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MODELLING THE CORRELATION BETWEEN PRESERVICE SOCIAL STUDIES TEACHERS' PERCEPTIONS OF 21ST-CENTURY SKILLS COMPETENCY AND LIFELONG LEARNING TENDENCIES

(*Research Article)*

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Abstract

This study aims to model the correlation between the perceptions of preservice social studies teachers of 21st-century skills competencies and their lifelong learning tendencies. In the study, the correlational survey model was used. The sample consisted of 2850 preservice teachers who were studying in the first, second, third, and fourth years in the Department of Social Studies Education at the Faculty of Education of 15 University in the academic year 2021-2022. The sample was identified by stratified sampling method. A "Personal Information Form," "21st Century Skills Competency Perceptions Scale," and "Lifelong Learning Tendencies Scale" were used to collect data. It was concluded that the latent variables of learning and innovation skills, life and career skills and information, media, and technology skills of the perceptions of preservice social studies teachers on the 21st-century skills competency were significant predictors of the latent variables' determination and curiosity, organization of learning and motivation of lifelong learning tendencies and positively affected them. The activities that are planned to be organized at the university to develop 21st century skills competency perceptions and lifelong learning tendencies should be based on the interests and needs of preservice teachers, and they should be motivated to participate in these activities.

Keywords: 21st century skills, lifelong learning, social studies, pre-service teachers

1. Introduction

Due to social, technological, and scientific advances in the information era, societies have become more diverse, and expectations for future members have changed accordingly (Dilekçi & Karatay, 2021; Erdoğan & Eker, 2020; Gömleksiz et al., 2019; Wagner, 2008). The rapid growth of knowledge in the 21st century has made learning information difficult and complex. Furthermore, merely storing existing knowledge in the mind is not enough to effectively tackle problems in life. People who can tackle problems by processing their knowledge through their reasoning processes stand out under today's conditions. In this case, acquisition of skills becomes more important than access to information (Bektaş et al., 2019). Moreover, the skills

required to be acquired in the information era differ from those required in other eras (Bektaş et al., 2019; Dede, 2010; Jacobson-Lundeberg, 2016).

The 21st century is an unprecedented era where new technologies and tools proliferate daily, and the information explodes. Therefore, the questions, "What skills will students require?" (Beers, 2011), "How much information should be processed in the 21st century and what skills should be taught and improved?" (Dilekçi & Karatay, 2021), and "What should the people of the future be like?" have been raised in the 21st-century world; these questions have also brought about a discussion on what skills individuals should possess based on social changes and advances (Erdoğan & Eker, 2020). The rapid growth and dissemination of information in today's societies, globalization, the coexistence of individuals with cultural differences, advances in science and technology, as well as natural disasters, wars, and environmental problems, have led individuals to come across more social, technological, cultural, and economic changes. Accordingly, individuals must possess basic skills, advanced skills, and competencies in order to lead their personal, social, and professional lives; adapt to changes; keep pace with technology; access accurate information among a wealth of information; and adapt and utilize the information they access in their lives. These skills are referred to as "21st-century skills" (Anagün et al., 2016).

21st-century skills are those that are necessary for individuals to lead a quality life, be able to consider events that take place from multiple perspectives, be able to solve problems that come up more quickly and easily, and be successful in their social and professional lives (Anagün et al., 2016). Individuals who possess 21st-century skills are entrepreneurs, able to realize self-management, leaders, productive, responsible, able to consider events from different perspectives, creative and critical thinkers, effective communicators, able to work collaboratively in teams, and literate in information and media (Kurudayıoğlu & Soysal, 2019).

The 21st-Century Skills developed by the Partnership for 21st Century Skills (P21) platform is the most widely used and internationally recognized framework for 21st century skills, offering a comprehensive framework among the many studies, projects, and reports produced by various researchers, institutions, and organizations on identifying what the 21st century skills are. The P21 platform has defined the knowledge, skills, expertise, literacy, and support systems that are important for students to succeed and be prepared for business life and today's conditions, with contributions from teachers, academics, and business leaders, and has set up a comprehensive, internationally recognized "21st Century Skills" framework by classifying skills. The 21st-century learning framework describes the core topics that all students are expected to master in the 21st century, the interdisciplinary themes that allow for a much better understanding of academic content, and the support systems for teaching skills. Furthermore, learning and innovation skills, information, media, and technology skills, and life and career skills were identified as 21st-century skills. This framework treats all components of the 21st-century teaching and learning process as interconnected while indicating the elements separately for descriptive purposes (Partnership for 21st Century Skills [P21], 2019).

Humankind begins learning as soon as it exists and continues to learn throughout its existence. This learning goes on throughout life through formal or informal learning. Accordingly, education continuously affects people, the society they live in, and the world, either directly or indirectly. It is important to think globally in the educational system, but find local solutions to problems in a world that has turned into a global village as information and communication technologies have rapidly advanced (Gelen, 2017). As a consequence of individuals' efforts to improve themselves, the need to create a qualified manpower capable of

meeting economic expectations in a world of globalisation, and the requirements of society, the need for learning has emerged (Yenen et al., 2016).

During the 21st century, advances in science and technological changes have necessitated the rapid generation of knowledge, the dissemination of generated knowledge through various channels, and individuals' continuous learning efforts to keep pace with the era they live in, as well as the lifelong effort to sustain these efforts (Keskin & Yazar, 2015). Following such changes and developments, individuals are expected to become lifelong learners to continuously improve their knowledge and skills and keep pace with the needs of the era in which they live (Özgür, 2016). Accordingly, the developed societies need individuals who possess lifelong learning skills and continuously improve and renovate themselves (Çetinkaya et al., 2019).

