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Research Article

Investigating the link between teachers' perceptions of 21st century skills efficiency and students' perceptions of learning experience: Mediating role of teacher's self-efficacy

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This study aimed to put forward the mediating role of teacher self-efficacy in the relationship between students' perceptions of learning experience and teachers' perceptions of 21st century skills efficacy. Participants of the research consisted of two groups. First group is 262 teachers and the second group is 622 primary school students. Data were collected with the Learning Experience Perceptions Scale (LEPS), Turkish version of the Teachers' Sense of Efficacy Scale (TTSES) and 21st Century Skills and Competences Scale (21stCSCS). The data were analysed with Two-Stage Structural Equation Modeling (SEM). The research results revealed that teacher self-efficacy has a full mediating effect between students' perceptions of learning experience and teachers' perceptions of 21st century skills competence.

Keywords: Teacher perceptions; 21st century skills efficiency; Students' perceptions of learning experience; Teacher's self-efficacy

1. Introduction

Globalization and improvements in information technologies have led to radical changes in countries and societies, particularly in their economy, health and politics. Various developments in education have been triggered by digitalization. As a result of this emerging new structure, learners' needs, characteristics, and the competencies required of teachers who train them have also evolved. The 21st century education should aim to prepare students for more than just the business world. It should provide them with skills necessary to become active, responsible citizens as well (Organisation for Economic Co-operation and Development, [OECD], 2018). To adapt to the 21st century world and live up to certain standards, individuals need a set of skills such as producing solutions to problems encountered, critical thinking, creative thinking, being

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entrepreneurial, innovative and effective in communication, and using technology competently (Acedo & Hughes, 2014; Alismail & McGuire, 2015; Trilling &Fadel, 2009).

In order to meet the social expectations, 21st century teachers should be role models for their students and should be using their pedagogical and communication skills effectively. What is expected of teachers of the 21st century is to raise generations with various skills such as creativity, critical thinking, problem solving, adaptation, innovation, scientific and digital literacy, i.e., individuals who are word citizens with global awareness, and to carry out their studies in accordance with this purpose (Ministry of National Education, 2017). Although these skills, called 21st century skills, were taken their place in the curriculum objectives of many countries, it cannot be said that there is a clear consensus as to how the learning models of the 21st century should be applied in schools. Saavedra and Opfer (2012) expressed that classroom learning should be directly relevant to students' lives and that a learning environment appropriate for the century can be provided by developing students' knowledge-generating skills in line with the knowledge of the subject area as well as helping them employ thinking skills, teaching them how to learn, sharing learning results with others, and using technology to support learning as well as encouraging creativity.

Developing 21st century skills at the level of primary school would be convenient so that students that will form the society of the future are prepared for business and social life (O'Neal, Gibson & Cotton, 2017). It is of great importance for the teachers to provide their students, who spend most of their education time in the primary school period and take them as role models, with appropriate learning experiences in the learning environments they were prepared, enable students to define themselves, take on new responsibilities, and use entrepreneurial skills. Spending the primary school period with teachers who will be effective role models for them contributes to the improvement of 21st century skills in students permanently and helps them to use these skills at higher educational levels, thereby continuing their educational life in a more qualified manner. It can be said that classroom teachers obviously have a special importance in this respect. Teachers cannot be expected to transfer their 21st century skills to their students and equip them with these skills without fully understanding how they view themselves about their profession and how they carry out their teaching experiences first.

1.1. Teachers' Perceptions of 21st Century Skills Competence

The 21st century skills that are necessary for the learners to adapt to social life can only be achieved by providing appropriate learning environments for them. It is the teachers' responsibility to give students these experiences (Yaşar, 2021). It can be said that the qualities of teachers are of key importance in the education process considering the fact that they are in constant interaction with other components influencing the quality of education and have a direct influence on them (Leigh & Mead, 2005), and that the knowledge and skills of the teachers are the most important factors that support student development. One of the most important issues for teachers to develop the desired 21st century skills in their students is how competent they are in teaching these skills. Many international organizations such as P21CS, ATTCS, NETS and ISTE have been carrying out detailed studies on categorising the skills necessary for all learners to adapt to the globalizing world of the 21st century. These organizations defined those skills that they predict to be required by individuals living in the 21st century to become effective citizens as "21st Century Skills" and explained the basic qualities of mentioned skills with different classifications (OECD, 2005). Although there are many different perspectives on how to classify 21st century skills in the literature, the most recognized classification is the skill classification in the Partnership for 21st Century Skills Report [P21] (2009; 2015; 2019). These skills were classified into three groups as "Life and Career Skills". "Learning and Innovation Skills", "Information, Media and Technology Skills". As can be seen, the skills that take place in the first group are classified as Life and Career Skills and are subdivided as Flexibility and Adaptability, Initiative and Self Direction, Social and Cross-Cultural Skills, Productivity and Accountability, and Leadership and Responsibility.

Learning and Innovation Skills were focused more on thinking skills and collaboration/communication, and they are explained under the headings of Critical Thinking, Communication, Collaboration, and Creativity. The final group, Information, Media and Technology Skills, includes ICT (Information, Communications, and Technology) Literacy and Media Literacy. This is the classification that was also adopted in this study. In Turkey, there are no studies that measure the degree of teachers' 21st century skills by examining these skills, in addition to the fact that the studies that collect data based on opinion and perception of competence seem to be rather limited. These studies were mostly conducted on prospective teachers (Anagün et al., 2016; Dağhan et al., 2017; Günüç et al., 2013; Kozikoğlu et al., 2020; Özdemir Özden et al., 2018).

