Self-Efficacy and Teaching Skills Perceptions of Primary School Teachers: A Predictive Study

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Abstract
The purpose of this research is to examine the correlation and predictive power between the 21st century teaching skills of primary school teachers and their 21st century skills efficacy perception levels. The cross-sectional survey design has been carried out in the research. As data collection tools, 21st Century Skills Efficacy Perception Scale and Utilization of 21st Century Teacher Skills Scale have been administered. The sample consists of 459 primary school teachers working in state and private primary schools in Izmir province and its central districts. Linear regression analysis and path analysis have been carried out in testing of the research hypothesis. The model established between 21st century skills efficacy perceptions and utilization of 21st century teacher skills has been concluded to be valid and significant. Additionally, it has been determined that the model has generally acceptable goodness of fit values. Results of the research indicate that utilization of 21st century teacher skills increase as does 21st century teacher skills efficacy perceptions. Accordingly, it is deemed to be beneficial that professional development programs for improving 21st century teacher skills are developed and implemented extensively in order to support utilization of such skills. Furthermore, it is considered that incentive practices for utilization of 21st century skills adopted by decision-makers can help primary education to meet requirements of the modern age.
Keywords: Primary school teacher, 21st century teacher skills, 21st century skills self-efficacy Perception, Regression analysis, Quantitative research, Professional development

Introduction

All societies have expectations of their individuals to be in global competition. Producing and sharing new goods or services in face-to-face or virtual cooperation, solving problems and making correct decisions are among such expectations. Additionally, being open to changes, access to information as well as selection, elimination and production of what is needed are also included among these expectations.

Individuals with these characteristics are raised through educational processes (Kıyasoğlu and Çeviker Ay, 2020). Therefore, regulating education in line with modern developments, meeting the needs of society and individuals is included in the utmost priorities of all countries. It is beyond doubt that the success or failure of the education and teaching process can be explained based on various factors. The physical structure of the education and teaching environments, basis and efficiency of curriculums, quality and accessibility of educational tools and equipment, the existence of technological opportunities, management of the school, etc., factors directly or indirectly related to the quality of the provided education. However, taking into account the fact that teachers are in constant interaction with and have active roles over other factors affecting the quality of the education; it can be suggested that teacher qualification is critical in educational processes (Leigh and Mead, 2005) and that the teachers' accumulation of knowledge and skills is the most influential factor that supports the development of students. According to Shihab (2008), individuals must be equipped with a certain set of skills to attain competitive capacity and achievement within the rapidly growing and changing global economy of our time. Such skills, called 21st-century skills, require that students are creative and learn in cooperation and put their skills into practice in all fields of their lives as parts of a learning society. 21st-century skills are a concept combining knowledge and skills (Dede, 2010). These are basic skills for students to succeed in their current and future social and working lives (Partnership for 21st Century Skills, 2009).

According to the classification by P21 (Partnership for 21st Century Skills, 2009; 3-9), 21st-century skills are analyzed under three main topics, namely (1) learning and innovation skills, (2) life and career skills, and (3) information, media and technology skills. Students are prepared for the gradually complex social and economic life through learning and innovation skills. These skills emphasize creativity, critical thinking, communication and cooperation. On the other hand, life and career skills include managing leadership and responsibilities, engaging in social and cross-cultural interactions, having the capabilities of flexibility, of being adaptable and self-directed. These skills focus rather on flexibility and adaptation skills. Lastly, information, media and technology skills are related to quicker access to information and use of various technological tools by the students. Hence, more effective use of information, technology and media by the students is only possible by attaining these skills. Information, media and technology skills include literacies. 21st-century skills are necessary to ensure that individuals maintain more qualified lives, resolve the problems they face more easily, consider and analyze the environmental and social events through different perceptions, and attain greater achievements in their professional and social lives. Ensuring that students acquire such skills is included in the essential responsibilities of teachers at all stages of education. This also requires a change in the characteristics of teachers.

