced by their schools directly and indirectly, and because of this, there is a limit to interpreting a phenomenon only by the personal characteristics of a teacher or the characteristics of a school organization (Byun, 2016). Therefore, the lifelong learning competence of elementary school teachers should be considered not only in terms of the teachers' personal characteristics but also in the contexts of their school environments.

The purpose of this study was to examine how individual and organizational variables affect the lifelong learning competence of elementary school teachers. This two-dimensional analysis revealing the effects of individual and organizational variables on elementary school teachers' lifelong learning competence provides useful data for improving this competence in the future.

Method

Research Model

The purpose of this study was to investigate the hierarchical effects of individual and organizational variables on elementary school teachers' lifelong learning competence. The criterion of the study is lifelong learning competence, and the predictor variables are the individual and organizational variables. The individual-level variables were the teachers' demographic characteristics (gender, age, academic background, teaching career, administrative position experience, and lifelong learning experience) and socio-psychological variables (learning agility, learning motivation, and positive psychological capital), and the organization-level variables were principals' educational leadership, learning organization culture, and knowledge sharing. Analysis included two hierarchical levels, an individual level and an organizational level, where individual-level variables use individual teachers as a unit of analysis, and organization-level variables use schools as a unit of analysis. Hierarchical linear modeling (HLM) is a statistical method of analyzing multilevel data (Raudenbush & Bryk, 2002). The specific procedures for analyzing the data were as follows:

First, one-way ANOVA with random effect model (Model 1) was conducted to examine whether it is meaningful to consider not only the teacher-level variables but also the school-level variables -such as principals' educational leadership, learning organization culture, and knowledge sharing as variables affecting elementary school teachers' lifelong learning competence- in the analysis. Second, in order to investigate the influence of individual variables, a random-coefficient regression model (Model 2) was set up, with only teacher characteristics variables as input. Finally, an intercepts and slope-as-outcomes model (Model 3) was conducted to investigate the influence of the organizational variables and of interaction between individual and organizational variables.

Figure 1 presents the research model.

Research Subjects and Data Collection

The population of this study was public elementary school teachers in Seoul, Korea (22,885 as of 2017); multi-stage stratified sampling was used to ensure the most representative sample. First, the sample size of the study was set at 1,200 teachers (5.24%) in 70 schools, and the sample schools and the teachers were proportionally allocated according to the schools' composition ratios and the number of teachers in 11 education districts of the Seoul Metropolitan Office of Education. Second, schools corresponding to the number of allocated samples were extracted using random sampling, and the number of teachers sampled was determined based on the sizes of the selected schools. Finally, 1,138 surveys were collected from teachers in 70 schools and the responding rate was 94.8%. Among the collected data, 61 surveys with unrelia-