Changing world perception and expectations in the 21st century require individuals to be multifaceted from different perspectives, such as education, culture, and thought (Altunbay, 2015). Technological advances and the rapid growth and dissemination of information have greatly affected and altered social life, social structure, daily life, and educational systems (Ministry of National Education [MEB], 2017). The advances in education in the 21st century have led to changes in the needs and expectations of teachers and students (Çopur, 2022). Students should possess 21st-century skills in order to catch up with the changes and innovations, to keep pace with these changes, to be more successful, and to be successful in their cognitive development and future professional careers (Alismail & McGuire, 2015). Moreover, due to the rapid growth of information in every field due to the advances in the field and the obsolescence and loss of validity of such information at the same rate, individuals are expected to be lifelong learners in order to acquire the up-to-date knowledge and skills they need (Oral & Yazar, 2015). It is possible for individuals to possess the qualifications and skills needed by society and to adapt to the ever-changing technology in society through acquiring lifelong learning skills. The responsibility to bring up these individuals lies with the teachers, who are the practitioners of the educational system. Therefore, teachers should be individuals who can constantly renovate themselves, are open to change, are lifelong learners (Çam & Saltan, 2019; Kazu & Erten, 2016), are equipped in their fields, and possess 21st-century skills (Öğretir Özçelik & Eke, 2020) in order to bring up lifelong learners with these qualities and skills.

The acquisition of 21st-century skills is extremely important for individuals to maintain their lifelong learning tendencies and to be successful in their professional development accordingly (Boe, 2013; Washer, 2007). Individuals should be equipped with 21st-century skills in order to become individuals with lifelong learning habits (Kozikoğlu & Altunova, 2018). As reported by the literature, it can be asserted that 21st-century skills support, sustain, and complement lifelong learning tendencies, and also these skills are developed during the lifelong learning process. This draws attention to the correlation between the two concepts, and the growing importance of the concepts brings up the need for a detailed analysis of this correlation. Moreover, the correlation between the two concepts was analyzed in this study since the topic is up-to-date and is considered important for responding to new needs. This study aims to model the correlation between the perceptions of preservice social studies teachers of 21st-century skills competencies and their lifelong learning tendencies.

2. Method

2.1. Model of the Study

In the study, the correlational survey model was used. Review research is those conducted to collect data in order to identify the characteristics or behaviors of a group on any subject (Teddlie & Tashakkori, 2020). The model determining the change between two or more variables was correlational survey model (Karasar, 2004).

2.2. Participants

The sample consisted of 2850 preservice teachers who were studying in the first, second, third, and fourth years in the Department of Social Studies Education at the Faculty of Education of Adıyaman University, Ankara University, Balıkesir University, Bursa Uludağ University, Çukurova University, Erzincan Binali Yıldırım University, Fırat University, Gazi University, Kırşehir Ahi Evran University, Marmara University, Ondokuz Mayıs University, Pamukkale University, Recep Tayyip Erdoğan University, Sivas Cumhuriyet University, and Süleyman Demirel University in the academic year 2021-2022. The sample was identified by stratified sampling method. Stratified sampling is a method where each unit in the population is not exposed but divided into subgroups belonging to a stratum, and the sample is selected separately and independently from each stratum (Can, 2019).

While identifying the sample, the Nomenclature of Territorial Units for Statistics (NUTS), determined according to socio-economic indicators, was used as a variable, and substrata were formed within the population by taking this classification into account. It is observed that there are differences between regions and provinces in Turkiye in terms of economic, social, and cultural development processes (Arı & Hüyüktepe, 2019; Temiz, 2011). The NUTS defined by the Decree of the Council of Ministers (No. 2002/4720 dated 28/08/2002) in Turkiye identifies 81 provinces as “Level 3,” 26 neighboring provinces as “Level 2,” and 12 regions as “Level 1” resulting from the grouping of neighboring provinces in Level 2 (Official Journal, 2002).

According to the data from the Higher Education Council (“HEC”), there are 129 state universities in Turkiye in the academic year 2021-2022. Based on the data from the Higher Education Program Atlas, 64 state universities were identified as offering social studies education departments among these state universities. 15679 students including 9566 (61.01%) female and 6113 (38.99%) males, have been studying in these universities.

The population, which consisted of state universities having Social Studies Education Departments, was divided into 12 sub-strata according to the territories in Level 1 of the NUTS. A list of the names of the universities in these territories was created, the universities in the territories according to the list were written on papers one by one and put in separate sacks, and universities were selected from each sack through simple random sampling. Furthermore, one university from some strata was included into sample, and two universities were included into sample from some strata, regardless of their rate in the population.