In an environment with students having a high level of skills, problems may arise in the teaching process if the teacher is inefficient at putting these skills to use. Teachers must also have high self-efficacy perceptions in societies demanding a qualified education. Self-efficacy beliefs of teachers, including their beliefs on students, teaching and learning, are the leading variables directly affecting their classroom teaching practices, class management and performances. Bandura defines the self-efficacy concept as an effective qualification in developing behaviors and an individual's belief in their capacity to organize and successfully carry out certain actions to attain a particular performance (Bandura, 1997; Zimmerman, 1995; Cited in Ekici, 2008). It has become inevitable that teachers are well aware of 21st-century skills (Cansoy, 2018) and possess certain teaching skills ensuring qualified education to monitor the development of students' 21st-century skills. Teachers having a high efficacy of implementing teaching based on 21st-century skills will ensure a more effective conversion of the learning outcomes (Lee, 2012; Laar et al., 2017). Results of the research by Wilborn (2013), analyzing self-efficacies of teachers within the framework of 21st-century skills, revealed that positive 21st-century skills perceptions of teachers contribute to the implementation thereof.

In their research, Orhan Göksun (2016) holistically analyzed the necessary skills for teachers, compiled from various resources (ISTE, 2015, Lemow, 2010, MEB, 2008, Melvin, 2011). As a result, classroom management and self-management skills, cooperation and communication skills are applied in the learner-teacher interaction within teaching processes, teaching technologies skills, skills of putting their pedagogical knowledge to use, and skills of flexibly conducting all teaching processes be the prominent aspects. In the study conducted by Ekici, Abide, Canbolat and Öztürk (2017), data resources on 21st-century skills were analyzed on a global scale; a total of 63 different skills from 19 resources were identified. The most repeated skills among the 63 in the resources are; problem-solving, communication, cooperation, creativity/ innovation, critical thinking skills, information literacy, flexibility and adaptation, respectively. It was stated that, upon a general evaluation of these identified skills, a consensus was reached that techno-pedagogic skills are influential in teaching processes and that teachers' putting their teaching skills to use is the most important condition for an effective teaching process. The literature contains studies indicating the importance of teacher efficacy for student performance (Goldschmidt and Phelps, 2010; Kunter et al., 2013; Dicke et al., 2015; Sirait, 2016) as well as studies analyzing attitudes of teachers towards the teaching of critical thinking, cooperation, communication and creativity within the scope of 21st-century skills (Wilborn, 2013). It is important for students that teachers, whom they spend most of their time with and take as models during the primary school period, possess 21st-century skills. Regarding teachers, utilization of 21st-century skills and competencies is possible not only by being aware of what these skills are and how they are utilized but also by serving as implementers and supporters of such skills.

There is much research in the literature that emphasizes the role of teachers in teaching processes. In the research conducted by Clark (2008), the integration of teachers in the technology integration process carried out in Western Virginia was evaluated based on 21st-century learner skills recommended by P21. In their studies, Garba, Byabazaire and Butshami (2015) analyzed the integration process of teachers in the information and communication technologies, taking into consideration characteristics of the 21st-century learning environments. Additionally, there are studies analyzing 21st-century skills efficacy perceptions of the teachers (Anagün, 2018; Ciğerci, 2020; Güneş and Buluç, 2017). Teacher characteristics and 21st-century efficacy perceptions of primary school teachers become more important within this context. However, there is a gap in the correlation between 21st-century teacher characteristics and 21st-century efficacy perceptions of primary school teachers in the literature. It is considered that this study will contribute to the literature in this regard. Within this context, the purpose of this study is to examine the associations between the perceptions of primary school teachers about their efficacy in terms of 21st-century skills and their perceptions of 21st-century teaching skills. The research questions are in the following:

1. Are 21st-century teacher skills of primary school teachers predictors of their 21st-century skills efficacy perceptions?
2. How well do 21st-century teacher skills of primary school teachers predict the 21st-century skills perceptions?

Method

Research Design

A cross-sectional survey model, a general survey model, has been carried out in this research. Cross-sectional survey models are research models that identify the existence and degree of covariance between two or more variables. The purpose is to determine whether there is a significant relationship between variables and how it occurs (Karasar, 2009). An effort has been made in this research to examine the correlation and predictive power between 21st-century teacher's skills and 21st-century skills efficacy perception levels of primary school teachers. 21st-century skills efficacy perceptions of primary school teachers have been assigned as a dependent variable, while the utilization level of 21st-century teacher characteristics has been assigned as an independent variable.

Population and Sample

The population of the research consists of primary school teachers working in public and private primary schools under the Ministry of National Education that is in the west part of Turkey. According to the Izmir Province Directorate of National Education (2020), 13281 primary school teachers are assigned in Izmir province. Calculations based on the sample size require that a minimum of 373 primary school teachers are included in the research. A convenient sampling method was applied in selecting the teachers to be included in the sample, and 484 teachers have been included in the research. Following the control of the collected forms, incorrect or incomplete surveys were sorted out, and a total of 459 valid data have been included within the research scope. Data collection tools have been implemented through primary school teachers through digital environments due to the covid-19 pandemic conditions. Some demographic information about participants is presented in Table 1.