1.2. Teacher Self-efficacy

Self-efficacy can be defined as a person's belief in his/her capacity to perform the certain actions for certain tasks (Martin & Mulvihill, 2019). Self-efficacy beliefs shape people's thoughts and actions as well as determining how much effort the individual should spend to accomplish a task (Bandura, 1997; Eccles & Wigfield, 2002).

These beliefs are mostly related to teachers' own perception of their abilities relating to teaching strategy, classroom management, and student engagement (Tschannen-Moran & Woolfolk-Hoy, 2001). Hilleker and Loranc (2022), teachers' beliefs about their teaching abilities are related to the learning environment. Teachers' self-efficacy beliefs have an important role in the effective teaching and learning process. From this viewpoint, it can be seen that studies that deal with the conceptual framework of 21st century skills in the context of teacher self-efficacy (Wilborn, 2013) and 21st century skills in terms of learning, instructional design or program development principles (Acedo & Hughes, 2014; Sharif & Cho, 2015; Yáñez et al., 2015;) and professional development (Sharif & Cho, 2015) are in the majority.

The teaching performance of teachers and student-learning cannot be separated from each other it can be stated that there is a relationship between teachers' self-efficacy perceptions for teaching 21st century skills and students' learning experiences in the classroom. Although primary school teachers have an awareness of the fact that they offer different experiences in terms of transferring skills and performing their profession, it is also important to evaluate this situation from the student's point of view.

1.3. Students' Perceptions of Learning Experience

Developing 21st century competencies requires a range of experiences (Koh et al., 2017). By synthesizing the concepts of 21st century learning and meaningful learning, six widely accepted practices have emerged: self-directed learning, cooperative learning, and meaningful learning with information and communication technology, critical thinking, creative thinking, and authentic problem solving. The six factors that stand out in learning experiences can be subdivided into two main groups as *learning processes* and *thinking skills*. Emphasized in order to enable students to learn, these factors are aimed at developing the capacity of students to produce/create knowledge (Scardamalia et al., 2012). According to Chai et al. (2015), it is aimed to increase the knowledge generation competence of students by using high-level thinking skills in learning processes. The learning experiences that teachers offer to their students for education can be defined as teaching activities offered to students during teaching on a particular subject. Students' learning in the school environment is dependent on teachers' in-class teaching experiences. For this reason, students' learning experiences can be seen as the kind of learning where 21st century learners take on their own responsibilities and the reflections brought about by their teachers' teaching activities (Freeman & Johnson 2005).

2. Theoretical Framework

Educating students in the 21st century requires a variety of skills. Teachers play a fundamental role in achieving the desired outcomes through the comprehension of teaching activities. There are

many factors that affect the successful execution of educational activities. Studies in the literature that argue that one of the most important of these factors is teachers' self-efficacy beliefs. The way teachers use their beliefs to teach may serve as barriers or facilitators of student's learning and shape their practice (Admiraal et al., 2017).

The present study based on Social Cognitive Theory. According to the Social Cognitive Theory, the concept of teacher self-efficacy refers to teachers' beliefs about their ability to successfully continue the teaching process. Bandura (1997) stated that the concept of teacher self-efficacy can best be understood within the framework of social cognitive theory and that this theory can provide an important perspective for teachers' performance and behaviors throughout the teaching process. There are many studies examining the effect of teachers' beliefs on teaching practices in the classroom (Canrinus et. al, 2012; Ghasembolanda & Hashimb, 2013; İlgör, 2019; Zee & Koomen, 2016). There are also research about teacher self-efficacy which has been linked to desirable outcomes like students' motivation and success (Skaalvik & Skaalvik, 2007), a better classroom climate (Aslan, 2015) and student performance (Mojavezi &Tavis, 2012). Dilekli and Tezci (2016) revealed that self-efficacy was valuable in explaining teachers' teaching thinking practices. Also, Çimen (2022) reached that there was a moderate positive correlation between the self-efficacy and efficacy perceptions for skill teaching of physical education and sports teachers. Therefore it is important to know about teacher's perceptions of 21st century skills competencies and its relation with their self efficacy beliefs and how students perceive these efforts of teachers.

There is a relationship between the self-efficacy perceptions that teachers need to equip their students with 21st century skills and their self-efficacy perceptions for their profession. However, no study that examines the relationship between teachers' perceptions of 21st century skills efficacy and students' perceptions of learning experience or revealing the role of teachers' perceptions of self-efficacy towards their profession in such a relationship has been found in the literature. Based on this requirement, this study aimed to put forward the mediating role of teacher self-efficacy in the relationship between students' perceptions of learning experience and teachers' perceptions of 21st century skills efficacy. The structural model created for this purpose is given in Figure 1.

Figure 1
Hypothetical Model
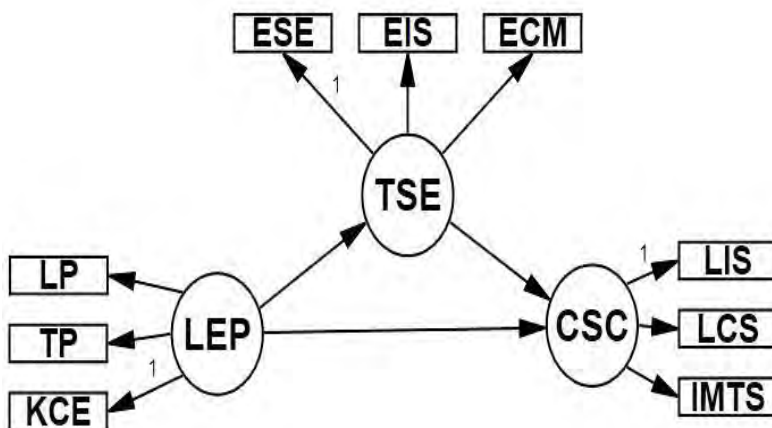
Note: LEP: Learning Experience Perceptions, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, CSC: 21st Century Skills and Competences, TSE: Teachers' Sense of Efficacy, LIS: Learning and Innovation Skills, ESE: Efficacy in Student Engagement, LCS: Life and Career Skills, EIS: Efficacy in Instructional Strategies, IMTS: Information, Media and Technology Skills, ECM: Efficacy in Classroom Management.