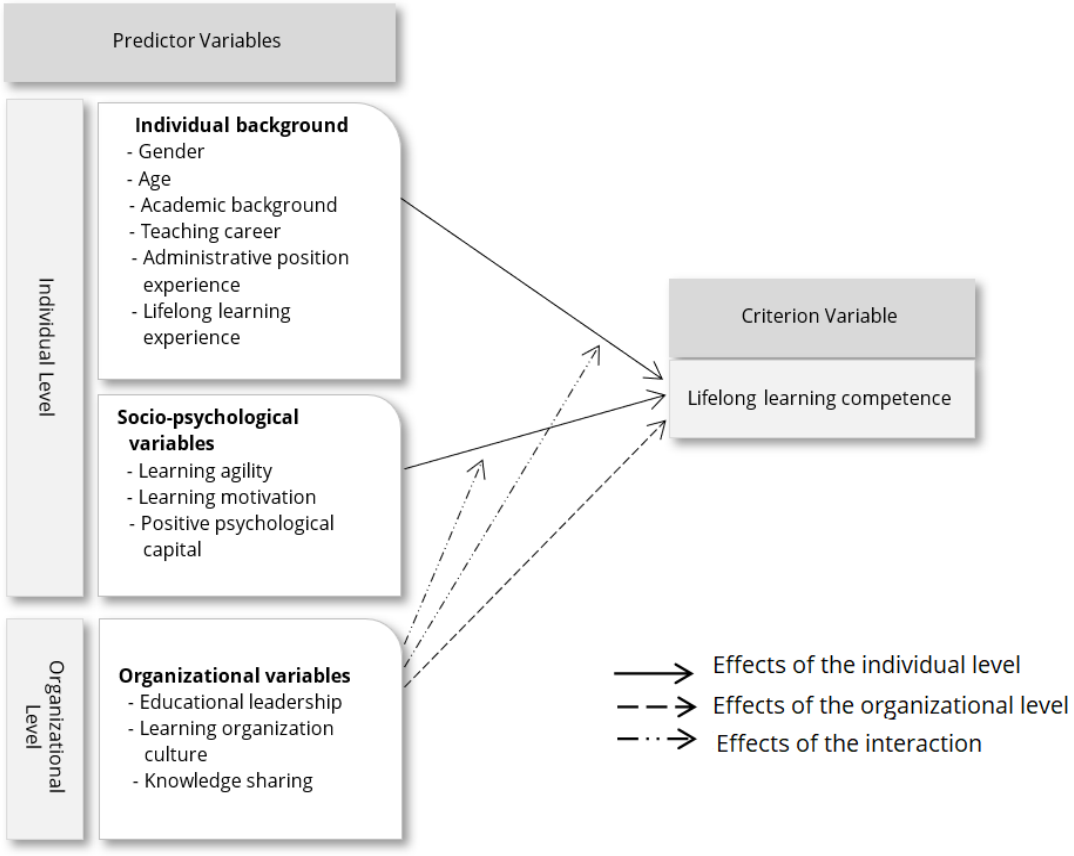

Figure 1. The research model

ble, duplicate, or missing responses were excluded, leaving data collected from 1,077 individuals for the final analysis.

Measures

Lifelong learning competence

The elementary school teachers' lifelong learning competence in this study was measured with the lifelong learning competence scale Kim et al. (2014) used based on the Delors Report (Delors et al., 1996). The scale consisted of 10 questions for each of five dimensions (learning to know, learning to be, learning to do, learning to live together, and learning to generate), for a total of 50 questions. The overall Cronbach's α was .963, and the values for each dimension were .865, .865, .898, .890, and .905.

Learning agility

Learning agility of elementary school teachers was measured by a tool developed by Im et al. (2017). The scale consists of a total 25 questions. The overall Cronbach's α was .950, and the values for each dimension were .862 for self-awareness, .889 for growth orientation, .850 for flexible thinking, .864 for reflective behavior seeking, and .912 for behavioral change.

Learning motivation

In this study, learning motivation was measured with Lee's (2015) scale. The measurement tool consists of 13 questions. The Cronbach's α was .774 for internal learning motivation, .861 for external learning motivation, and .901 for the entire questionnaire.

Positive psychological capital

The scale used to measure the positive psychological capital of elementary school teachers was first developed by Luthans, Youssef, and Avolio (2007) and modified by Kim (2016) to make some terms suit the school context. This scale consists of 21 questions with four sub-factors. The Cronbach's α values for this scale were .866 for self-efficacy, .749 for hope, .868 for optimism, .820 for resilience, and .952 for the entire questionnaire.

Principals' educational leadership

Principals' educational leadership was measured using a scale developed by Hallinger and Murphy (1985) and Sirinides (2009) and translated by Yoo (2012). This tool consists of 18 questions. The Cronbach's α was .963 for the entire questionnaire, and for the individual dimensions, reliability was .892, vision and mission sharing was .890, teaching and learning support was .928, and professionalism development support was .900.

Learning organization culture

The scale used to measure the learning organization culture of elementary schools was the tool that An (2013) translated and modified to be used for elementary school teachers, which was based on Yang's (2003) short version of the Dimension Learning Organization Questionnaire originally developed by Watkins and Marsick in 2003. The overall Cronbach's α was .962, and those for the sub-factors were .776 for continuous learning, .883 for inquiry and dialogue, .876 for team learning, .854 for system accumulation, .835 for system connection, .846 for empowerment, and .910 for leadership support.