Table 1: Demographic Characteristics of Primary School Teacher

	N	%
Gender		
Female	370	80.6
Male	89	19.4
Age		
20-29	96	20.9
30-39	172	37.5
40-49	108	23.5
50+	83	18.1
Location of the School		
Metropolitan	212	46.2
Country	170	37.0
Village	51	11.1
Town	19	4.1
Other	7	1.5
Faculty of Graduation		
Faculty of Education	376	81.9
Faculty of Science and Literature	30	6.5
School of Higher Teacher Education	15	3.3
Institute of Education	17	3.7
Other	21	4.4
Total	**459**	**100**

Table 1 revealed that 15.9% (n=73) of primary school teachers received postgraduate education, 0.2% (n=1) received PhD degree, and 83.9% (n=385) did not engage in postgraduate education. Additionally, 26.6% of the participants teach first-grade students, 24.2% teach second-grade students, 24.6% teach third grade students, and the remaining 22% teach fourth grade students.

Data Collection Tools

A "Personal Information Survey" for revealing the socio-demographic characteristics of the participants and two data collection tools have been administered to primary school teachers. The first data collection tool is the "21st Century Skills Efficacy Perception Scale" developed by Anagün, Atalay, Kılıç and Yaşar (2016). This scale consists of 42 items and three factors, namely Learning and Innovation Skills, Life and Career Skills, and Information, Media and Technology skills. Following the exploratory factor analysis (EFA) and the confirmatory factor analysis (CFA), it has been reported that the model confirmed the factor structure and model was found to be theoretically and statistically valid, and the goodness of fit indexes show perfect fit values. According to reliability analyses, Cronbach alpha value is .889, Spearman-Brown value is .731, and Guttman Split-Half value is .731 for the whole scale. Factor-based Cronbach alpha coefficients have been calculated as 0.845 for Learning and Innovation Skills, 0.826 for Life and Career Skills, and 0.810 for Information, Media and Technology Skills.

The second data collection tool is the "Utilization of 21st Century Teacher Skills Scale," developed by Orhan Göksün (2016). The scale consists of 27 items under five factors, named Administrative Skills, Techno pedagogical Skills, Affirmative Skills, Flexible Teaching Skills and Generative Skills. Cronbach alpha coefficients calculated for such factors are .852 for Administrative Skills, .629 for Techno-pedagogical Skills, .419 for Affirmative Skills, .752 for Flexible Teaching Skills and .714 for Generative Skills. The total explained variance of the scale was 40.33% and the internal consistency coefficient was calculated to be .870 (Orhan Göksun, 2016). This established construct was confirmed through the confirmatory factor analysis ($\chi 2/df=0,87$;

p= 0,95; RMSEA= 0,00). Both data collection tools are five-point scales.

Data Analyses

The data were analyzed using the SPSS 20.0 (Statistical Package for the Social Sciences) package program. Correlation between variables was evaluated through regression and path analyses. Regression analysis is; a process of explaining the relationship between a dependent variable and one or more independent variables through a mathematical equation (Büyüköztürk, 2009). In this study, simple linear regression analysis with one dependent and one independent variable was carried out. Whether 21st-century teacher skills, namely the independent variable, significantly predict 21st-century skills efficacy perceptions, the dependent variable, has been determined through simple linear regression analysis. And the correlation between the dependent and independent variables has been established through a path analysis. Path analysis is; a statistical method employed for modeling inter-explanatory relationships of variables analyzed within structural equation modelings, accepted in the literature and have an identified correlation (Çelik and Yılmaz, 2013). It refers to the testing of a model based on observed variables. In this analysis method, the number of explained and unexplained variances are determined for each variable. The most important condition within this regard is that previously conducted validity and reliability studies are available for observed variables as well as measurement tools adopted in the model study (Şimşek, 2007). Path analysis works only through observed variables (Raykov & Marcoulides, 2006), and fit indices are utilized to determine whether the theoretical structure to be examined confirmed by the data set (Bentler & Yuan, 1999; Pedhazur, 1997).

Results

A simple linear regression analysis has been conducted to answer the first research question of the study. The assumptions of simple regression analysis were checked out. First, the linear relationship between the dependent and the independent variable was controlled. A scatter dot analysis was carried out. The analysis presented a linear relationship. The diagram is shown in Figure 1.