The following hypotheses were created to test the model:
Direct effect
H1:   LEP → TSE
H1: Students' perceptions of learning experience are a significant predictor of teacher self-efficacy.

H2: TSE → CSC

H2: Teacher self-efficacy is a significant predictor of teacher 21st century skills competence perceptions.

H3: LEP → CSC

H3: Students' perceptions of learning experience are a significant predictor of teacher 21st century skills competence perceptions.

Mediator Effect

H4: LEP → TSE → CSC

H4: Teacher self-efficacy has a mediating effect between students' perceptions of learning experience and teacher 21st century skills competence perceptions.

3. Method

3.1. Research Model

The present study employs a causal design. The causal pattern is a model used to explain the cause-effect relationships of variables (Neuman, 2016). In the present study, this model was preferred because it was emerged as the purpose of determining the mediating role of Teachers' Sense of Efficacy as the mediator variable in the effect of the cause variable (Learning Experience Perceptions) on the outcome variable (21st Century Skills and Competences).

3.2. Study Group

Participants of the research consisted of two groups. First group is teachers and the second group is primary school students.

3.2.1. Teacher Participants

Research data was collected via Google Survey. A total of 262 teachers, 128 female (48.9%) and 134 male (51.1%) participated in the present study. These teachers were selected according to the convenient sampling method. In addition, the sampling calculation formula (N=Sample size=Number of parameters in the model) suggested in Structural Equation Modeling (SEM) studies was used in the present study. According to this rule, it was recommended that the sample size be 20 times the number of parameters (20:1) (Jackson, 2003; Kline, 2015). Since there are 12 parameters in the present study, the minimum sample size was expected to be 240. Since 262 teachers were reached in the current study, it can be said that the study group is sufficient in number.

3.2.2. Student Participants

Research data were collected from 622 fourth grade students (300 female, 322 male) who are attending five public schools in a city centre located in the central region of Turkey in the context of fourth researcher's doctoral thesis (Yaşar, 2021). Participants were selected according to the convenience sampling method. In this context, at the beginning, the purpose of the study were explained to the students. The questionnaire was completed approximately at 20 minutes by the students.

3.3. Data Collection Tools

3.3.1. Learning Experience Perceptions Scale (LEPS)

LEPS was developed by Chai et al (2015). Its Turkish adaptation, validity and reliability studies were carried out by Yaşar (2021). LEPS includes 32 items and three factors. These factors are thinking processes, learning processes and knowledge creation efficacy. Construct validity was tested with Confirmatory Factor Analysis (CFA) technique by Yaşar (2021). As a result of CFA, the goodness of fit values of learning processes, which are among the sub-dimensions of LEPS, are $\chi^2/df = 1.99$, RMSEA=.058, CFI = .97 and TLI = .97, respectively, while thinking processes' $\chi^2/df = 1.54$, RMSEA= .043 , CFI = .98 and TLI = .98, and knowledge creation efficacy was

found to be $\chi^2/df = 0.72$, RMSEA=.000, CFI = 1.00 and TLI = 1.00 at an acceptable level. In addition, the Composite Reliability coefficients by Yaşar (2021) were found to be learning processes= CR: .95, thinking processes= CR: .96. In addition, the Cronbach alpha value of knowledge creation efficacy was calculated as ($\alpha = .80$). As a result of the reliability analysis made in the current study, it was seen that the whole LEPS was Cronbach alpha value ($\alpha = .93$).

3.3.2. Turkish version of the Teachers' Sense of Efficacy Scale (TTSES)

TTSES was developed by Tshannen-Moran et al. (1998). Its Turkish adaptation, validity and reliability analyses were carried out by Çapa et al. (2005). TTSES has 24 items and three dimensions. These dimensions are; efficacy in student engagement, efficacy in instructional strategies and efficacy in classroom management. Construct validity was tested by Çapa et al. (2005) via Confirmatory Factor Analysis (CFA). In CFA results goodness-of-fit values of TTSES were found to be at acceptable levels for TLI = .99, CFI = .99 and RMSEA = .065. In addition, in the reliability analysis performed by Çapa, Çakıroğlu &Sarıkaya (2005), the whole scale was founded as Cronbach alpha value ($\alpha = .93$). In the present study, it was determined that the whole scale was Cronbach alpha value ($\alpha = .97$).

3.3.3. 21st Century Skills and Competences Scale (21stCSCS)

21stCSCS was developed by Anagün et al. (2016) and its validity and reliability analysis were performed by these researchers. The 21st CSCS has 42 items and a three-factor structure. These factors are *learning and innovation skills*, *life and career skills and information*, and *media and technology skills*. Construct validity exploratory factor analysis (EFA) and Confirmatory Factor Analysis (CFA) were evaluated by Anagün et al. (2016). In the EFA results, it was determined that the three-factor and approximate total explained variance of 21stCSCS was 51.30%. As a result of DFA, 21stCSCS was found to have acceptable goodness-of-fit values $\chi^2/df = 2.00$, RMSEA = .055, CFI = .93, IFI = .93. At the same time, as a result of the reliability analysis by Anagün et al. (2016) the Cronbach alpha value of the whole 21stCSCS was calculated as ($\alpha = .88$). In the reliability analysis conducted in the present study, the whole 21stCSCS was determined as Cronbach alpha value ($\alpha = .95$).

