
Structural relationship among environment, motivation, engagement and transfer of training of teachers in distance education*

Hye-Sook Kim
Daegu University, South Korea
Shin-Bok Yu
Kyungpook National University, South Korea

Abstract

This study investigates the structural relationship among motivation, environment, engagement and transfer of training of teachers in distance education. There were 1,437 survey responses from primary and secondary school teachers in South Korea, and structural equation modeling was used to analyze the data. The findings underline that learning engagement in distance education had a significant mediating effect on the relationship between task value, self-efficacy, contextual factors and transfer of training. Also, contextual factors of distance education had significant direct effects on learning engagement and transfer of training. These findings suggest implications for the motivational and contextual factors when designing and developing effective instructional and learning strategies in distance education for teachers.

Keywords: distance education, teacher training, learning engagement, transfer of training, structural equation model

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Adult distance education is not a new phenomenon, but in recent years a growing number of distance programs have been aimed at primary and secondary school teachers. Teachers need to update their knowledge and skills on curricular matters, psychology, and the pedagogy of learners, as well as new research on teaching and learning; hence, they need appropriate in-service training as well (OECD, 2005). With the development of information and communication technology, distance learning has been activated. Participation has also increased since distance learning can occur at any time, which aligns with the busy daily life and work life of teachers.

Studies show that once teachers are exposed to distance courses, they will become familiar with the technology and nuances of distance education and will be more prone to use it as a delivery pedagogy in their classroom (Willis & Raines, 2001). There are some learning strategies that are uniquely required for distance learning (Eastmond, 1993). Studies that examine reasons for participating in distance education may offer insight into the relationship between motivation and outcome. Learners across studies appear to enroll in online courses for similar reasons; for example, convenience, flexibility in scheduling, credit recovery, accelerated learning opportunities, conflict avoidance, and the ability to take courses not offered in one's local area (Mills, 2003; Tunison & Noonan, 2001).

In spite of such quantitative growth, there has been a repeated call for systematic quality management and support for distance education for teachers in South Korea. First, expectations of teachers are constantly growing regarding the contents and program operations of distance education. Although teachers who take distance education courses have lower levels of satisfaction for their teachers in both the technical and systematic arenas in the past (Kim et al., 2014), recently, satisfaction with the content and program operations is low (Ahn et al., 2018; Kim et al., 2018). Teachers who take distance education courses are requesting that online course contents are relevant to their teaching, reflect the latest trends, and induce their interests, and the programs be composed of specialized and accurate contents. In addition, from the perspective of the learners, the qualitative level of the teachers' engagement in distance education programs is not up to par with the level of quantitative growth. According to a study by Kim et al. (2016), only 22.1% of the group had a high level of cognitive and emotional engagement in distance education, with a higher proportion in the non-voluntary than voluntary engagement group. In addition, they found that there was inadequate financial support for teacher training from schools and the Office of Education, along with a significant gap not only in the amount of subsidies to support teacher training for each unit school, but also in the organizational culture of the school that encourages voluntary training.

With the establishment of distance teacher training institutions since 2000, An et al. (2000) developed the initial model for distance education for teachers, including

a prototype and a management plan. They proposed an open system model composed of the core internal part and external elements for distance education. The core internal part of operations includes a need analysis, course development, transmission and interaction, and evaluation. The external elements include facility support, policy support, student records, and student support. These elements have been treated as major evaluation factors to certify distance teacher training institutions. Recent research on distance education can be divided largely into survey work on the level of satisfaction of teachers (Kim et al., 2014; Yu et al., 2013), analysis of the quality of the content and learning management systems (Kim, 2013), analysis of educational programs in distance education (Kim et al., 2013), the relationship between learner characteristics, levels of satisfaction on learning and academic achievement in distance education (Hwang & Choi, 2006; Kang et al. 2011), improvement in distance education policies (Jung et al., 2013) and development of tools for measuring the performance of distance education (Joo et al., 2014). That is, in the early stages, the majority of research focused on the demand for distance education programs, content development, and improvement or evaluation of the system.

In recent years, with the segmentation of research on distance education, more studies have investigated the psychological characteristics of the participants in distance education and disclosed the relationship among the relevant variables. Several studies aimed at disclosing the types of learners, according to engagement, or investigating the variables that affect engagement as the characteristics of the learners (Kim et al., 2016), analyzing the correlation between the contextual variables and the level of preparedness and self-efficacy of teachers (Nam, 2017), examining the structural relationship between the distance education service, levels of loyalty and satisfaction of teacher's distance training courses, and recognition of the quality by participants (Jeong, 2017) and investigating the relationship between the level of distance learning engagement and how well teachers used what they learned (Ahn et al., 2018). Such changes illustrate the expansion of the interest in learning engagement and variables that influence distance education, including changes in the level of satisfaction, self-efficacy and transfer of training by engagement in distance learning, and the individual and contextual factors that influence distance learning engagement, rather than the demands for content or the evaluation itself. So far, few studies have examined the relationship between distance learning engagement and transfer of training for teachers. In particular, there are not many researches dealing with exploring the structural model and the role learning engagement plays in transferring what teachers learned in distance education through motivational and environmental variables. Because there are virtually no studies examining the relevance of the motivational and environmental variables mentioned and their impact on learning engagement in distance education, it is difficult to get an idea of on what mechanism the distance education related variables could be operated, if we expect

an effect. Therefore, this study explores ways to increase the level of teachers' participation in distance education and increase the degree of application in the field.

This study presents contextual variables and motivational variables as the overall variables that affect the learning engagement of teachers in distance education programs on the basis of the learning engagement model, in order to assess the structural relationship among the overall influential variables. By examining the contextual factors and motivational variables, and the effects of these variables on the transfer of training through learning engagement in distance education, we anticipate that we will arrive at implications for the development of teaching and learning strategies teacher distance education. The research questions are as follows:

- 1) What is the structural relationship among motivation factors, contextual factors, learning engagement and transfer of training in distance education?
- 2) Is learning engagement significant as a mediating effect in the path of motivation and contextual variables in the transfer of training in distance education?