Table 1. *Distribution of preservice social studies teachers by territories and universities*

Level 1	**University**	**Preservice Teacher**	
		f	**%**
Istanbul	Marmara	225	7.9
Western Marmara	Balıkesir	201	7.1
Aegean	Pamukkale	209	7.3
Eastern Marmara	Bursa Uludağ	144	5.1
Western Anatolia	Ankara	206	7.2
Mediterranean	Süleyman Demirel	110	3.9
Central Anatolia	Çukurova	160	5.6
	Kırşehir Ahi Evran	224	7.9
	Sivas Cumhuriyet	195	6.8
	Gazi	217	7.6
Western Black Sea	Ondokuz Mayıs	187	6.6
Eastern Black Sea	Recep Tayyip Erdoğan	200	7.0
Northeast Anatolia	Erzincan Binali Yıldırım	233	8.2
Central East Anatolia	Fırat	183	6.4
Southeast Anatolia	Adıyaman	156	5.5
Total		2850	100

When Table 1 was analyzed, it was determined that the sample consisted of 2850 preservice social studies teachers. 225 of these preservice teachers were studying at Marmara University, 201 at Balıkesir University, 209 at Pamukkale University, 144 at Bursa Uludağ University, 206 at Ankara University, 217 at Gazi University, 110 at Süleyman Demirel University, 160 at Çukurova University, 224 at Kırşehir Ahi Evran University, 195 at Sivas Cumhuriyet University, 187 at Ondokuz Mayıs University, 200 at Recep Tayyip Erdoğan University, 233 at Erzincan Binali Yıldırım University, 183 at Fırat University, and 156 at Adıyaman University. The sample included two universities, each from the Western Anatolia, Mediterranean, and Central Anatolia regions, and one university from each of the other regions. It was determined that 658 (23.1%) first-year, 747 (26.2%) second- year, 706 (24.8%) third-year, and 739 (25.9%) fourth- year preservice teachers studying at those universities participated in the study. The sample of the study consisted of a total of 2.850 preservice social studies teachers, including 1.962 (68.8%) female preservice teachers and 888 (31.2%) male preservice teachers.

2.3. Data Collection Tools

A "Personal Information Form," "21st Century Skills Competency Perceptions Scale (21CSCPS)," and "Lifelong Learning Tendencies Scale (LLLTS)" were used to collect data. In line with the purpose of the study, researchers prepared a personal information form (gender, university, university year, etc.) to collect information about the demographic characteristics of the preservice teachers participating in the study.

The 21st Century Skills Competency Perceptions Scale (21CSCPS), which was developed to determine the preservice teachers' perceptions of 21st-century skills competencies, was used (Aksüt, 2023). The scale consisted of 44 items and 3 factors: learning and innovation skills (18 items), life and career skills (15 items), and information, media, and technology skills (11 items). The explained total variance of the scale was determined as 64.43%. When the fit

indices (x^2/sd= 5.04, RMSEA= .041, CFI= .91, TLI= .91, SRMR= .042) of the first- and second-level CFA results were evaluated together to test the construct of the scale consisting of 3 factors and 44 items, it was determined that the proposed models were supported and validated by the data. The Cronbach's alpha internal consistency coefficient for the EFA and CFA sample groups was calculated to be at least 84 for the total score and factor of the scale. This result showed that the internal consistency of the scale was high.

The Lifelong Learning Tendencies Scale (LLLTS), which was developed to determine the lifelong learning tendencies of preservice teachers, was used (Aksüt, 2023). The scale consists of 40 items and 3 factors: determination and curiosity (18 items), organization of learning (12 items) and motivation (10 items). The factors of the scale were found to explain 74.80% of the total variance. When the fit indices (x^2/sd= 3.24, RMSEA= .035, CFI= .92, TLI= .92, SRMR= .034) of the first- and second-level CFA results were evaluated together to test whether the construct of the scale consisting of 3 factors and 40 items was confirmed or not, it was determined that the proposed models were supported and confirmed by the data. The Cronbach's alpha reliability coefficient for the EFA and CFA sample groups was calculated to be at least 79 for the total score and factor of the scale. This result showed that the reliability of the scale was high.

2.4. Data Collection and Analysis

The research was carried out with the permission received from Fırat University Social and Human Sciences Research Ethics Committee (decision numbered 430871 dated 21.12.2020). The researcher managed the data collection process at 15 universities in the sample by himself in the fall semester of the 2021–2022 academic year, during which the study was conducted. The researcher visited the universities where the application would take place on the scheduled days to collect the data and managed the data collection process. To avoid any disruption in the courses, convenient class hours were set, the necessary authorizations were taken from the lecturers in charge of the course, and the data collection process was managed. The participation in the study is based on the principle of volunteerism. The data collection was completed in approximately three months.

The data were transferred into the computer and analyzed using the computer-based quantitative data analysis software SPSS version 26.0 (IBM Corporation, 2021) and Mplus version 8.0 (Muthén & Muthén, 1998–2017). During the data analysis, 71 data points that were incomplete and incorrectly filled in the data set were excluded from the analysis. In the study, structural equation modeling (SEM) was used to explain the causal correlations between the learning and innovation skills (LIS), life and career skills (LCS), and information, media, and technology skills (IMTS) variables of the 21CSCPS and the determination and curiosity (DC), organization of learning (OL), and motivation (Mot.) variables of the LLLTS and to develop a theoretical model explaining the correlations between these factors. SEM is a multivariate statistical approach that allows testing the causal correlations between observed variables and latent variables (Şen & Yılmaz, 2013; Tabachnick & Fidell, 2020). The data gathered from the analyses were interpreted based on the literature.

3. Findings

The study aimed to uncover the causal correlations between the LIS, LCS, and IMTS variables of 21st-century skills competency perceptions and the DC, OL, and Mot. variables of lifelong learning tendencies; to determine whether the theoretically proposed model was confirmed with the data set; and to test the direct correlations between the latent variables. Figure 1 shows the theoretically proposed research model.