3.4. Statistical Analysis

In the present study, the Structural Equation Modeling (SEM) assumptions were tested by making preliminary analysis such as univariate, multivariate normality and multicollinearity before starting the Structural Equation Modeling (SEM) analysis (Field, 2013; Kline, 2015; Mardia, 1974). After testing the assumptions, the data were analysed and evaluated with Two-Stage Structural Equation Modeling (SEM). Accordingly, in the first stage, the measurement model was tested. Then, the second phase of testing the structural model was carried out (Anderson & Gerbing, 1988). In testing and interpreting these models, used as goodness of fit indices "$0 \leq \chi^2/df \leq 2$", ".05 < p ≤ 1.00", "0 ≤ RMSEA ≤ .05", "95 ≤ NFI ≤ 1.00", ".97 ≤ CFI ≤ .95 ", ".95 ≤ GFI ≤ 1.00", ".90 ≤ AGFI ≤ 1.00", "AIC: smaller than AIC for comparison model" and "ECVI: smaller than ECVI for comparison model" (see Table 5) (Schermelleh-Engel, Moosbrugger and Müller, 2003). Finally, the maximum likelihood method was preferred as the estimation method (Kline, 2015).

4. Results

4.1. Preliminary Analysis

The assumptions of the present study were evaluated before performing the Structural Equation Modeling (SEM) analysis. In this regard; univariate, multivariate normality and multicollinearity assumptions were investigated. Firstly, Mardia's asymmetry and kurtosis coefficients were examined in the univariate normality test. The asymmetry values of the present study are between -1.05 and .05; the kurtosis values were found to vary between -.49 and 1.53 (see Table 1). These results mean that univariate normality is achieved because the asymmetry and kurtosis values are not less than minus two and greater than plus two (Kline, 2015). In addition, the multivariate

normality test was analysed with the absolute value of kurtosis. The critical ratio value of the present study was found to be 6.306 (see Table 1), and since this value is less than 8, it can be said that there is no problem with the kurtosis value. As a result, the present study met both univariate and multivariate normality assumptions (Mardia, 1974). Finally, the assumption of multicollinearity was evaluated according to tolerance, VIF and the correlation coefficient between the variables. In the present research, it was determined that the tolerance value was .97, the VIF value was 1.02, and it was confirmed that there was no multicollinearity problem among the variables, since the VIF value was less than 5 and the tolerance value was greater than .10. In addition, the correlation coefficients between the latent variables in the present study ranges from $r = .142$ to $r = .544$ (see Table 4), and it can be interpreted that there is no multicollinearity problem since there was no correlation coefficient of .90 and above between the latent variables (Kline, 2015). Arithmetic mean, standard deviation and multivariate normality analysis results for observed variables displayed in Table 1.

Table 1

Arithmetic Mean, Standard Deviation and Multivariate Normality Analysis Results for Observed Variables

Variables	Mean	SD	Skew	Kurtosis	c.r.
LP	47.190	11.933	.052	-.285	
TP	44.656	8.904	-.569	.307	
KCE	18.610	4.235	-.436	-.236	
ESE	57.784	8.968	-1.058	1.538	
EIS	59.670	8.268	-.973	1.266	
ECM	59.659	8.474	-.963	1.418	
LIS	65.287	8.155	-.013	-.497	
LCS	75.585	8.108	-.740	.491	
IMTS	33.898	4.621	-.420	-.284	
Multivariate				10.963	6.306

Note. SD: Standard Deviation, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, ESE: Efficacy in Student Engagement, EIS: Efficacy in Instructional Strategies, ECM: Efficacy in Classroom Management, LIS: Learning and Innovation Skills, LCS: Life and Career Skills, IMTS: Information, Media and Technology Skills.

The correlation between teacher self-efficacy, students' perceptions of learning experience and teachers' perceptions of 21st century skills efficacy were presented in Table 2.

Table 2

Correlation Results between Observed Variables

Variables	1	2	3	4	5	6	7	8	9
1. LP	1								
2. TP	.742**	1							
3. KCE	.608**	.764**	1						
4. ESE	.173**	.149*	.133*	1					
5. EIS	.130*	.095	.071	.907**	1				
6. ECM	.140*	.126*	.097	.887**	.905**	1			
7. LIS	.149*	.122*	.074	.446**	.440**	.402**	1		
8. LCS	.156*	.144*	.073	.545**	.536**	.520**	.706**	1	
9. IMTS	.048	.056	.014	.410**	.400**	.366**	.535**	.660**	1

Note: **$p < .01$; *$p < .05$, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, ESE: Efficacy in Student Engagement, EIS: Efficacy in Instructional Strategies, ECM: Efficacy in Classroom Management, LIS: Learning and Innovation Skills, LCS: Life and Career Skills, IMTS: Information, Media and Technology Skills.