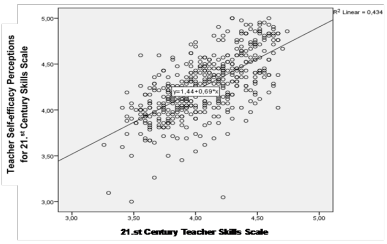

Figure 1: Scatter diagram for linearity between variables

Secondly, extreme values were evaluated. Cook's distance maximum value was taken into consideration. This value was calculated to be 0.055. According to Cooks and Weisberg (1982), a value less than 1 indicates no significant outlier in the data. (As cited in: Altınkaynak, 2003, p.463). The third one is determining the normal distribution of errors. For this purpose, a histogram analysis was utilized. The result is shown in Figure 2.

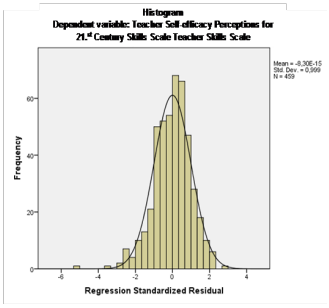

Figure 2: Histogram for distribution of errors

In Figure 2, it is seen that data are normally distributed. For the last assumption, the covariance of the variables was determined. A Scatter Plot analysis was performed. This analysis is shown that the variables are covariate. This diagram is shown in Figure 3.

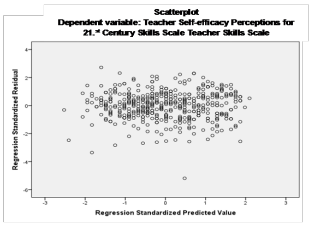

Figure 3: Scatter diagram for the covariance of variables

After the assumptions, a simple linear regression analysis was performed. The results are demonstrated in Table2.

Table 2: The Regression Matrix

Independent variable	Dependent variable	β	Std. Error	Beta	t	P	R	R2	F	p
21.st Century Teacher Skills	21.st Century Skills	,420	,023	,657	18,651	,000	0,657	0,432	347,871	,000

Independent variable: 21.st Century Teacher Skills Scale
Dependent variable: Teacher Self-efficacy Perceptions for 21.st Century Skills Scale Teacher Skills Scale

According to Table 2, the model showed that of 21st-century teacher skills and 21st-century skills efficacy perceptions is significant (F(1.457)=347.871, p<.001). 21st-century efficacy perceptions explained 43% of the variance in 21st-century teacher skills, of 21st-century teacher skills (at p<.001 level) is a significant predictor (R2=0.43). This revealed that 21st-century skills efficacy perceptions predicted 21st-century teacher skills positively (R=.657, Beta=.657, t(457)=18.651,p<.001). A 65% correlation coefficient value resulted. According to Büyüköztürk (2009), a correlation coefficient between 0.30 and 0.70 indicates a medium degree correlation. Accordingly, it can be suggested that teachers' 21st-century skills efficacy perceptions increase, as do their utilization of 21st-century teacher skills.

In the second research question of the study, a path analysis was carried out to explain the correlation between the variables of administrative skills, techno-pedagogical skills, affirmative skills, flexible teaching skills and generative skills of primary school teachers, which are sub-dimensions of 21st-century teacher skills, and their learning and innovation skills, life and career skills, and information and media skills variables, which are sub-dimensions of 21st-century skills.

Beta values and p-values were examined in the path analysis to determine the contribution and significance of variables in the model. Data on such values are shown in Table 3.

Table 3: Path analysis results of 21st-century skills self-efficacy perceptions and the use of 21st-century teacher skills

			β1	β2	S.E.	C.R.	P
Measurement Model							
Generative Skills	<---	21.st Century Teacher Skills	0,548	1			
Flexible Teaching Skills	<---	21.st Century Teacher Skills	0,383	0,902	0,128	7,039	<0,001
Affirmative Skills	<---	21.st Century Teacher Skills	0,599	0,509	0,052	9,851	<0,001
Technopedagogical Skills	<---	21.st Century Teacher Skills	0,699	0,779	0,072	10,853	<0,001
Administrative Skills	<---	21.st Century Teacher Skills	0,908	1,031	0,085	12,071	<0,001
Learning and Innovation Skills	<---	21.st Century Skills	0,745	1			
Information, Media and Technology Skills	<---	21.st Century Skills	0,655	0,915	0,072	12,778	<0,001
Life and Career Skills	<---	21.st Century Skills	0,806	0,817	0,054	15,148	<0,001
Structural Equation Model (SEM)							
21.st Century Skills	<---	21.st Century Teacher Skills	0,803	0,766	0,076	10,021	<0,001
β_1: Standard coefficients, β_2: Unstandardized coefficients							