Variables and their relationships

In this section, we describe the concept of task value, self-efficacy, contextual factors, learning engagement, transfer of training and the relationships between the variables.

Learning engagement in distance education for teacher training

Distance education, or distant learning, has been a major form of professional development for pre-service and in-service teachers in developing and developed countries. In this study, distance education means teaching and learning via the Internet. Although there are various definition of e-learning (Khan, 2005; Lee, 2002; Rosenberg, 2001), from a technical perspective, e-learning uses a telecommunication network such as the Internet and delivery system that can be expanded to a desktop computer or mobile units. Distance education signifies training executed through the Internet for the entire training program and all the activities that occur during the process of distance education are managed through a learning management system (Korea Education and Research Information Service, 2007). The number of teachers participating in distant training programs is increasing every year in South Korea.

The number of teachers who completed distance education programs nearly doubled in the 4 years from 2012, from 699,115 to 1,242,516 (South Korea Ministry of Education & Korean Educational Development Institute, 2017).

Learning engagement in distance education is a critical factor for predicting the effects of learning, and is defined as the efforts made in the learning process by the learner in order to accomplish the goals of learning (Coates, 2006). Learning engagement in distance education requires cognitive, emotional and behavioral effort by the teachers who become the learners, thereby requiring multifaceted approaches. Since teachers often need to engage in a distance education program while executing their jobs of teaching their own students at the same time, there is a need for a cognitive approach including time management and self-control strategies (Hwang & Choi, 2006). In this study, we used a distance learning engagement scale from Kim et al. (2016) that had been validated for the multifaceted approach appropriate for teachers engaged in distance education (Fredricks et al., 2004; Sun & Rueda, 2012), which presented learning engagement at school from the cognitive, emotional and behavioral perspectives. This scale distinguished learning engagement in distance education into cognitive engagement and emotional engagement. For the cognitive engagement, use of self-regulated learning strategies is proposed mainly as the cognitive effort of the learners to acquire the complicated contents and skills in the learning process, while for the emotional engagement includes the interest in learning and the attitude of the learner towards distance education.

In particular, in the distance education environment, it is difficult to anticipate effective learning without the cognitive and emotional engagement of learners because many factors related to learning, such as learning time and progress, are determined by the learner's choice.

Learning engagement affecting transfer of training

Transfer of training is the extent of application and utilization of the techniques, attitude and abilities acquired through educational training to situations that are other than learning, such as one's professional work (Wexley & Latham, 1981). Transfer of training is defined as 'generalization and continuing with what has been learnt and scrapped through educational training' (Baldwin & Ford, 1988). In-depth cognitive learning and active learning of the learner are the core issues of transfer. In order for learners to generate transfer effects after having engaged in learning, they need to be able to process the knowledge attained at a profound level in the learning process, the acquired knowledge must be conceptually condensed, and the learners must be able to connect them with learning contents under diversified situations (Pugh & Bergin, 2006). When considering that the intrinsic purpose of teacher

training is to apply the contents learned through specialization development at their worksite, there is a need to discuss the effects of learning engagement in distance education on the transfer of training. One of the factors affecting transfer of training—motivation for participation—is a defining learner's characteristic that was emphasized first by Burke and Hutchins in 2007. They found that the primary learner characteristics influencing transfer of training include the trainee's intellectual ability, self-efficacy regarding the training task, motivation level, as well as job/career variables and personality traits that can largely affect trainee motivation.

A cluster analysis of the types of learner by learning engagement in distance education (Kim et al., 2016) found that learners are classified into four types: high engagement, average engagement, cognitive engagement deficiency and low engagement, with the extent of transfer of training manifested in the order of engagement, from greatest to least. This finding suggests the need to investigate the causal relationship between learning engagement in distance education and transfer of training.

Task value, self-efficacy and contextual factors affecting learning engagement and transfer of training

Within the field of educational research, motivation and learning engagement are considered important. It is critical that learners become genuinely interested in learning and are motivated to learn in such a way that they acquire new knowledge and persist in their learning over time. The learning engagement model by Skinner et al. (2008) proposed in this study considers learners' motivational factors. This study focused on the teacher's task value and self-efficacy motivation. Task value refers to the value of the tasks acknowledged by the learners, which include interest, importance and usefulness of the task itself (Wigfield & Eccles, 1992). Expectancy-Value Theory (Wigfield & Eccles, 1992) states that expectancies and values determine which tasks people pursue and persist in. Task value is closely related to the selection of tasks, use of cognitive strategy and self-control (Han, 2004). Thus, if the learner considers the task more valuable, there is higher probability of choosing the task with use of the appropriate cognitive strategy and increasing the frequency of executing the task (Kang et al., 2011). Therefore, task value not only affects the selection of and continuation with the training process, but also, it is related to the effort made in the learning activities or learning engagement. For example, learners in distance education with higher task values displayed higher level of cognitive and emotional engagement (Kim & Yu, 2016). Also, in a study of university students, task value predicted behavioral and cognitive engagement

(Marchand & Gutierrez, 2017). However, there are few studies dealing with the direct relationship between task value and transfer of training.

Self-efficacy refers to the confidence of an individual in his/her ability to organize and execute actions required to accomplish the intended outcomes (Bandura, 1977). In this study, the concept of academic self-efficacy can be viewed as the confidence in the outcome of distance education. Skaalvik and Skaalvik (2014) found that higher teacher self-efficacy predicted greater engagement in distance education with approximately 2,500 Norwegian elementary and middle school teachers. In the case of Massive Open Online Courses (MOOCs) for adult learners, academic self-efficacy of the learner is found to have a significant effect on the decision to engage and persist in learning, since the program is a long-term process and the autonomy of the learner is emphasized (Breslow et al., 2013). In addition, there has been some research on self-efficacy as another motivational factor to explain learning engagement in a university or adult e-learning situation (Ha & Im, 2010; Joo et al., 2010; Sun & Rueda, 2012; You & Kang, 2011; Wang et al., 2008). To summarize these studies, in an online learning environment, a learner with higher academic self-efficacy has a higher possibility of more assertively engaging in learning by promoting self-determined motivation, and displays a more affirmative attitude toward learning outcomes such as academic performance.