4.2. Two-Stage Structural Equation Modeling (SEM)

4.2.1. First Stage: Testing the Measurement Model

The observed variables in the measurement model were examined find out whether they are meaningfully represented by latent variables (Anderson & Gerbing, 1988). Accordingly, the present study consists of 3 latent variables and 9 observed variables. It was determined that the

goodness of fit indices obtained from the analysis of the measurement model showed a perfect fit (χ^2/df (18.420/24) = 0.76, p=.78; GFI= .98; AGFI= .97, NFI=.99; CFI = 1.00 ; RMSEA = .00 (90% CI for RMSEA = [.00, .03]) In addition, as another result of this measurement model, the latent variables are standardized factor loads on the observed variables to be related (ranged from .70 to .96, p<. 001) and all t values are significant (Figure 2 and Table 2) As a result, the observed variables in the present study are significantly explained by the latent variables to which they depend.

Figure 2
Standardized Factor Loads of the Measurement Model
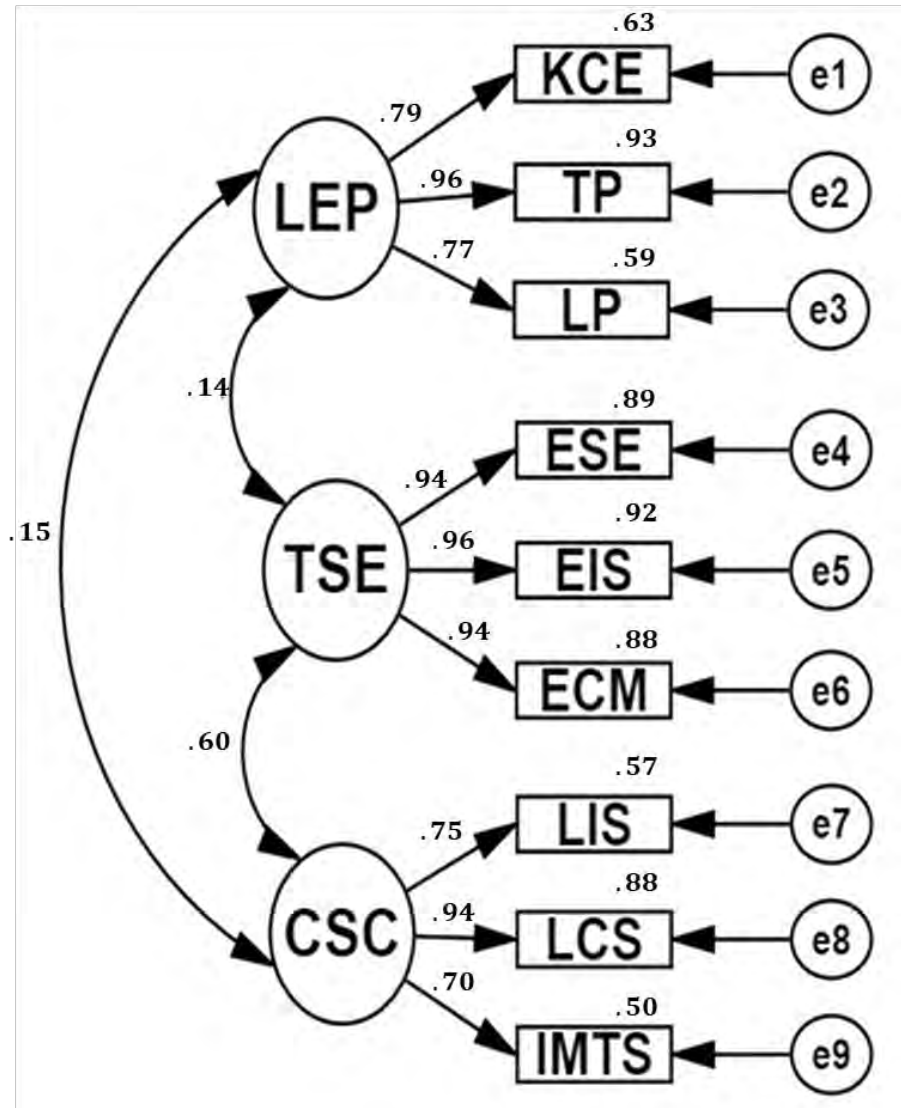
Note: LEP: Learning Experience Perceptions, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, CSC: 21st Century Skills and Competences, TSE: Teachers' Sense of Efficacy, LIS: Learning and Innovation Skills, ESE: Efficacy in Student Engagement, LCS: Life and Career Skills, EIS: Efficacy in Instructional Strategies, IMTS: Information, Media and Technology Skills, ECM: Efficacy in Classroom Management.

Table 3
Results of the Measurement Model

Predicted		Predictive	Estimate	S.E.	C.R.	p	R^2
KCE	<---	LEP	1.000				0.63
TP	<---	LEP	2.564	.168	15.265	***	0.93
LP	<---	LEP	2.741	.199	13.756	***	0.59
LIS	<---	CSC	1.000				0.57
LCS	<---	CSC	1.236	.091	13.562	***	0.88
IMTS	<---	CSC	.529	.046	11.414	***	0.50
ESE	<---	TSE	1.000				0.89
EIS	<---	TSE	.938	.028	33.762	***	0.92
ECM	<---	TSE	.940	.030	30.925	***	0.88

Note: ***p<.001, LEP: Learning Experience Perceptions, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, CSC: 21st Century Skills and Competences, TSE: Teachers' Sense of Efficacy, LIS: Learning and Innovation Skills, ESE: Efficacy in Student Engagement, LCS: Life and Career Skills, EIS: Efficacy in Instructional Strategies, IMTS: Information, Media and Technology Skills, ECM: Efficacy in Classroom Management.

The correlation coefficients between the latent variables in the presented at Table 4.