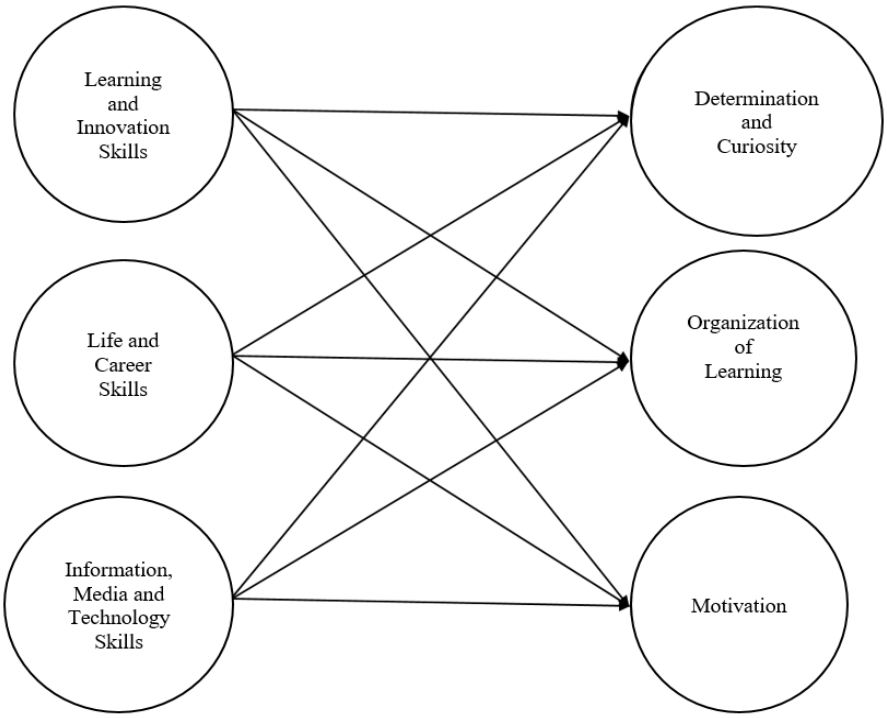

Figure 1. Research model

The first step of the structural regression model included checking whether the part of the research model belonging to the assessment models fit adequately or not. Accordingly, the CFA was carried out by including the 21CSCPS, which was defined as the independent assessment model in the research, the latent variables of LIS, LCS, and IMTS, and all the items that are considered to explain these latent variables in the analysis. Table 2 shows the fit indices of the model and the model fit results from the analysis.

Table 2. *Fit criteria for independent assessment model*

Examined Fit Indices	**Perfect Fit Criteria**	**Good Fit Criteria**	**Scale Fit Values**	**Scale Fit Statuses**
X^2/sd	$0 \leq X^2/sd \leq 3$	$3 \leq X^2/sd \leq 5$	10.50	-
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	.058	Good
CFI:	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$	.930	Good
TLI	$.95 \leq TLI \leq 1.00$	$.90 \leq TLI \leq .95$	.926	Good
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$	.031	Perfect
X^2= 9435.053; sd= 899				

When Table 2 was examined, the x^2/ sd ratio was found to be 10.50 in the study. The greater than 5 of this value indicated that the model had no acceptable fit. When evaluating the model fit, chi-square (x^2) and degrees of freedom (sd) values of 3 and below indicated that the model had a good fit, while a value between 3-5 indicated that the model had an acceptable fit (Gürbüz, 2021). However, the increase in the degrees of freedom with the growth of the sample made it difficult to evaluate the fit reasonably. Accordingly, the larger the sample size, the

higher the x²/sd ratio (Çokluk et al., 2018). For large samples (n > 700), the x²/sd ratio is likely to take a value above 5 since the x² value will also rise (Gürbüz, 2021). Consequently, since the x² and sd ratios are sensitive to sample size, the model-data fit was decided by considering alternative fit indices. While the root means square error of approximation (RMSEA) of .058), comparative fit index (CFI) of .93, and non-normed fit index (TLI) of .93 indicated that the model had an acceptable fit, the root mean square of standardized residual means (SRMR) of .031 indicated that the model had a perfect fit. An RMSEA value between 0 ≤ .05 indicated a perfect fit (Schumacker & Lomax, 1996), while a value between .05 ≤ .08 indicated a good fit, i.e., an acceptable fit (Sümer, 2000). CFI value between .90 ≤ .95 indicated that the model had a good fit, while a value between .95 ≤ 1.00 indicated that the model had a perfect fit (Hu & Bentler, 1999; Sümer, 2000). A TLI value between .90 ≤ .95 indicated a good fit (Schumacker & Lomax, 1996; Sümer, 2000), a value between .95 ≤ 1.00 indicated a perfect fit (Hu & Bentler, 1999; Sümer, 2000). An SRMR value between 0 ≤ .05 indicated a perfect fit (Brown, 2006), a value between .05 ≤ .08 indicated a good fit (Brown, 2006; Hu & Bentler,1999), and a value >.10 indicates a poor fit (Kline, 2019). Moreover, it was determined that the standardized factor loadings of the variables related to the independent assessment model ranged between .74 and .86, error variances ranged between .26 and .46, t-values ranged between 83.56 and 154.77, explained variance values ranged between .54 and .74, and these values were significant. When both global/general and local/individual fit statistics of the independent assessment model were evaluated together, the assessment model was found to have a significant and good fit. Moreover, since it appeared that the use of correction indices would not make a significant contribution to x² due to the large sample size, no modification (correction) was required in the model.