Switzer et al. (2005) proposed that self-efficacy may increase transfer of training primarily through motivation to learn. In other words, transfer of training is expected to be influenced by mediating factors of commitment to transfer goals to success rather than directly affected by self-efficacy (Machin & Fogarty, 1997). Studies on the direct effect between self-efficacy and transfer of training are limited and difficult to find, but it can be seen that self-efficacy affects transfer of training indirectly through goal commitment.

Task characteristics among the contextual factors that explain learning engagement is linked with the recognition of the environment in e-learning. Technology factors that explain learning engagement in e-learning, that is, functionality and interaction, impart affirmative effects on cognitive engagement and have significant mediation effects on the learning transfer or transfer of training (Kim, 2013). Therefore, functionalities including minimization of system error and convenience in accessing the web and interaction, such as inducing the engagement of the learner in question and answer sessions, influence learning engagement in online programs. Fredricks et al. (2008) presented task characteristics among the contextual factors that affect learning engagement. That is, if the learning lesson in class has higher relevance with the tasks of the learner, and if the level of support for learning and interaction with colleagues is higher, then the level of engagement is also high. In addition, a needs analysis of teacher groups in distance education (Kim et al., 2018), the most demanding level is whether what they learned in distance education can be used immediately in class and reflected in the latest trends in teaching methods.

Contextual factors have been viewed as a critical factor in the success of distance education. Wise et al. (2004) found that contextual factors are thought to create an approachable environment and hence, more satisfying learning experience and greater learning engagement. However, the target of the study was students, not teachers, in online learning. Learners feel more motivated to engage when they think that what they are learning will be helpful and when they are satisfied with contextual factors such as content quality and program operation in distance learning. Also, social presence has been viewed as a critical factor in the success of online learning. High social presence is thought to create an approachable environment and hence, more satisfying learning experience and learning.

Method

Participants

A total of 1,437 primary and secondary school teachers who completed more than 60 hours of distance education during the last three years completed our survey. Teachers who wished to participate were asked to complete the survey online. Demographic information on the participants is shown in Table 1. The teachers were allowed to access the survey website from a link through each distance teacher training institution. They were provided incentives, such as beverage coupons, to complete the survey. The distance teacher training institutions are divided into municipal training institutions, university-affiliated training institutions, private training institutions, and public institution training institutions.

This study did not target specific programs to identify causal relationships among variables affecting learning engagement and transfer of training. The purpose of this study was to search for variables that affect learning engagement in distance education in the overall sense, rather than the results limited to specific programs. Therefore, the participant's program was limited to the most recently completed programs at the time of survey completion. These programs include interactions between instructors and learners, or between learners through limited ways. For example, teachers can give their own opinions related to the training subject and the instructor or tutor can provide feedback on their responses. In some programs, discussion boards are also available to share ideas among trainees. Although each province's school district has different requirements, teachers must participate in a certain number of trainings per year to prepare for school evaluation and promotion. As shown in Table 2, the training topics and program duration are very diverse.

Table 1. Descriptive statistics of the participants

Variables		Frequency (%)
School level	Elementary school	717 (49.9)
	Middle school	339 (23.6)
	High school	381 (26.5)
School area size	Metropolitan city	812 (56.5)
	Medium and small city	407 (28.3)
	Town area	208 (14.5)
	Island area	10 (0.7)
Teaching experience	Less than 5 years	217 (15.1)
	More than 5 but less than 10 years	182 (12.7)
	More than 10 but less than 20 years	418 (29.1)
	More than 20 years	620 (43.1)
Training institutions	Municipal	547 (38.1)
	Private	335 (23.3)
	Public	529 (36.8)
	University-affiliated	26 (1.8)
Gender	Male	583 (40.6)
	Female	854 (59.4)
Total		1,437 (100)

Table 2. Topic and duration of participants' distance training programs

Training Theme and Duration		Number of Respondents	%
Training topic	teaching and learning	506	35.2
	career and guidance	460	32.0
	liberal arts	373	26.0
	others	98	6.8
Training Duration	Under 15h per week	541	35.8
	16-30h per week	793	55.2
	31-45h per week	52	3.6
	46-60h per week	50	3.5
	61h or more	28	1.9

ANOVA and the post-hoc analysis were conducted to determine if there were differences in research variables by the training topic. The results showed that teaching and learning, career and guidance, and liberal arts were attended by the most teachers. Because others were difficult to classify as a specific training theme, ANOVA was conducted again for only these three training themes. The results showed the differences in task value, self-efficacy, learning engagement and contextual factors, and transfer of training in the other three training topics were not statistically significant.

Measures

The survey included items related to each of the five constructs: task value, self-efficacy, contextual factors of distance education, learning engagement, and training of transfer. From prior studies, we selected and validated items for each construct. Contextual factors were composed of questions to measure the sufficiency of relevance, usability, contents and program operation in distance education derived from studies that examined satisfaction with a distance education program and key evaluation standards (Kim et al., 2013; You & Song, 2013). Specifically, it is composed of questions that measure whether the relevance complied with the demands of the teachers, whether the usability is convenient for the online learning system, whether the contents are appropriate for the subject of teacher training, and whether the program operation is sufficient for the operation of a distance education program with learner support services. Participants were instructed to provide answers for this study by limiting their experiences to the distance education program that they completed most recently. In this study, transfer of training is presented as the extent of application of the contents learned through distance education in executing a teacher's tasks, by classifying them into classroom lessons, guidance and consultation for students, classroom management, and other school related duties. The teachers rated the survey items from 1 (*strongly disagree*) to 4 (*strongly agree*) on a four-point Likert scale. The summary of measurement items is presented in Table 3.