Table 4
Correlation Results between Latent Variables

Latent variables	1	2	3
1. LEP	1		
2. TSE	.150*	1	
3. CSC	.142*	.544**	1

Note: **p<.01; *p<.05, LEP: Learning Experience Perceptions, TSE: Teachers' Sense of Efficacy CSC: 21st Century Skills and Competences.

4.2.2. Second Stage: Testing the Structural Model

In the first stage, the accuracy of the measurement model was determined. In the second stage, the structural model, and the cause-effect relationships between latent variables were evaluated (Anderson & Gerbing, 1988). In this context, a direct-effect model was tested in the first step, a partial mediation structural model was tested in the second step, and a full mediation structural model was tested in the last step.

In the first step, a direct-effect model was used to assess the effect of the predictor (LEP: Learning Experience Perceptions) on the outcome variable (CSC: 21st Century Skills and Competences) in the absence of a mediator (TSE: Teachers' Sense of Efficacy). The direct path coefficient from (LEP: Learning Experience Perceptions) to (CSC: 21st Century Skills and Competences) was significant ($b = .15$, $p < .05$). As a result, it was revealed that there is a direct relationship between the predictor (LEP: Learning Experience Perceptions) and the outcome CSC: 21st Century Skills and Competences) variables.

The second step was to test a partial mediation structural model (Model A) that estimated the direct relationship between (LEP: Learning Experience Perceptions) and (CSC: 21st Century Skills and Competences) and added paths from (LEP: Learning Experience Perceptions) to (TSE: Teachers' Sense of Efficacy) and from (TSE: Teachers' Sense of Efficacy) to (CSC: 21st Century Skills and Competences). The partial mediation structural model goodness of fit indices: (χ^2/df (18.420/24) = 0.76, $p =.78$; RMSEA = .00 (90% CI for RMSEA = [.00, .03], CFI = 1.00, NFI=.99, GFI= .98 and AGFI= .97) show good agreement with the data. However, it should be observed that (LEP: Learning Experience Perceptions) had no significant direct effect on (CSC: 21st Century Skills and Competences) in this model ($b = .07$, $p > .05$).

The final step was to compare the partial mediation model with a full mediation model (Model B) in which the direct path from (LEP: Learning Experience Perceptions) to (CSC: 21st Century Skills and Competences) was constrained to zero. The full mediation structural model goodness of

fit indices: (χ^2/df (20.039/25) = 0.76, p=.74; RMSEA = .00 (90% CI for RMSEA = [.00, .03], CFI = 1.00, NFI=.99, GFI = .98 and AGFI = .97) showed good agreement with the data.

The χ^2 difference between Models A and B was not significant ($\Delta\chi^2$ = 1.61, SD = 1, p > .05). In addition, Model B (AIC = 60.039; ECVI = .230) has a slightly smaller values than Model A (AIC = 60.420; ECVI = .231) the goodness of fit indices are presented in Table 5.

Table 5
Fit Indices among Competing Models

Fit Measure	Good Fit Criteria	MODEL A	MODEL B[a]
χ^2/df	$0 \le \chi2/df \le 2$	0.76	**0.80**
p value	$.05 < p \le 1.00$	0.78	**0.74**
RMSEA (90% CI = [.00, .03])	$0 \le RMSEA \le .05$	.00	**.00**
NFI	$.95 \le NFI \le 1.00$	.99	**.99**
CFI	$.97 \le CFI \le .95$	1.00	**1.00**
GFI	$.95 \le GFI \le 1.00$	.98	**.98**
AGFI	$.90 \le AGFI \le 1.00$	.97	**.97**
AIC	smaller than AIC for comparison model	60.420	**60.039**
ECVI	smaller than ECVI for comparison model	.231	**.230**

Note. Source: (Schermelleh-Engel, Moosbrugger & Müller, 2003). *[a]Represents the best model.*

The standardized path coefficient of independent variables on (CSC: 21st Century Skills and Competences) is given in Figure 3.