Knowledge sharing

The scale used to measure knowledge sharing was the tool that Lee (2013) translated and adapted from studies by Bock et al. (2005) and Gupta and Govindarajan (2000). This measurement tool consists of a total of 8 questions. The overall Cronbach's α was .948, and those for the sub-factors were .914 for knowledge contribution and .909 for knowledge utilization.

Data Analysis

In this study, a hierarchical linear model analysis was conducted using maximum likelihood estimation to reveal the influence of individual and organizational variables on the lifelong learning competence of elementary school teachers.

Findings

Descriptive Statistics and Correlation of Variables

Table 1 shows the descriptive statistics of the elementary teachers' individual-level variables. Individual variables are divided into demographic (gender, age, academic background, teaching career, administrative position experience, lifelong learning experience) or socio- psychological (learning agility, learning motivation, positive psychological capital).

Pearson's correlation coefficients between predictor variables and the criterion variable are shown in Table 2.

Variances of Individual and Organizational Levels on Lifelong Learning Competence

Table 3 shows the results of the one-way ANOVA with random effects (Model 1) to determine whether the organiza-

Table 1. *Descriptive Statistics (N= 1,077)*

Variables			Mean	SD	Min.	Max.
Criterion variable	Lifelong learning competence		4.12	.479	2.44	5.00
	- Learning to know		4.30	.479	2.50	5.00
	- Learning to be		4.30	.515	2.10	5.00
	- Learning to do		4.24	.525	1.70	5.00
	- Learning to live together		3.70	.663	1.00	5.00
	- Learning to generate		4.07	.616	1.90	5.00
Predictor variables (Individual level)	Gender	Male (170)	.84	.365	.00	1.00
		Female (907)				
	Age	20s (165)	-	-	-	-
		30s (282)	.26	.440	.00	1.00
		40s (385)	.36	.479	.00	1.00
		50s and above (245)	.23	.419	.00	1.00

Table 1 (Cont.). *Descriptive Statistics (N= 1,077)*

Variables			Mean	SD	Min.	Max.
Predictor variables (Individual level)	Academic background	Male (170)	.84	.365	.00	1.00
		Female (907)				
	Administrative position experience	No (493)	.54	.498	.00	1.00
		Yes (584)				
	Teaching career	Less than 5 years (166)	-	-	-	-
		5-9 years (178)	.17	.372	.00	1.00
		10-19 years (366)	.34	.474	.00	1.00
		More than 20 years (367)	.34	.474	.00	1.00
	Lifelong learning experience	No (500)	.54	.499	.00	1.00
		Yes (577)				
	Learning agility		3.98	.546	2.23	5.00
	- self-awareness		4.33	.561	2.00	5.00
	- growth-oriented		4.14	.618	2.14	5.00
	- flexible thinking		4.00	.693	1.67	5.00
	- reflective behavior seeking		3.84	.683	1.60	5.00
	- behavioral change		3.58	.756	1.17	5.00
	Learning motivation		4.13	.560	2.00	5.00
	- internal learning motivation		4.25	.566	2.00	5.00
	- external learning motivation		4.00	.626	1.63	5.00
	Positive psychology capital		3.82	.617	1.86	5.00
	- self-efficacy		3.72	.682	1.50	5.00
	- hope		3.81	.675	1.75	5.00
	- optimism		3.86	.643	1.50	5.00
	- resilience		3.88	.664	1.40	5.00
Predictor variables (Organization level)	Educational leadership		4.06	.730	1.08	5.00
	- reliability		4.01	.815	1.00	5.00
	- vision and mission sharing		4.26	.688	1.00	5.00
	- teaching and learning support		4.07	.783	1.17	5.00
	- professionalism development support		3.92	.947	1.00	5.00
	Learning organizational culture		3.89	.700	1.29	5.00
	- continuous learning		3.90	.786	1.33	5.00
	- inquiry and dialogue		3.67	.895	1.00	5.00
	- team learning		3.76	.852	1.00	5.00
	- system accumulation		4.03	.827	1.00	5.00
	- system connection		3.89	.810	1.00	5.00
	- empowerment		3.90	.817	1.00	5.00
	- leadership support		4.12	.848	1.00	5.00
	Knowledge sharing		4.26	.683	2.00	5.00
	- knowledge contribution		4.22	.733	1.00	5.00
	- knowledge utilization		4.29	.682	2.00	5.00