Table 3. Measurement variables

Variables	No. of Questions	Cronbach's Alpha		Source	Example of items
		Factors	Total		
Task value	3	-	.896	Joo & Kim (2008)	I think the distance learning curriculum is very useful overall.
Self-efficacy	3	-	.887	Joo & Kim (2008)	I am very confident in my course learning.
Contextual Factors	Relevance	3	.884	Stufflebeam (2002) Kim et al. (2014) Yu et al. (2013)	It is operated in response to the needs of the students.
	Usability	5	.853		It is convenient to connect and operate the system.
	Contents	6	.926		The amount of learning is appropriate.
	Program operation	6	.921		Interaction with tutors and instructors is enough.
Learning Engagement	Cognitive engagement	6	.889	Sun & Rueda (2012)	I searched the Internet and other materials for information related to distance training.
	Emotional engagement	4	.891		I am interested in the task of doing distance training.
Transfer of training	4	-	.903	Kim, Kim, & Yu (2018)	What we learned in distance training was applied to class management.
Total	40				

Research model

Our research model is based on the learning engagement model proposed by Skinner et al. (2008). This model explains learning in the flow of '(environment) context → (motivation) self → (engagement) action → (accomplishment) outcome'. The perspective of context explained in this model views the contextual variables surrounding the learner, such as the support of an instructor, as influencing the motivational perspective related to the capacity or autonomy of the learner, and contextual variables and motivational variables as affecting learning engagement. Moreover, the model assumes that learning engagement can lead to results, such as academic accomplishment. In particular, this kind of process suggests the importance of learning engagement.

The purpose of this study is to examine whether the task value and self-efficacy of distance education learners and contextual factors affect learning engagement in a distance education program, and what effects teachers have on transfer of training through learning engagement in distance education. The model for this study is presented in Fig. 1.

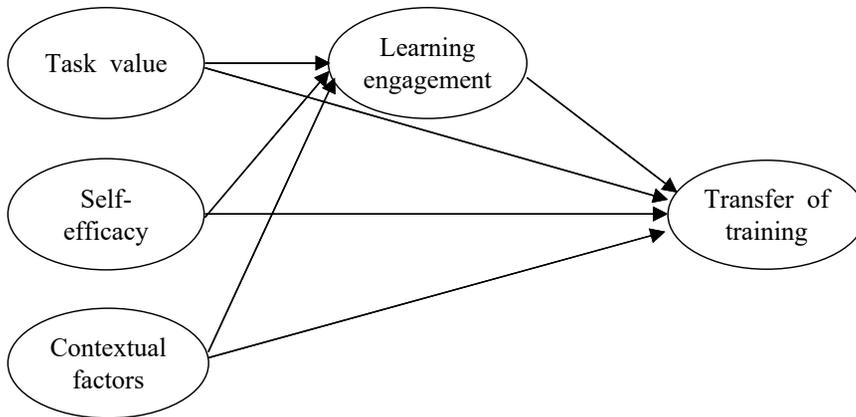


Figure 1. The research model

Data analysis

We used structural equation model (SEM) analysis to measure precisely the relationships between variables by controlling each variable’s measurement error and to identify the direct and indirect effects of the factors. SPSS Statistics 18.0 (IBM, Armonk, NY) was used to analyze descriptive statistics and test reliability and validity of each construct. AMOS 20.0 (SPSS Inc, Chicago, IL) was first used to conduct a confirmatory factor analysis of the fit and validity of the measurement, and then the structural model of this study was adopted. Analysis procedures were as follows. First, we assessed the measurement model, and the relationship among the latent variables was verified through the structural model analysis. The Maximum Likelihood Estimation (MLE) was used to estimate the coefficient, and the chi-square value was (X^2) considered fundamental to evaluate the appropriateness between the model and data. Moreover, we used the following goodness-of-fit indices: the fit of the measurement model using TLI ($\geq .90$), CFI ($\geq .90$) and RMSEA ($\leq .80$, 90% CI) as supported by Brown and Cudeck (1992). Second, indirect effects were investigated through bootstrapping and then the Sobel test (Preacher & Hayes, 2004) was implemented to verify the statistical significance of the mediating effects of learning engagement on the relationship between task value, self-efficacy, contextual factor and transfer of training for distance education.

Results

Descriptive statistics and correlations

Results of the correlation coefficient, average, standard deviation, skewness and kurtosis between the measurement variables included in this study are illustrated in Table 4. Multivariate normal distribution must be presumed for analysis of the structural equation model, and it was possible to confirm that the equation model complied with the multivariate normal distribution through skewness and kurtosis. In this study, the absolute value of skewness was in the range of .32 ~ .64, while that of kurtosis was in the range of .02 ~ .75. Because the standard kurtosis was smaller than 3 and the kurtosis smaller than 10, all the normalization standards were satisfied – that is, the current data satisfied the assumption of multivariate normal distribution (Kline, 2015). Based on the results of correlation analysis of each variable, the correlation coefficients between all the variables were found to be statistically significant with the significance level of .01 and all the variables displayed a positive correlation.

Table 4. Descriptive statistics of measurement variables

Measurement Variable	1	2	3	4	5	6	7	8	9
1	1	.718**	.601**	.498**	.614**	.568**	.660**	.722**	.650**
2		1	.456**	.418**	.507**	.455**	.618**	.570**	.542**
3			1	.660**	.772**	.695**	.478**	.521**	.602**
4				1	.704**	.672**	.380**	.408**	.502**
5					1	.782**	.478**	.530**	.607**
6						1	.476**	.519**	.603**
7							1	.732**	.635**
8								1	.670**
9									1
<i>Mean</i>	9.76	9.78	9.84	15.95	19.66	18.89	18.38	11.96	12.59
<i>SD</i>	1.80	1.71	1.81	3.09	3.57	3.82	3.57	2.83	2.46
<i>Skewness</i>	-.59	-.32	-.62	-.61	-.64	-.42	-.35	-.45	-.52
<i>Kurtosis</i>	.75	.17	.69	.35	.59	-.02	.45	-.07	.65

** $p < .01$

1. Task value, 2. Self-efficacy, 3. Contextual factors(Relevance), 4. Contextual factors(Usability), 5. Contextual factors(Contents), 6. Contextual factors(Program operation), 7. Cognitive engagement, 8. Emotional engagement, and 9. Transfer of training

Assessing the measurement model

Before analyzing the structural model, we calculated the goodness-of-fit indices for the measurement model. As presented in Table 5, the results showed that the measurement model had a good fit with the data (TLI=.970, CFI=.976 and RMSEA=.058). These results indicate that our measurements of the latent model variables were valid. In addition, all of the factor loadings were higher than .30, ranging from .760 to .921 ($p < .001$), indicating good convergent validity (see Table 6).