The confirmatory factor analysis was run by including lifelong learning tendencies scale, which was defined as the dependent assessment model in the study, the latent variables of DC, OL, and Mot. and all the items that are considered to explain these latent variables in the analysis. Table 3 shows the fit indices of the model and the model fit results from the analysis.

Table 3. *Fit criteria for dependent assessment model*

Examined Fit Indices	**Perfect Fit Criteria**	**Good Fit Criteria**	**Scale Fit Values**	**Scale Fit Statuses**
X^2/sd	$0 \leq X^2/sd \leq 3$	$3 \leq X^2/sd \leq 5$	9.92	-
RMSEA	.00 ≤ RMSEA ≤ .05	.05≤ RMSEA ≤.08	.056	Good
CFI:	.95 ≤ CFI ≤ 1.00	.90 ≤ CFI ≤ .95	.957	Perfect
TLI	.95 ≤ TLI ≤ 1.00	.90 ≤ TLI ≤ .95	.954	Perfect
SRMR	.00 ≤ SRMR ≤ .05	.05 ≤ SRMR ≤ .10	.018	Perfect
X^2= 7311.827; sd= 737				

When Table 3 was examined, the x²/sd ratio was found to be 9.92 in the study. The greater than 5 of this value indicated that the model had no acceptable fit. While the RMSEA index of .056 indicated that the model had an acceptable fit, the CFI index of .96, the TLI index of .95, and the SRMR value of .018 indicated that the model had a perfect fit. Moreover, it was determined that the standardized factor loadings of the variables related to the dependent assessment model ranged between .79 and .93, error variances ranged between .14 and .38, t-values ranged between 107.30 and 333.50, and explained variance values ranged between .62 and .86, and those values were significant. When both global/general and local/individual fit statistics of the dependent assessment model were evaluated together, the assessment model was found to have a significant and good fit. Moreover, since it appeared that the use of

correction indices would not make a significant contribution to x^2 due to the large sample size, no modification was required in the model.

After the fit of the independent and dependent assessment models was statistically analyzed and it was determined that the models had sufficient fit and were validated, the second stage of the structural regression model, the structural model stage, in which the correlations between the latent variables were tested, was initiated. Table 4 shows the fit indices analyzed in order to evaluate the structural regression model and the model fit results from the analysis.

Table 4. *Fit criteria for the research model*

Examined Fit Indices	**Perfect Fit Criteria**	**Good Fit Criteria**	**Scale Fit Values**	**Scale Fit Statuses**
X^2/sd	$0 \leq X^2/sd \leq 3$	$3 \leq X^2/sd \leq 5$	6.34	-
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	.043	Perfect
CFI:	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$	.936	Good
TLI	$.95 \leq TLI \leq 1.00$	$.90 \leq TLI \leq .95$	.934	Good
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$	.025	Perfect
X^2= 21457.482; sd= 3387				

When Table 4 was examined, the x^2/sd ratio of the model was found to be 6.34. A ratio greater than 5 indicates that the model does not fit. The RMSEA index of .043 and SRMR value of .025 indicated that the model showed a perfect fit, while the CFI index of .94 and TLI index of .93 indicated that the model had an acceptable fit. When the fit indices were analyzed together, the results statistically showed that the research model had an adequate fit. Moreover, it was determined that all estimates of the unstandardized and standardized solutions in the structural regression model were significant at the level of .05. Based on these results, it can be asserted that the research model fit the data and was validated.

To determine whether the observed variables defined in the latent factors describe the construct they are related to, the construct reliability and explained variance of the latent factors should be calculated (Çelik & Yılmaz, 2013). Table 5 shows the construct reliability and explained variances of the latent variables in the research model.

Table 5. *Construct reliability and explained variances of the latent variables in the research model*

Factors	**Construct Reliability**	**Explained Variances**
LIS	.97	.66
LCS	.97	.67
IMTS	.96	.67
DC	.99	.79
OL	.97	.72
Mot.	.97	.75

When Table 5 was analyzed, the construct reliability was determined as .97 for the LIS factor, .97 for the LCS factor, .96 for the IMTS factor, .99 for the DC factor, .97 for the OL factor, and .97 for the Mot. factor. These results showed that the latent variables were highly reliable (above .70). It was considered sufficient for the construct reliability assessment estimates to be above .70 (Hair et al., 2009; Sönmez Çakır, 2020). It was determined that the factor of LIS in the model was explained at a rate of .66, the factor of LCS was explained at a

rate of .67, the factor of IMTS was explained at a rate of .67, the factor of DC was explained at a rate of .79, the factor of OL was explained at a rate of .72, and the factor of Mot. was explained at a rate of .75. The estimates of the variance explained by the latent variables in the model were above .50, indicating that the model explained the variance adequately. Explained variance assessment estimates should be above .50 (Hair et al., 2009; Gürbüz, 2021). Table 6 shows the structural relationships, t-values, structural equations and multiple coefficients of determination (R^2) from the analysis after the structural regression model was evaluated.