Table 2. *Correlation Coefficients among Variables*

	Lifelong learning competence	Lifelong learning experience	Learning agility	Learning motivation	Positive psychology capital	Educational leadership	Learning organizational culture
1	1						
2	.268**	1					
3	.797**	.189**	1				
4	.682**	.130**	.656**	1			
5	.727**	.165**	.740**	.656**	1		
6	.364**	.075*	.346**	.324**	.383**	1	
7	.421**	.046	.419**	.410**	.453**	.826**	1
8	.400**	.077*	.360**	.325**	.342**	.495**	.640**

**p< .05, **p< .01 Note: 1-Lifelong learning competence, 2-Lifelong learning experience, 3-Learning agility, 4-Learning motivation, 5-Positive psychological capital, 6-Educational leadership, 7-Learning organizational culture, 8-Knowledge sharing*

tional (school) variables have significant effects on elementary school teachers' lifelong learning competence. The variance within schools was statistically significant with the value of .006 (χ^2= 95.178, p< .001), and the variance between schools was .224. The intra-class correlation coefficient (ICC) was .027, and out of the total variance in lifelong learning competence, 2.7% is explained as the differences between schools, and 97.3% is explained as the differences between individual teachers. This means that the variance explained by the differences between teachers is much larger than that explained by the differences between schools on the lifelong learning competence of elementary school teachers.

Table 3. *Effects of Individual and Organizational Levels on Lifelong Learning Competence*

Fixed effect	Coefficient	SE	*t*
Intercept	4.116	.017	243.057***
Random effects	*SD*	Variance	χ^2
Variance between schools	.075	.006	95.178***
Variance within schools	.473	.224	
Intra-class Correlation Coefficient (ICC)	.027		

***p< .001

In order to accurately analyze the effects of organizational variables, it is necessary to control all effects of individual variables. With the individual, that is, demographic and socio-psychological, variables controlled, the variance between schools was 20.3% and that within schools was 79.7% (see Table 4). The ICC was .203, and the variance explained as the difference between schools increased from 2.7% to 20.3%; correspondingly, the variance explained by the differences within teachers in the schools decreased from 97.3% to 79.7%. In addition, the between-school differences in the elementary school teachers' lifelong learning competence was statistically significant (χ^2= 335.210, p< .001). In short, this implies that characteristics of both teachers and schools affect the teachers' lifelong learning competence.

Table 4. *Variances for Lifelong Learning Competence before and after Controlling Individual Variables*

Random effects	Variance between schools	Variance within schools	χ^2
Before controlling individual variables	.006 (2.7%)	.006 (2.7%)	95.178***
After controlling individual variables	.016 (20.3%)	.063 (79.7%)	335.210***

Table 5 shows the effects of individual level, organizational level, and the interactions between the variables on the lifelong learning competence of elementary school teachers.

Table 5. *The Effects of Individual Level, Organizational Level, and Interaction on Teachers' Lifelong Learning Competence*