Table 5. Fit statistics for the measurement model

	χ^2	df	TLI	CFI	RMSEA (90% CI)
Measurement Model	543.946***	94	.970	.976	.058 (.053 - .062)
Criteria (Browne & Cudeck, 1992)			> .90	> .90	< .80

*** $p < .001$

Table 6. Path coefficient of the measurement model

Latent variable	Observed variable	Estimates (B)	SE	Standardized Estimates (β)
Task value ←	Task value(1)	1.000		.849
	Task value(2)	.921***	.022	.869
	Task value(3)	.975***	.023	.873
Self-efficacy ←	Self-efficacy(1)	1.000		.850
	Self-efficacy (2)	.964***	.026	.829
	Self-efficacy(3)	1.045***	.026	.870
Learning Engagement ←	Cognitive engagement	1.000		.847
	Emotional engagement	.810***	.021	.864
Contextual Factors ←	Relevance	1.000		.844
	Usability	1.588***	.044	.785
	Contents	2.152***	.046	.921
	Program operation	2.213***	.051	.886
Transfer of Training ←	Transfer of training(1)	1.000		.850
	Transfer of training(2)	1.019***	.024	.872
	Transfer of training(3)	1.048***	.024	.880
	Transfer of training(4)	.969***	.029	.760

Assessing the structural model

After confirming that the goodness-of-fit indices for the measurement model met the criteria, we analyzed the fit of the structural model. As shown in Table 7, the research model showed a good fit with the data, as judged by the suggested criteria (TLI = .970, CFI = .976 and RMSEA = .058). In the research model, all direct effects were statistically significant, except for the effect of (1) self-efficacy on transfer of training ($\beta = .008, p > .828$) and (2) task value on transfer of training ($\beta = .032, p > .597$). Therefore, we sequentially removed the two paths stated from the structural model within the range of not damaging the appropriateness with considerations for the simplicity of the model (Bae, 2009). Because the initial and modified models showed a hierarchical relationship, a chi-square was used to measure the statistical difference between the two models, which showed no significant difference between the two in terms of the goodness of fit ($\Delta X^2 = 0.564, \Delta df = 2, p > .05$). With this finding, we confirmed the modified model as the final research model due to its conciseness. Figure 2 shows the standardized path coefficients of the modified model.

Table 7. The goodness-of-fit comparison between research model and modified model

Goodness-of-fit indices	X^2	df	TLI	CFI	RMSEA (90% CI)	$\Delta X^2(\Delta df)$
Research model	543.946***	98	.970	.976	.058 (.053 - .062)	.564(2)
Modified model	544.510***	96	.970	.976	.057 (.052 - .062)	

*** $p < .001$

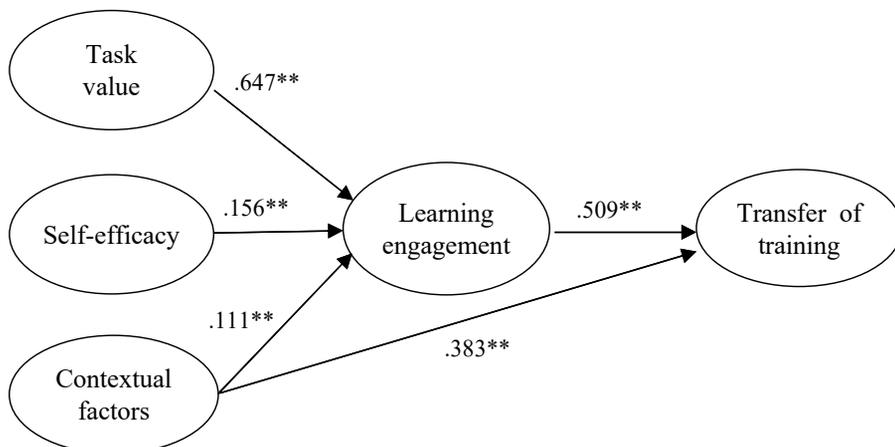


Figure 2. Modified Model with Standardized Path Coefficients

The relationships between the variables in the modified model are shown in Table 8. First, task value ($\beta = .647, p < .001$) and self-efficacy ($\beta = .156, p < .001$), which are the motivational factors, had statistically significant effects on learning engagement in distance education. Second, contextual factors of distance education had statistically significant effects on learning engagement ($\beta = .111, p < .001$) and transfer of training ($\beta = .383, p < .001$) in distance education. Last, learning engagement had a statistically significant effect on transfer of training ($\beta = .509, p < .001$) in distance education.

Table 8. Path coefficients of the structural model

Path		Estimates (B)	SE	Standardized Estimates (β)	<i>t</i>
Task value	→ Learning engagement	3.322	.249	.647	13.331***
Self-efficacy	→ Learning engagement	.880	.220	.156	3.991***
Contextual factors	→ Learning engagement	.220	.059	.111	3.755***
Contextual factors	→ Transfer of training	.146	.011	.383	13.184***
Learning engagement	→ Transfer of training	.098	.006	.509	16.624***

*** $p < .001$

Table 9 shows total effects, direct effects and indirect effects of variables on transfer of training. Both the direct and indirect effects of the contextual factors in distance education on transfer of training were found to be statistically significant, with the direct effects ($\beta = .383, p < .05$) imparting greater influence than the indirect effects ($\beta = .057, p < .01$). In addition, squared multiple correlation (SMC) indicates that the extent of what is explained in variance by the task value, self-efficacy, contextual factors and learning engagement in distance education for transfer of training was 66.4%.

Table 9. Total, direct, and indirect effects of variables on transfer of training

Variables	Total Effect	Direct Effect	Indirect Effect	SMC
Task value	.330*	-	.330*	.664
Self-efficacy	.079**	-	.079**	
Contextual factors	.440*	.383*	.057**	
Learning engagement	.509**	.509**	-	

* $p < .05$, ** $p < .01$,

Mediation analysis

To investigate learning engagement's mediation effect, we verified the statistical significance of the indirect effects by conducting bootstrapping at a significance level of .001. Results of the z -value computed by formula of Sobel (Preacher & Hayes, 2004) to verify the mediating effects of learning engagement are given in Table 10. The results show that the mediating effects of learning engagement were statistically significant in all paths from the task value to transfer of training ($z = 3.635$, $p < .001$), from self-efficacy to transfer of training ($z = 3.885$, $p < .001$) and from contextual factors in distance education to transfer of training ($z = 10.333$, $p < .001$).