Table 6. *Structural regression model results for the research model*

Structural Correlations	**Standardized Loadings**	**t-value**
Learning and Innovation Skills → Determination and Curiosity	.16	6.37
Learning and Innovation Skills → Organization of Learning	.34	23.55
Learning and Innovation Skills → Motivation	.26	13.60
Life and Career Skills → Determination and Curiosity	.22	10.06
Life and Career Skills → Organization of Learning	.35	27.52
Life and Career Skills → Motivation	.42	26.19
Information, Media, and Technology Skills → Determination and Curiosity	.21	8.32
Information, Media, and Technology Skills → Organization of Learning	.34	24.16
Information, Media, and Technology Skills → Motivation	.22	11.55
Structural Equations		**R^2**
Determination and Curiosity = +.16 × LIS +.22 × LCS+.21 × IMTS		.26
Organization of Learning = +.34 × LIS +.35 × LCS+.34 × IMTS		.80
Motivation = +.26 × LIS +.42 × LCS+.22 × IMTS		.61

When the structural correlations in Table 6 were analyzed, it was determined that there was a correlation of .16 between LIS and DC latent variable, .34 between LIS and the latent variable of OL and .26 between LIS and the Mot. latent variable. The path coefficient between the latent variables of LCS and DC was .22, the path coefficient between the latent variables of LCS and OL was .35, and the path coefficient between the latent variables of LCS and Mot. was .42. It was determined that there was a correlation of .21 between IMTS and the latent variable of DC, .34 between IMTS and the latent variable of OL and .22 between IMTS and the Mot. latent variable. A significant and positive correlation was observed between these independent and dependent latent variables. The path coefficient, indicating the extent to which one latent variable is effective on another latent variable, takes a value between ±1, and values close to 1 indicate that the correlation is strong (Sönmez Çakır, 2020). Accordingly, the independent latent variables of LIS, LCS, and IMTS were significant predictors of the dependent latent variables of DC, OL, and Mot.

The structural equation determined according to the path coefficients of the independent latent variables of LIS, LCS, and IMTS, which are assumed to explain the dependent latent variable of DC, indicated that R^2 value was .26, and it can be asserted that it explained 26% of the latent variable of DC weakly. When the direct effects of the independent latent variables of LIS, LCS, and IMTS, which are assumed to explain the dependent latent variable of OL, were evaluated, the R^2 value of the variables was found to be .80, and it was determined that they explained 80% of the latent variable of OL strongly. The R^2 value of the independent latent

variables of LIS, LCS, and IMTS, which are assumed to explain the dependent latent variable of Mot., was determined to be .61, and 61% of the latent variable of Mot. was found to be explained moderately. According to the R^2 values, when the latent variables were .75 and above, they had a strong explanatory rate; when they were .50 and above, they had a medium explanatory rate; and when they were .25 and above, they had a weak explanatory rate (Henseler et al., 2009). Figure 2 presents the structural model of the theoretically proposed research model.

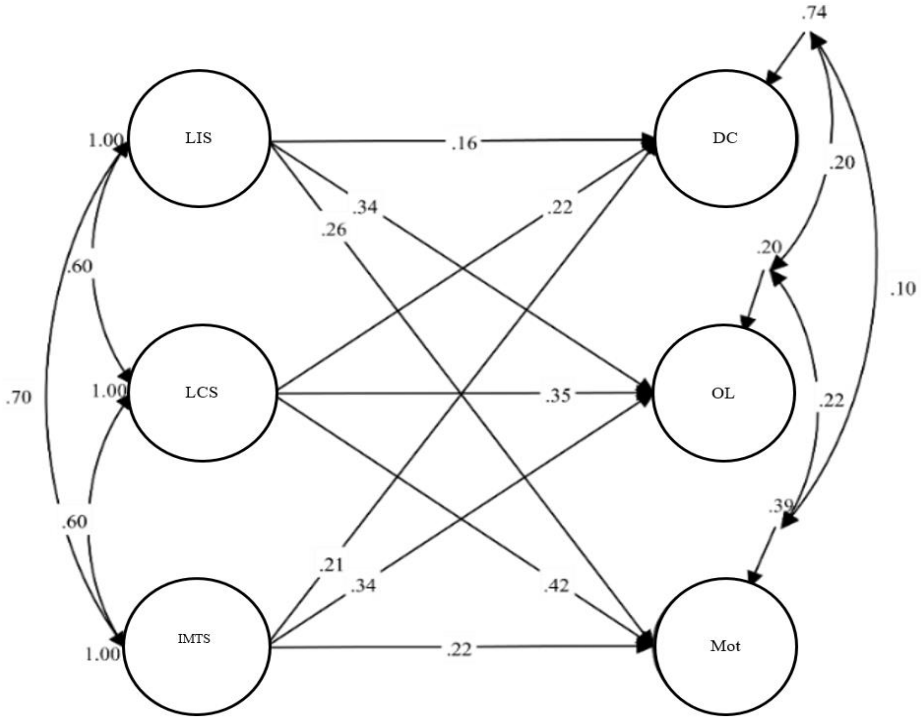

Figure 2. Structural model for the research model

When Figure 2 was examined, the best predictor of the latent variables of determination and curiosity was the latent variable of the LCS (.22). The second predictor of the latent variable of determination and curiosity was the latent variable of IMTS (.21), and the third predictor was the latent variable of LIS (.16). When the direct effects of the predictors of the latent variable of organization of learning were examined, it was observed that the latent variable of LCS was .35, the latent variable of LIS was .34, and the latent variable of IMTS was .34. The best predictor of the latent variable of motivation was the latent variable of LCS. The standardized magnitude of the effect of that latent variable on motivation was stronger than the other effects (.42). The second predictor of the latent variable of motivation was the latent variable of LIS (.26), and the third predictor was the latent variable of IMTS (.22). Figure 3 presents the structural regression model of the theoretically proposed research model.