Fixed effect			Model 1			Model 2			Model 3		
			b	SE	*t*	*b*	SE	*t*	*b*	SE	*t*
Intercept (lifelong learning competence)			4.116	.017	243.057***	3.975	.031	130.001***	3.974	.030	132.352***
Individual Level	Gender					.063	.019	3.255**	.063	.019	3.252**
	Age	20s				-			-		
		30s				-.006	.039	-.159	-.007	.039	-.183
		40s				-.082	.046	-1.762	-.083	.046	-1.810
		50s and above				-.097	.052	-1.878	-.099	.052	-1.929
	Academic background					-.008	.019	-.416	-.007	.019	-.363
	Teaching career	Less than 5 years				-			-		
		5-9 years				.056	.039	1.445	.058	.038	1.528
		10-19 years				.078	.047	1.657	.076	.047	1.629
		More than 20 years				.091	.052	1.770	.088	.051	1.712
	Administrative position experience					.025	.021	1.211	.029	.021	1.378
	Lifelong learning experience					.117	.016	7.205***	.118	.016	7.328***
	Learning agility					.406	.027	14.902***	.406	.027	14.849***
	Learning motivation					.170	.020	8.477***	.170	.020	8.494***
	Positive psychological capital					.192	.025	7.818***	.192	.025	7.799***
Organizational Level	Educational leadership								.087	.098	.891
	Learning organizational culture								-.014	.150	-.092
	Knowledge sharing								.207	.100	2.063*
Interaction	Age × Educational leadership								-.065	.117	-.557
	Age × Learning organizational culture								-.157	.184	-.854
	Age × Knowledge sharing								.310	.139	2.238*
	Lifelong learning experience × Educational leadership								.087	.089	.984
	Lifelong learning experience × Learning organizational culture								-.156	.138	-1.136
	Lifelong learning experience × Knowledge sharing								.150	.113	1.326
	Learning agility × Educational leadership								.245	.170	1.442

Table 5 (Cont.). *The Effects of Individual Level, Organizational Level, and Interaction on Teachers' Lifelong Learning Competence*

Fixed effect		Model 1			Model 2			Model 3		
		b	SE	*t*	*b*	SE	*t*	*b*	SE	*t*
Interaction	Learning agility × Learning organizational culture							-.336	.247	-1.356
	Learning agility × Knowledge sharing							.180	.182	.987
	Learning motivation × Educational leadership							-.280	.126	-2.226*
	Learning motivation × Learning organizational culture							.456	.187	2.439*
	Learning motivation× Knowledge sharing							-.192	.138	-1.392
	Positive psychology capital × Educational leadership							-.094	.134	-.704
	Positive psychology capital × Learning organizational culture							.061	.205	.298
	Positive psychology capital × Knowledge sharing							-.161	.134	-1.198
Random effects		SD	Variance	χ^2	SD	Variance	χ^2	SD	Variance	χ^2
Variance between schools		.075	.006	95.178***	.126	.016	335.210***	.112	.012	264.661***
Variance within schools		.473	.224	-	.251	.063	-	.251	.063	-

** $p < .01$, *** $p < .001$

The effects of individual variables on lifelong learning competence

Model 2 shows the effects of individual variables (i.e., gender, age, educational background, teaching career, administrative position experience, lifelong learning experience, learning agility, learning motivation, and positive psychological capital) on the elementary school teachers' lifelong learning competence (see Table 5).

On fixed-effects analysis, learning agility (γ= .406, t= 14.902, p< .001), learning motivation (γ= .170, t= 8.477, p< .001), positive psychological capital (γ=.192, t=7.818, p<.001), lifelong learning experience (γ= .117, t= 7.205, p< .001), and gender (γ= .063, t= 3.255, p< .01) significantly affected the teachers' lifelong learning competence. Specifically, female gender, more lifelong learning experience, greater learning agility, higher learning motivation, and more positive psychological capital increased the teachers' lifelong learning competence. The random-effects analysis, meanwhile, showed that the effects of individual variables on lifelong learning competence differed among schools (γ= .016, χ^2= 335.210, p< .001). In contrast, individual variables of teachers accounted for 71.9% of the variance within schools. This means that the individual variables set out in this study had impacts on the individual differences in the lifelong learning competence of elementary school teachers working in the same school.

The effects of organizational variables on the lifelong learning competence

Model 3 shows the pure effects of organizational variables (i.e., educational leadership, learning organization culture, and knowledge sharing) on the lifelong learning competence of elementary school teachers (see Table 5).

The fixed-effects analysis revealed that only knowledge sharing (γ= .207, t= 2.063, p< .05) significantly affected the teachers' lifelong learning competence; the more active the knowledge sharing in the school, the greater the teachers' competence at learning. In contrast, the principals' educational leadership and learning organization culture did not have significant effects.