Table 10. Mediation effect of learning engagement

Path		Coefficient	SE	z
Task value		.022	.006	3.635***
Self-efficacy	→ Learning engagement → Transfer of training	.086	.022	3.885***
Contextual factors		.326	.032	10.333***

*** $p < .001$

Discussion

The purpose of this study was to investigate the relationship among motivation, environment, learning engagement and transfer of training for teachers so that we could propose an integrated model to explain learning engagement and transfer of training in distance education. The key results and implications are summarized below.

First, the results showed that task value had a significant direct effect on learning engagement in distance education. This confirms teachers' acknowledgement that the completion of the distance education program was important and useful for them as a learning motive and can lead to in-depth cognitive engagement (Hidi & Harackiewicz, 2000; Pintrich & Schunk, 2002). In addition, it is in line with a prior study that the task value of adult learners in MOOCs encourages learning engagement (Jung & Lee, 2018). In particular, it was found that the task value had a relatively greater effect on learning engagement in comparison to other variables (see Table 8). This suggests that recognition of the importance and usefulness of the corresponding distance education program by the learner can become the motivating

force to induce assertive engagement.

Second, self-efficacy had a significant direct effect on learning engagement in distance education. That is, when designing distance education programs, it is important to plan a learning strategy to enhance self-efficacy in order to increase learning engagement. Such results are in concordance with the results of previous research conducted on university students and MOOCs (Jung & Lee, 2018; You & Song, 2013). You and Kang (2011) concluded in their study on university students that recognition of learners' own academic self-efficacy is a core factor that leads to assertive learning engagement.

Third, contextual factors in distance education had a significant direct effect on both learning engagement and transfer of training. In particular, contextual factors showed greater direct effects on transfer of training, which could be deemed the ultimate goal of distance education, than the indirect effect through learning engagement. As learners perceive that their distance education courses are more relevant and more usable, and the content and program operation are more appropriate, they are more likely to engage in distance education. Also, contextual factors had a significant indirect effect on transfer of training. Park and Kim (2015) investigated factors that affect the transfer of training by the teachers in an in-person training situation, and found that an indirect path from learning engagement to transfer of training via program content, that is, the contextual factor is significant although the direct path through which the voluntary engagement affects transfer of training is not significant. Thus, even if the voluntary engagement of a teacher is high, it is not possible to guarantee the enhancement of specialization that can be used in their professional work if the program does not consider task relevance for the practical training goal. The relevance and contents among the contextual factors presented in this study signify whether the demands of the teachers are being reflected and whether the contents of distance education programs can actually be utilized and useful.

Fourth, learning engagement had a significant direct effect on transfer of training. Results of the cluster analysis by Kim et al. (2016) indicated that there is a significant difference in transfer of training in accordance with the cognitive and emotional engagement types of learners; however, it failed to present it as a structural relationship between the variables. In this study, it was possible to explain clearly the relationship between the two variables by disclosing that the direct path from learning engagement in distance education to transfer of training is statistically significant. Therefore, there is a need to establish a strategy for enhancing learning engagement both for motivation and contextual factors at the programmatic development stage of and during implementation, in order to enhance the transfer of training.

Fifth, this study explored the indirect effect of learning engagement on the

relationship between the study variables and transfer of training in distance education. Learning engagement significantly mediated the relationship between task value, self-efficacy, contextual factor and transfer of training. In particular, although the direct path from the task value to transfer of training and from self-efficacy to transfer of training in the research model in this study were not significant, it is necessary to note that the indirect path via learning engagement was statistically significant. The motivation variables have an effect on learning engagement, as indicated in the learning engagement model. However, without learning engagement, learners cannot gain the learning outcome (Skinner et al., 2008). This suggests that it is important to induce cognitive and emotional engagement in distance education until learners come to use what they have learned, even though the learners have a high task value and self-efficacy. This result is in concordance with the results of Jung and Lee (2018), who found that although the path from academic self-efficacy and perceived usefulness to learning persistence in MOOCs was not significant, learning engagement as the indirect effect was significant.

Recently, the number of distance education program participants in South Korea has been continuously increasing. However, rather than being satisfied with the quantitative growth in distance education, it is necessary to develop a lot of content with high transition in terms of quality, and to make it possible for many teachers to participate. To this end, the implications of educational policy and system improvements are as follows. First, it is necessary to increase the proportion of autonomous selective training rather than compulsory training for teachers. Second, a distance education program should be developed that meets various demands by using the characteristics from a variety of distance teacher-training institutions and by expanding the quality management system. Third, emphasis should be placed on the development of distance education programs centered on transfer of training. It is necessary to enhance the participation of teachers through training through the life cycle training system. Last, it is necessary not only to expand the support for teacher training tuition fees in each school, but also to provide free Wi-Fi in schools in order to use mobile content freely.

The results of this study show that a remote training program that can be satisfied by teachers should be developed not only to be more immersed in learning, but also to apply what they learned in the field faster. Based on the results of this study and previous studies (Burns, 2011; Kang et al., 2011; Kim et al., 2018; Knowles, 1984), the following recommendations for designing distance education programs are suggested. First, it is necessary to provide detailed information on online content so that teachers have confidence in understanding the content of the program and accessing it online. Second, before the training starts, there are ways to ensure that teachers are fully aware of the value of the training program and to participate in the training. Third, adult learners are practical and want solutions they can implement to

address real-life challenges. Therefore, the program should be structured to give the opportunity to reflect on and analyze teachers' own practice. As adult learners, teachers should be provided appropriate time for learning at a distance. Fourth, it is necessary to conduct regular surveys of needs, and to understand which topics are important and relevant to learners' ages, school levels, and subject-specific characteristics. Last, it is necessary to give teachers the opportunity to practice a new approach or apply new knowledge to enhance transfer of training. More practical approaches, such as micro-teaching, should be central to the design of a distance education program that aims to improve the quality of instruction and affect student learning.