This analysis shows 21st-century teacher skills and their sub-dimensions and 21st-century skills self-efficacy perception and its sub-dimensions are, holistically, in a significant structure within the

model. It was seen in the goodness of fit analysis of the model that such values are within acceptable limits. When standardized path coefficients of the model were considered, it was observed that the effects were greater than the .005 value. This indicates that the predicted values of the model are fitted. When the effects of the variables are considered, it can be concluded that managerial skills (b1=0.908) have the highest effect while affirmative skills (b1=0.383) have the lowest.

Correlations between variables and an illustration of the model are presented in Figure 4.

A positive correlation was determined between 21st-century teacher skills and 21st-century skills self-efficacy perception based on the hypothesis analyzed in the structural model. It suggested that 21st-century skills co-efficacy perception increases, as do 21st-century teacher skills. Path coefficient between YEM 21st century skills self-efficacy perception and 21st-century teacher skills is statistically significant (b2=0.766; p=<0.001).

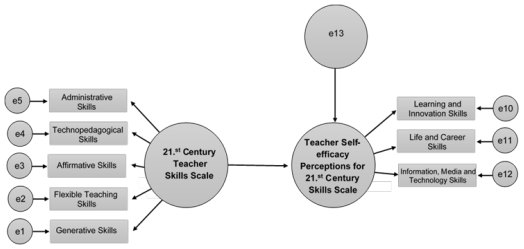

Figure 4: The Path Analysis between Teacher Self-efficacy Perceptions for 21.st Century Skills Scale and 21.st Century Teacher Skills Scale

Fit indicates of the model have been examined to be CMIN=89.006; DF=19; p=.000; CMIN/DF=4.685; RMSEA=.090; GFI=.954; AGFI=.913; CFI=.947; RMR=.009. Fit indicates are shown on Table 4.

Table 4: Fit indicates of the model

Fit value dimension	Fit value	Accept situation	Model fit value	References
CMIN/DF	0<X2/df<5	Acceptable fit	4,685	Şimşek (2007)
RMSEA	0<RMSEA<0.080	Poor fit	0.090	Rigdon (1996)
GFI	0.90<CFI<1.00	Good fit	0.954	Shevlin & Miles (1998)
AGFI	0.90<CFI<1.00	Acceptable fit	0.913	Sümer (2000)
CFI	0.90<CFI<1.00	Acceptable fit	0.947	Bentler & Bonnet (1980)
RMR	0<RMR<0.080	Good fit	0.009	Hu & Bentler (1995)

Table 4 reveals that the CMIN/DF value, checked through division of X2 (CMIN) value by the degree of freedom (DF), has acceptable goodness of fit as it falls within the range of 0<CMIN/DF<5 (Şimşek, 2007). When other goodness of fit indicates are examined, GFI, AGFI, CFI, RMR have a good model fit (Bentler & Bonnet, 1980; Hu & Bentler, 1995; Shevlin & Miles, 1998; Sümer, 2000). RMSEA value below .080 indicates acceptable goodness of fit value for the model. This value is above .080 in this research, indicating a weak fit (Rigdon, 1996). Within this respect, it is considered that the model has a generally acceptable goodness of fit and the data fit well to the model.

Discussion, Conclusions and Recommendations

Global realities and technological changes taking hold in the whole world compel us to rethink the future social role of schools and reconsider the competencies a 21st-century teacher must-have. 21st-century teachers, who must meet the current and future needs of the society, must be not only a person that provides the content to students and evaluates them but also a good manager, a good observer and a qualified guide that can organize teaching-learning processes (Gökçe, 2000). Teachers must adopt methods and techniques in compliance with the target audience to ensure an effective teaching process and enhance learner performances (Schauffler and Greer, 2006). Within this regard, it is apparent that teachers providing teaching experiences to 21st-century students should utilize 21st-century teacher skills in classroom activities.