In Model 3, the individual variables (i.e., gender, lifelong learning experience, learning agility, learning motivation, and positive psychological capital) showed significant positive effects, which was consistent with the results for Model 2. This finding indicates that elementary school teachers' lifelong learning competence changes according to the level of knowledge sharing in a school when all other conditions including individual variables are the same. The random-effects analysis showed that the effects of organizational variables on lifelong learning competence differed among schools (γ= .012, χ^2= 264.661, p< .001). School organizational variables, however, accounted for 25.0% of the variance between schools, reflecting the importance of these variables in the differences in teachers' lifelong learning competence between schools.

The effects of interaction between individual and organizational variables on lifelong learning competence

The interaction effects between individual and organizational variables were analyzed using the individual variables—gender, lifelong learning experience, learning agility, learning motivation, and positive psychological capital—that had significant impacts on lifelong learning competence in Model 2. There were statistically significant interaction effects for gender and knowledge sharing (γ= .310, t= 2.238, p< .05), learning motivation and learning organization culture (γ= .456, t= 2.439, p< .05), and learning motivation and principals' educational leadership (γ= -.280, t= -2.226, p< .05).

The interaction effect between gender and knowledge sharing showed that the effect of gender on lifelong learning competence was greater for schools with active knowledge sharing if other variables were controlled for. The interaction effect between learning motivation and learning organization culture showed that the more well-established a school's learning organization culture, the more influence teachers' learning motivation had on lifelong learning competence. It is an interesting result that teachers' learning motivation had a greater influence on the teachers' lifelong learning competence in schools with weaker school principal educational leadership. In contrast, lifelong learning experience, learning agility, and positive psychological capital among individual teacher variables showed no statistically significant interaction effects with organizational variables at the school level on lifelong learning competence.

Conclusions and Implications

The following conclusions were drawn from the analysis of the hierarchical effects of individual and organizational variables on the lifelong learning competence of elementary school teachers.

First, the teachers' learning competence was more influenced by individual teacher variables than by school-level organizational variables. The individual variables of elementary school teachers had significantly positive influence on lifelong learning competence in the order of learning agility, learning motivation, positive psychological capital, lifelong learning experience, and gender. In other words, these individual variables had great explanatory power for the variances in lifelong learning competence within schools, and the influence of the teachers' socio-psychological variables was greater than that of their demographic variables. Therefore, to improve elementary school teachers' lifelong learning competence, it is necessary to enhance their learning agility, motivation, positive psychological capital, and lifelong learning experience. For instance, it is necessary for metropolitan and provincial offices of education and unit schools to expand and encourage the right to learn so that teachers can have lifelong learning experiences beyond their in-service training. In unit schools, inconveniences such as learning costs and time and environment constraints related to teacher training and job performance should be removed so that teachers are able to participate in lifelong learning activities. In addition, the national Office of Education needs to establish systems that approve the results of various types of formal and informal learning for training credits and institutional policies that can expand lifelong learning to enhance teachers' skills and professional development.

Second, the organizational variables contributed to the differences in the elementary school teachers' lifelong learning competence; for instance, knowledge sharing, one organizational variable, had a statistically significant effect. Because knowledge sharing by school teachers is based on spontaneity, it is necessary to create school climates that promote knowledge sharing. In contrast, in the hierarchical linear model analysis for this study, principals' educational leadership and learning organization culture, also organizational variables, did not have significant effects on the teachers' lifelong learning competence, although they showed significant interaction effects with learning motivation, a teacher-level individual variable.

Additionally, the stronger the learning organization culture, the greater the influence of learning motivation on lifelong learning competence, and learning motivation also had a greater influence when the school principals' educational leadership was weaker. In schools where teachers are motivated to learn, a principal's educational leadership is required to systematically guarantee and support the learning community of teachers to promote an appropriate learning organization culture. Chakravarthy et al. (1999) point out that organizational culture can vary greatly depending on top management's commitment to managerial leadership, and it is desirable to focus more on creating supportive environments than on direct intervention in individuals' behaviors.

Finally, elementary school teachers develop lifelong learning competence not only via the individual characteristics of teachers or school organizations but also by the interaction between individual and organizational variables. Specifically, with regard to the lifelong learning competence of elementary teachers, teachers' individual characteristics interact with schools' learning cultures, the educational leadership of the school head, and knowledge sharing among school members.

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