Figure 3
Standardized Path Coefficients of Final Full Mediating Structural Model
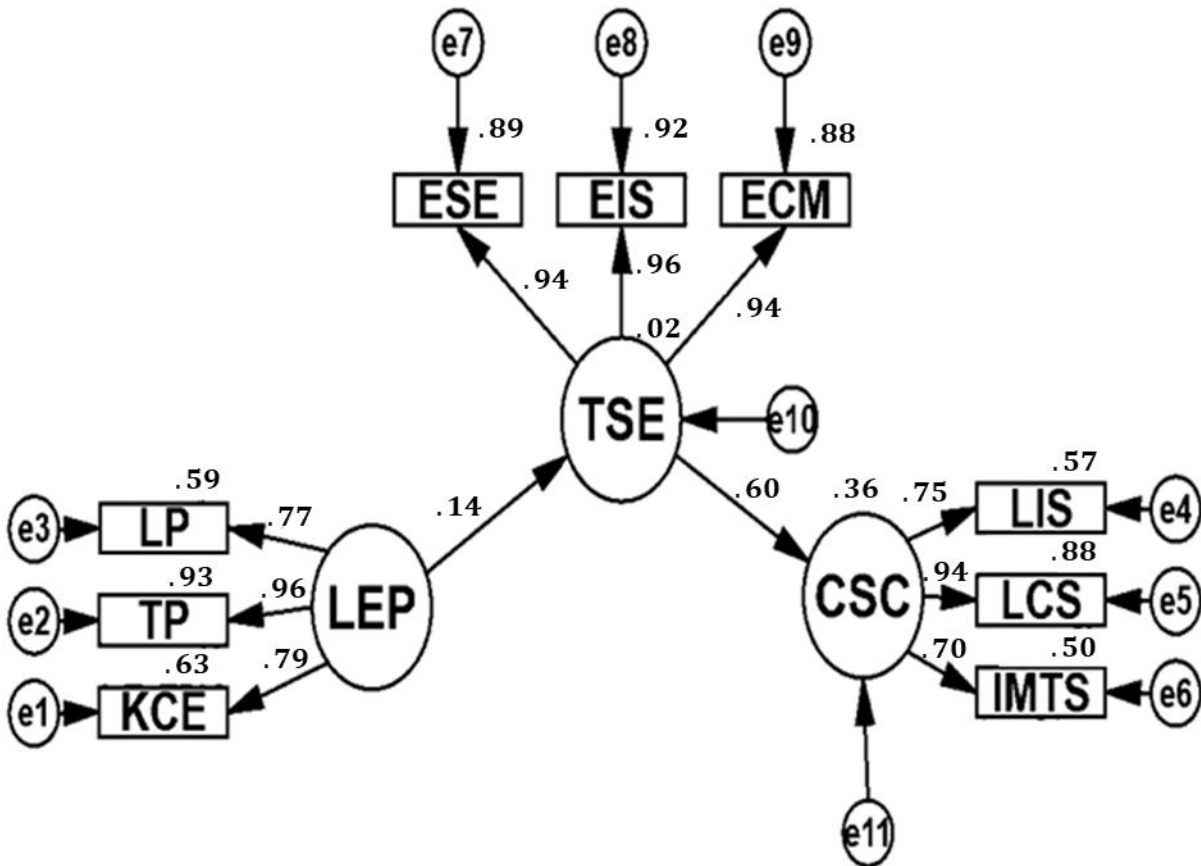
Note: LEP: Learning Experience Perceptions, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, CSC: 21st Century Skills and Competences, TSE: Teachers' Sense of Efficacy, LIS: Learning and Innovation Skills, ESE: Efficacy in Student Engagement, LCS: Life and Career Skills, EIS: Efficacy in Instructional Strategies, IMTS: Information, Media and Technology Skills, ECM: Efficacy in Classroom Management.

Figure 3 shows the standardized path coefficients of final full mediating structural model findings. Accordingly, a one-unit increase in (LEP: Learning Experience Perceptions) increased (TSE: Teachers' Sense of Efficacy) by 0.14 (t = 2.142; p < .05). In addition, a one-unit increase in (TSE: Teachers' Sense of Efficacy) increased (CSC: 21st Century Skills and Competences) by 0.60 (t = 8.957; p < .001). In addition to these, it was seen that the findings in the model (R^2) (LEP: Learning Experience Perceptions) explained a small fraction of 0.02 of (TSE: Teachers' Sense of Efficacy). Also, (LEP: Learning Experience Perceptions) and (TSE: Teachers' Sense of Efficacy) together account for about 36% of (CSC: 21st Century Skills and Competences). A result of final full mediation structural model was presented in Table 6.

Table 6
Results of the Final Full Mediation Structural Model

Predicted		Predictive	Estimate	S.E.	C.R.	p
TSE	<---	LEP	.350	.163	2.142	.032*
CSC	<---	TSE	.436	.049	8.957	***
KCE	<---	LEP	1.000			
TP	<---	LEP	2.557	.167	15.274	***
LP	<---	LEP	2.740	.199	13.778	***
LIS	<---	CSC	1.000			
LCS	<---	CSC	1.234	.091	13.543	***
IMTS	<---	CSC	.529	.046	11.429	***
ESE	<---	TSE	1.000			
EIS	<---	TSE	.937	.028	33.761	***
ECM	<---	TSE	.940	.030	30.954	***

Note: $*** p < .001$, $* p < .05$, LEP: Learning Experience Perceptions, LP: Learning Process, TP: Thinking Process, KCE: Knowledge Creation Efficacy, CSC: 21st Century Skills and Competences, TSE: Teachers' Sense of Efficacy, LIS: Learning and Innovation Skills, ESE: Efficacy in Student Engagement, LCS: Life and Career Skills, EIS: Efficacy in Instructional Strategies, IMTS: Information, Media and Technology Skills, ECM: Efficacy in Classroom Management.

Finaly the results of the hypotheses are given in Table 7.

Table 7
The Results of Hypotheses

Hypotheses	Model pathways	Standardized Effects	Effect Size	Remarks
	Direct effect			
H1	LEP→ TSE	0.14	Moderate	Supported
H2	TSE→ CSC	0.60	High	Supported
H3	LEP → CSC	0.07	Low	Unsupported
	Mediator Effect			
H4	LEP → TSE → CSC	0.08	Low	Supported
	Total Effect			
	LEP→ CSC	0.15	Moderate	

Note. The effect sizes are interpreted as .10 is low, .30 is moderate, .50 and above are strong (Cohen, 1992); LEP: Learning Experience Perceptions, TSE: Teachers' Sense of Efficacy, CSC: 21st Century Skills and Competences.

5. Discussion and Conclusion

The research was carried out to reveal the mediating role of teacher self-efficacy in the relationship between students' perceptions of learning experience and teachers' perceptions of 21st century skills efficacy. The results of the research showed that teachers' perceptions of 21st century skills competence and students' perceptions of learning experience were fully mediated by teacher self-efficacy. Besides, the results of the study revealed that students' perceptions of learning experience are significant predictors of teacher self-efficacy. It was also revealed that teachers' professional autonomy significantly predicted teachers' perceptions of 21st-century skills competence. Although

the third hypothesis of the research showing that students' perceptions of learning experience has a significant direct effect on teachers' perceptions of 21st century skills competence, this effect was been determined to become meaningless with the inclusion of teacher self-efficacy in the model as a mediating variable.