Although this study suggested several points for future studies, some limitations remain. The primary purpose of this study was to see if there are relationships between learning engagement and transfer of training, and motivational and contextual factors in distance education. Therefore, the analysis was conducted with all subjects as elementary, middle and high school teachers, and the characteristics according to school level were not examined. In addition, as a result of analyzing differences in the school level for major variables in this study, primary school teachers had higher task value, self-efficacy, transfer of training, and contextual factors than middle and high school teachers; however, there was no statistically significant difference in learning engagement by school levels. It is necessary to examine in future studies whether the structural model between learning engagement and transfer of training, and motivation and contextual variables suggested in this study differs according to school level, using a multi-group structural equation model analysis. Also, this study is not a case study that examines the relationship between variables in a specific distance training program, but rather to find the relationship between the main variables that explain distance education in a general point of view. Multiple variables can be considered in one model, but major variables were selected and presented considering the simplicity of the model. In future studies, other models explaining teachers' learning engagement and transfer of training may be added to expand this model.

Despite these limitations, this study examined and provided an understanding of how learning engagement can be facilitated in distance education, considering the effects of motivational and contextual variables. We can once again pay attention to the importance of learning engagement in distance education. Therefore, to improve learning engagement in distance education, it is necessary to develop programs that reflect learners' needs. Also, the effects of motivational and contextual variables should be considered for the instructional design of programs. Through this study, it was confirmed that learning engagement of teachers as adult learners is one of the crucial factors in distance education and that it can have an effect on the learning outcomes. It was found that in order to improve teachers' participation in learning in a remote training situation, it is necessary to consider what teachers want, what task is important, and how to improve the program to satisfy the participants.

Address for correspondence

Hye-Sook Kim

Associate Professor/ Daegu University

201, Daegudae-ro, Gyeongsan-si, Gyeongsangbuk-do, 38453 Republic of Korea

Email: khs1@daegu.ac.kr

References

- Ahn, H., Park, H., & Cho, S. (2018). A study on distance education for teachers in Korea. *Journal of Education & Culture*, 24(5), 215-239. <https://doi.org/10.24159/joec.2018.24.5.215>
- An, M., Kim, J., Kwon, S., Lee, J., Rho, K., & Jang, S. (2000). A study on how to develop and operate distance teacher training center and distance graduate teacher schools. *Korean Association for Educational Information and Broadcasting*, 7(2), 134-167.
- Bae, B. (2009). *Amos 17.0 structural equation modeling with Amos 17.0: Principles and Practice*. Chungnam. [In Korean]
- Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology*, 41(1), 63-105. <https://doi.org/10.1111/j.1744-6570.1988.tb00632.x>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Breslow, L., Prichard, D. E., DeBoer, J., Stump, G. S., Ho, A. D., & Seaton, D. T. (2013). Studying learning in the worldwide classroom: Research into edX's first MOOC. *Research & Practice in Assessment*, 8, 13-25.
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21(2), 230-258.
- Burke, L. A., & Hutchins, H. M.(2007). Training transfer: An integrative literature review. *Human Resource Development Review*, 6(3), 263-296. <https://doi.org/10.1177/1534484307303035>
- Burns, M. (2011). *Distance Education for teacher training: Modes, models, and methods*. Education Development Center.
- Coates, H. (2006). *Student engagement in campubased and online education: University connection*. Routledge.
- Eastmond, D. V. (1993). *Adult learning of distance students through computer conferencing* [Unpublished doctoral dissertation], Syracuse University.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential

- of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59-109. <https://doi.org/10.3102/00346543074001059>
- Ha, Y., & Im, Y. (2010). Prediction of learning persistence, satisfaction, and academic achievement according to e-learning adult learners' intrinsic value and academic self-efficacy. *Journal of Korean HRD Research*, 5(4), 49-67.
- Han, S. (2004). The relationships between the academic motivation variables, cognitive strategies and academic achievement. *The Korean Journal of Educational Psychology*, 18(1), 329-350.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, 70(2), 151-179. <https://doi.org/10.3102/00346543070002151>
- Hwang, J., & Choi, M. (2006). Learning achievement and educational satisfaction according to learners' background variables and learning strategies in online teacher training. *The Journal of Educational Information and Media*, 12(2), 255-274.
- Jeong, H. (2017). The structural relationship among instructional services, noninstructional service, perceived service quality, satisfaction, and loyalty in teacher's distance training course. *The Korea Educational Review*, 23(3), 87-115.
- Joo, Y., Kim, N., & Kim, G. (2010). The structural relationship among self-efficacy, internal locus of control, school support, learning flow, satisfaction and learning persistence in cyber education. *Journal of Educational Technology*, 26(1), 25-55.
- Joo, Y., Lim, K., Lim, E., & Ha, Y. (2014). Computer aided education: Development of a scale for measuring learning outcomes in a distance teacher training program. *The Journal of Korean Association of Computer Education*, 17(2), 53-64.
- Jung, Y., & Lee, J. (2018). Learning engagement and persistence in massive open online courses (MOOCs). *Computers & Education*, 122, 9-22. <https://doi.org/10.1016/j.compedu.2018.02.013>
- Jung, Y., Nam, K., Yoo, J., Lee, S., Kim, J., & Choi, J. (2013). *Strategies for the development and operation of distance learning training center based on technological innovation*. Korea Education & Research Information Service. RM 2013-3. [In Korean]
- Kang, M., Jo, M., Han, J., & Kim, B. (2011). Relationship among perceived task value, ICT literacy, and learning outcomes in online in-service teacher training. *Korean Journal of Teacher Education*, 27(2), 59-81.
- Khan, B. H. (2005). *Managing e-learning strategies: Design, delivery, implementation and evaluation*. Idea Group Inc.
- Kim, Y. (2013). Analysis of e-learning contents in distance teacher training for quality improvement. *Journal of the Korea Contents Association*, 13(9), 476-484. <https://doi.org/10.5392/JKCA.2013.13.09.476>
- Kim, H., Kim, E., Nam, K., Yoo, J., Lee, S., Kim, J., & Choi, Y. (2013). *Analysis of educational curriculum of distance education institution based on teacher competency*. Korea Education & Research Information Service.