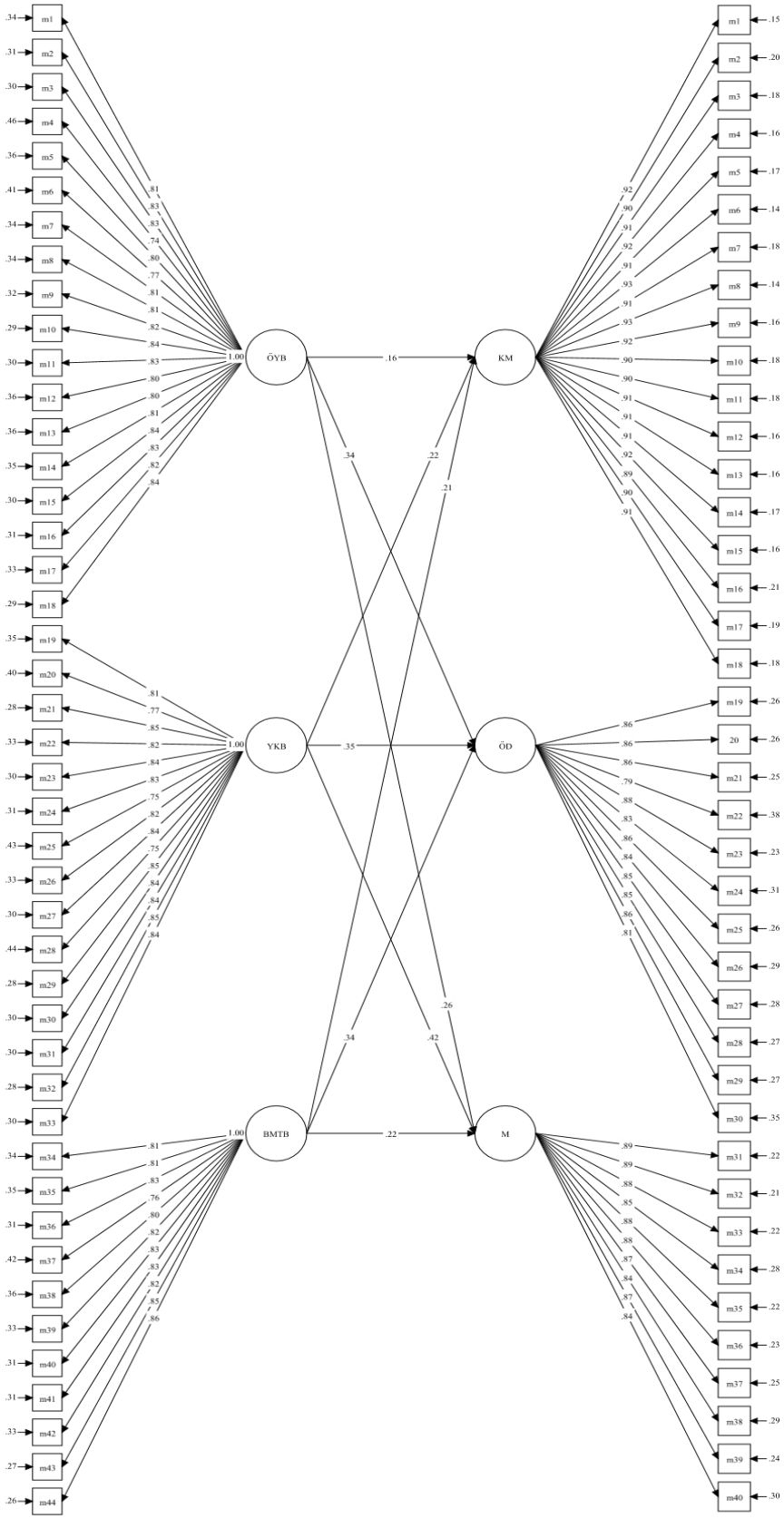

Figure 3. Structural regression model of the research model

The identified hypotheses were statistically evaluated under the research model by considering the structural regression model results of the theoretically proposed research model. Table 7 shows the hypotheses of the study examined within the scope of the research model.

Table 7. *Hypothesis results of the research model*

Hypotheses	**Conclusion**
H (1a): The LIS variable of the 21st-century skills competence perceptions has a positive effect on the DC variable of the lifelong learning tendencies.	Confirmed
H (1b): The LIS variable of the 21st-century skills competence perceptions has a positive effect on the OL variable of the lifelong learning tendencies.	Confirmed
H (1c): The LIS variable of the 21st-century skills competence perceptions has a positive effect on the Mot. variable of the lifelong learning tendencies.	Confirmed
H (2a): The LCS variable of the 21st-century skills competence perceptions has a positive effect on the DC variable of the lifelong learning tendencies.	Confirmed
H (2b): The LCS variable of the 21st-century skills competence perceptions has a positive effect on the OL variable of the lifelong learning tendencies.	Confirmed
H (2c): The LCS variable of the 21st-century skills competence perceptions has a positive effect on the Mot. variable of the lifelong learning tendencies.	Confirmed
H (3a): The IMTS variable of the 21st-century skills competence perceptions has a positive effect on the DC variable of the lifelong learning tendencies.	Confirmed
H (3b): The IMTS variable of the 21st-century skills competence perceptions has a positive effect on the OL variable of the lifelong learning tendencies.	Confirmed
H (3c): The IMTS variable of the 21st-century skills competence perceptions has a positive effect on the Mot. variable of the lifelong learning tendencies.	Confirmed

The research hypothesis H (1a) was statistically confirmed (© = .16; t = 6.37). The LIS variable had a positive effect on the DC variable. The LIS variable had a positive effect on the OL variable, and the research hypothesis H (1b) was accepted (© = .34; t = 23.55). The research hypothesis H (1c) was statistically confirmed, where the LIS variable had a positive effect on the Mot. variable (© = .26; t = 13.60).