First, the study determined that student perceptions of learning experiences were important predictors of teacher efficacy. It was concluded in different studies that teachers with higher confidence in their self-efficacy encourage the autonomy of their students (Leroy et al., 2007), and that the practices of teachers with high self-efficacy are more effective in providing individualized student support. In addition, in studies examining the relationship between self-efficacy and classroom practices (Lazarides et al., 2018; Schiefele et al., 2013), it has been determined that teachers with high self-efficacy perform more effective practices. In Bernhardt's (2015) research, it was determined that teachers who work on creative, innovative and collaborative thinking acquire 21st century skills more easily in their classrooms. Based on the result of this aforementioned study, it can be said that students' high perceptions of learning experience can be associated with teachers. These result can be said to support the result reached in current study as regards the relationship between students' perceptions of learning experience and teacher self-efficacy.

Secondly, the study found that teachers' perceptions of their 21st century skills competence are significantly influenced by their professional self-efficacy. Teachers should offer their students rich learning experiences and organize activities to equip them with 21st century skills in order to raise individuals who have the desired learning outcomes according to the requirements in this century (Holbrook, 2017). The success of the 21st Century Skills Movement depends on teachers being prepared to present both skills and content effectively (McComas, 2013). There are studies in the literature that reach similar results. The results of Wilborn's research (2013) examining teachers' self-efficacy within the framework of 21st century skills revealed that if teachers' perceptions of 21st century skills they have are positive, this is also reflected in their practices. Likewise, Pajares (1992) stated that teachers' self-efficacy beliefs play a crutial role in defining many problems that may negatively affect the teaching environment, developing new strategies and applying them during the teaching process. In this case, it can be expected that classroom teachers' self-perceptions about their teaching of 21st century skills will be high if they see themselves as professionally competent.

Thirdly, it emerged that students' perceptions of learning experience indirectly affected teacher perceptions of 21st century skills competence, but this effect became meaningless when teacher self-efficacy was incorporated as a mediating variable. For this reason, the model was structured in such a way that teacher self-efficacy has a full mediating effect between students' perceptions of learning experience and teachers' perceptions of 21st century skills competence. Students' perceptions about learning are an important tool that can reveal the effectiveness of teaching activities in the classroom (den Brok et al., 2006; König & Pflanzl, 2016). What students will learn in the classroom is closely related to how they perceive, interpret and process information during their teaching practices (Shuell, 1996). Since the teacher is in constant interaction with all the other factors affecting the quality of education and has an active role on them, qualities of the teacher can be said to have great importance in the education process (Leigh & Mead, 2005) and the knowledge and skills of the teachers were the most important factors that support the development of students. From this perspective, it can be stated that there is a relationship between the 21st century teaching practices offered to the students and the extent to which teachers perceive themselves to be competent in presenting 21st century skills. The results of the study confirm this assumption. Although teachers in Turkey consider themselves competent enough to develop 21st century skills, the exam-oriented and centralized national education system in Turkey may cause teachers to have problems in reflecting these competencies in their teaching practices. As a matter of fact, research on the effective use of information and communication technologies and Web 2.0 tools in classrooms, which is one of the basic requirements of teaching 21st century skills, was revealed that these applications are rather insufficient (Şengür, 2020; Tingen et al., 2012; Yaşar, 2021). Voogt et al. (2013) stated in their research that even though there is a consensus on

the framework of 21st century competencies, the results of international research have revealed that practices on how to gain these competencies, the strategies to be used and the implementation of teaching processes are not successful. The main reason for the failure at these competencies in terms of curricula and assessment was shown to be inappropriate teacher training policies and the lack of a systematic process for adopting unconventional teaching and learning processes.

The results of the research revealed that the relationship between student and teacher perceptions disappeared when teachers' perception of themselves about practicing their profession was also included in the study as a mediating variable. Based on these results, it can be thought that there are differences between students' perception of their learning experiences and the extent to which teachers see themselves as competent in teaching 21st century skills. As a mediator variable, professional self-efficacy of teachers can be used to predict students' perceptions of learning experience in a more realistic way as it includes teachers' self-efficacy in organizing an effective learning environment as well as their classroom management, even when teachers' perceptions of 21st century skills are only concerned with teaching them. The mediating variable alone is associated with both perceptions of learning experience and perceptions of 21st century skills efficacy. The mediator variable measuring teachers' self-efficacy was found to be related to both students' perceptions of the learning experience presented to them and teachers' 21st century skills self-efficacy perceptions.

5.1. Limitations and Recommendation for Further Research

One of the limitations of this study is can be stated that the results of this research are limited to the opinions of the students and teachers who responded to the items used in the scales. The final point to be made is that the study is limited to student and teacher perceptions of the skills covered by the curricula in primary schools in Turkey.

In spite of the growing interest in the importance of 21st century skills, it is known that such competencies are difficult to measure effectively. Models measuring the perceptions of teachers and students at different levels can be created by using different scales in future studies. Although there is a consensus on the framework of 21st century competencies, there is no clarity on how to equip learners with these competencies, which strategies to use, and how to implement teaching processes. Within this context, different models with different variables can be tried. Finally, more comprehensive research can be carried out to measure teacher and student perceptions with studies that include qualitative data as well as quantitative data.

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