- Kim, H., Kim, H., & Yu, S. (2016). Analysis of levels of job competency and transfer according to type of participation in distance teacher training. *The Journal of Korean Education*, 43(1), 99-122.
- Kim, H., Kim, H., Yu, S., Kim, S., Choi, J., & Seo, M. (2018). *A research on analyzing the performance of job training for teachers in distance education organization*. Korea Education & Research Information Service.
- Kim, H., Lee, E., Seo, M., & Choi, J. (2014). *The survey of learners' satisfaction with authorized distance education institution*. Korea Education & Research Information Service.
- Kim, H., & Yu, S. (2019, June 28-29). *Analysis on the structural relationship among environment, motivation, engagement and transfer of training for participants in distance teacher training* [Paper presentation]. Korean Educational Research Association Annual Conference, Seoul, Korea. http://ekera.org/bbs/board.php?bo_table=event_data&wr_id=5579&page=2.
- Kim, H., & Yu, S. (2016). An analysis of learner characteristics affecting engagement in distance teacher training. *Asian Journal of Education*, 17(3), 437-459. <https://doi.org/10.15753/aje.2016.09.17.3.437> [In Korean]
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford publications.
- Knowles, M. S. (1984). *Andragogy in action*. Jossey-Bass.
- Korea Education, & Research Information Service (2007). *White paper on ICT in education Korea*. Korea Education & Research Information Service.
- Lee, I. (2002). *E-learning: New paradigm of cyberspace*. Mooneumsa. [In Korean]
- Machin, M. A., & Fogarty, G. J. (1997). The effects of self-efficacy, motivation to transfer, and situational constraints on transfer intentions and transfer of training. *Performance Improvement Quarterly*, 10(2), 98-115.
- Marchand, G. C., & Gutierrez, A. P. (2017). Processes involving perceived instructional support, task value, and engagement in graduate education. *The Journal of Experimental Education*, 85(1), 87-106. <https://doi.org/10.1080/00220973.2015.1107522>
- Mills, S. C. (2003). Implementing online secondary education: An evaluation of a virtual high school. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2003* (pp. 444-451). AACE.
- Nam, K. (2017). The effect of distance education for teachers environment and readiness for learning of participating teachers on teacher efficacy. *The Journal of Lifelong Education and HRD*, 13(1), 55-77.
- OECD. (2005). *Teachers matter: Attracting, developing and retaining affective teachers*. Paris: OECD.
- Park, S., & Kim, T. (2015). The structural relationship of the factors that affect the

- transfer of in-service teacher training. *Korean Journal of Educational Research*, 53(4), 103-129.
- Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications*. Prentice Hall.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.
- Pugh, K. J., & Bergin, D. A. (2006). Motivational influences on transfer. *Educational Psychologist*, 41(3), 147-160.
- Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. McGraw Hill.
- Skaalvik, E. M., & Skaalvik, S. (2014). Teacher self-efficacy and perceived autonomy: Relations with teacher engagement, job satisfaction, and emotional exhaustion. *Psychological Reports*, 114, 68-77. <https://doi.org/10.2466/14.02.PR0.114k14w0>
- Skinner, E., Furrer, C., Marchand, G., Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of larger motivational dynamics? *Journal of Educational Psychology*, 100(4), 765-781. <https://doi.org/10.1037/a0012840>
- South Korea Ministry of Education, & Korea Education Development Institute (2017). *2017 Educational statistical year book*. Seoul: Korea Education Research Institute. [In Korean]
- Sun, J. C. Y., & Rueda, R. (2012). Situational interest, computer self-efficacy and self-regulation: Their impact on student engagement in distance education. *British Journal of Educational Technology*, 43(2), 191-204. <https://doi.org/10.1111/j.1467-8535.2010.01157.x>
- Switzer, K. C., Nagy, M. S., & Mullins, M. E. (2005). The influence of training reputation, managerial support, and self-efficacy on pre-training motivation and perceived training transfer. *Applied HRM Research*, 10(1), 21-34.
- Tunison, S., & Noonan, B. (2001). On-line learning: Secondary students' first experience. *Canadian Journal of Education*, 26(4), 495-514. <https://doi.org/10.2307/1602179>
- Wang, Y., Peng, H., Huang, R., Hou, Y., & Wang, J. (2008). Characteristics of distance learner; Research on relationships of learning motivation, learning strategy, self-efficacy, attribution and learning results, *Open Learning*, 23(1), 17-28. <https://doi.org/10.1080/02680510701815277>
- Wexley, K. N., & Latham, G. P.(1981). *Developing and training human resources in organizations*. Scott Foresman.
- Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review*, 12, 265-310. [https://doi.org/10.1016/0273-2297\(92\)90011-P](https://doi.org/10.1016/0273-2297(92)90011-P)
- Willis, E. M., & Raines, P. (2001). Technology in secondary teacher education: Integration,

- implication and ethics for the changing roles of teachers. *T.H.E. Journal*, 29(2), 54-64.
- Wise, A., Chang, J., Duffy, T., & Del Valle, R. (2004). The effects of teacher social presence on student satisfaction, engagement, and learning. *Journal of Educational Computing Research*, 31(3), 247-271. <https://doi.org/10.2190/V0LB-1M37-RNR8-Y2U1>
- You, J., & Kang, M. (2011). The structural relationship among social factor, psychological need factor, and motivational factor for enhancing learning engagement. *Korean Journal of Educational Research*, 49(4), 55-85.
- You, J., & Song, Y. (2013). Probing the interaction effects of task value and academic self-efficacy on learning engagement and persistence in an e-learning course. *Journal of Learner-Centered Curriculum and Instruction*, 13(3), 91-112. [In Korean]
- Yu, G., Kim, J., Nam, K., Yu, B., & Lee, E.(2013). *2013 Consumer satisfaction survey and analysis on distance education organization of teachers*. Korea Education & Research Information Service.