The hypothesis H (2a), indicating that the LCS variable had a positive effect on the DC variable, was confirmed, and the correlation between the variables was found to be significant (© = .22; t = 10.06). The research hypothesis H (2b) showed that the LCS variable had a positive effect on the OL variable. The correlation between the variables was significant, and the research hypothesis was confirmed (© = .35; t = 27.52). The research hypothesis H (2c) was statistically accepted, where the LCS variable had a positive effect on the Mot. Variable (© = .42; t = 26.19).

The hypothesis H (3a), indicating that the IMTS variable has a positive effect on the DC variable, was confirmed, and the correlation between the variables was significant (© = .21; t = 8.32). The research hypothesis H (3b) showed that the IMTS variable had a positive effect on the OL variable. This research hypothesis was accepted (© = .34; t = 24.16). The hypothesis H (3c), whereby the IMTS variable has a positive effect on the Mot. variable was confirmed as a result of the analyses (© = .22; t = 11.55). Accordingly, all the research hypotheses were confirmed under the research model.

4. Conclusion, Discussion and Recommendations

It was concluded that the latent variables of LIS, LCS, and IMTS of the perceptions of preservice social studies teachers on the 21st-century skills competency were significant predictors of the latent variables DC, OL, and Mot. of lifelong learning tendencies and positively affected them. According to the research model, the latent variables of LIS, LCS, and IMTS explained 26% of the latent variable of DC, 80% of the latent variable of OL, and 61% of the latent variable of Mot. Moreover, the best predictor of the latent variables of DC, OL, and Mot. was the latent variable of LCS. It can be asserted that it is important for preservice teachers to possess 21st-century skills in order to complement and maintain their lifelong learning tendencies. It can be asserted that teaching the 21st-century skills, such as creativity, critical thinking, communication, literacy in information and communication technologies, flexibility, entrepreneurship, self-management, and responsibility to individuals, is crucial for them to become lifelong learners and to be more determined, curious, and motivated and to organize their learning during this process. There are studies in the literature examining the relationship between 21CSCPS and LLLTS. In Erdoğan's (2020) study, it was determined that there was a positive, significant, and moderate relationship between Turkish teacher candidates' 21st-century skills and LLLTS. In Kozikoğlu and Altunova's (2018) study, a low-level positive relationship was found between LLLTS and IMTS, while a moderate positive relationship was found between LIS and LCS. In Korkmaz's (2019) study, it was determined that there was a significant relationship between classroom teachers' LLLTS persistence, motivation, and lack of curiosity dimensions and the use of 21st-century teaching skills, while no significant relationship was found between the dimension of lack of ability to organize learning. In Özdemir's (2022) study, a moderate and significant relationship was determined between teachers' self-efficacy perceptions of 21st-century skills and LLLTS. In Soruklu's (2022) study, a positive and significant relationship was found between teacher candidates' 21st-century skills and LLLTS. In the study conducted by Yaralı (2022) it was determined that there was a positive, significant and high-level relationship between the 21st century skills of teacher candidates and their lifelong learning tendencies. In the study conducted by Yalçın İncik (2020), a positive, moderate and significant relationship was determined between teachers' use of LLLTS and 21st-century teaching skills. The studies conducted by Erdoğan (2020) with preservice Turkish teachers and Kozikoğlu and Altunova (2018) with preservice teachers concluded that the factors of LIS and LCS regarding 21CSCPS were significant predictors of LLLTS, whereas the factor of IMTS was not a significant predictor of LLLTS. On the other hand, the study by Özdemir (2022) found that teachers' perceptions of 21st-century skills competency were significantly predicted by the LLLTS. This study, unlike previous studies, developed a theoretical model explaining the correlation between LIS, LCS, and IMTS variables of 21st-century skills competency perceptions and the DC, OL, and Mot. variables of lifelong learning tendencies.

The following recommendations can be made based on the research results:

- The activities that are planned to be organized at the university to develop 21CSCPS and LLLTS should be based on the interests and needs of preservice teachers, and they should be motivated to participate in these activities.
- Scientific activities such as panels, conferences, congresses, and symposiums should be organized in Turkiye and abroad for preservice teachers to follow all developments related to 21st-century skills and lifelong learning, to raise and build their awareness on this topic, to interact with each other, and to exchange information. They should be encouraged to attend them.

- Preservice teachers should be encouraged to participate in international student exchange programs in order to acquire the skills necessary for their personal development, adapt to changes in society, improve their knowledge and qualifications, learn about different cultures, and get trained in foreign languages.
- This study, through which the correlation between the preservice social studies teachers' perceptions of 21st-century skills competencies and their lifelong learning tendencies was examined, should be conducted with students from different departments, teachers working at different levels and branches, academicians, vocational school students, and school administrators, and the results should be compared.
- The correlation between the perceptions of 21st-century skills competencies and lifelong learning tendencies should be examined with longitudinal survey research; accordingly, the time-dependent changes in the characteristics of the same participants should be studied.

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