The research revealed that the model established between 21st-century skills efficacy perceptions and utilization of 21st-century teacher skills is valid and,

based on the conducted simple linear regression analysis and path analysis, statistically significant. Utilization of 21st-century teacher skills explains 43% and is a significant predictor of the variance in 21st-century efficacy perceptions variable. Furthermore, there is a 65% medium degree, positively significant correlation between utilization of 21st-century teacher skills and 21st-century skills efficacy perceptions. It also was reported in the study conducted by Çelebi and Sevinç (2019) with secondary school teachers that there is a significant correlation between 21st-century skills efficacy perceptions and the utilization degree of such skills. The purpose of another study by Sulaiman and Ismail (2020) has been to identify the correlation between teacher efficacies and 21st-century skills. In the study, the effect of each dimension on teacher efficacy, which contributes to predictor factors of teaching skills of 21st-century teachers, was analyzed. Results of the study revealed a strong and positive correlation between professional efficacies and 21st-century skills of the teachers. Anagün (2018) concluded in her research that there is a positive correlation between 21st century skills efficacy perceptions of teachers and their ability to organize constructive learning environments. The research further demonstrated that teachers could provide inquiry-based learning environments to the students when they have strong perceptions about their problem-solving, critical thinking, cooperation and communication skills.

A one-way relationship was identified upon analyzing the sub-dimensions of 21st-century skills efficacy perceptions and 21st-century teacher skills. It has been determined in model goodness of fit analyses of such relationships that these values fall within the desirable limits and are statistically significant. The model has had generally acceptable goodness of fit values. Hamlı, Hamlı and Taneri (2020) concluded in their study, in which primary school teachers stated their opinions on 21st-century skills, that primary school teachers who utilize 21st-century teacher skills become more prominent in terms of classroom and process management, skill to conjointly put technology and pedagogy into use, ability to conduct an independent teaching process in the classroom, and to produce and design teaching materials. It was further concluded in the same research that primary school teachers remarked a correlation between utilization of methods and techniques by the degrees of basic education first-grade students and acquisition of 21st-century skills by the students.

Similarly, Orhan-Göksün and Aşkım-Kurt (2017) noted in their studies conducted with prospective teachers that utilization of all sub-dimensions of 21st-century learner skills predicts the utilization of 21st-century teacher skills. Findings of such research support the results concluded herein. In their research, Kozikoğlu and Altınova (2018) analyzed the correlation between 21st-century skills self-efficacy perceptions and the life-long learning tendencies of prospective teachers. Results of the study indicated that there is a positive and significant correlation between the variables and that learning and innovation skills as well as life and career skills significantly predict the life-long learning tendencies of prospective teachers. In conclusion, teachers' 21st-century skills efficacy perceptions increase, as does their utilization of 21st-century teacher skills.

The study has many implications for researchers, practitioners and decision-makers. Teachers may expand their potentials towards their skills and individual competencies to ensure their professional development. Therefore, a wider scope of research must be carried out about the new skills acquired by 21st-century teachers. Additionally, it has been deemed beneficial that professional development programs are developed and extensively implemented for the development and utilization of 21st-century teacher skills. Another implication for researchers is that they can conduct similar studies with regards to teachers at different branches. Likewise, studies revealing how perceived efficacies of teachers occur in classroom practices would contribute to the literature. I can expect such various studies would shed light on the identification of in-service education needs of teachers in terms of 21st-century skills and further studies towards meeting such needs of the teachers. Lastly, it has been considered that incentive practices by decision-makers for utilization of 21st-century skills would contribute to primary education in meeting the needs of the modern age.

Reference

Altunkaynak, Bülent. "Determining Influential Observations on Multiple Linear Regression by Linear Restrictions and Projection Theory." *G.Ü. Fen Bilimleri Dergisi*, vol. 16, no. 3, 2003, pp. 457-466.

Anagün, Şengül.S. "Teachers' Perceptions about the Relationship between 21st Century Skills and Managing Constructivist Learning Environments." *International Journal of Instruction*, vol. 11, no. 4, 2018, pp. 825-840.

Anagün, Şengül Saime, et al. "The Development of a 21st Century Skills and Competences Scale Directed at Teaching Candidates: Validity and Reliability Study." *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, vol. 40, 2016, pp. 160-175.

Bentler, Peter. M., and Douglas G. Bonett. "Significance Tests and Goodness of Fit in the Analysis of Covariance Structures." *Psychological Bulletin*, vol. 88, no. 3, 1980, pp. 588-606.

Bentler, Peter M., and Ke-Hai Yuan. "Structural Equation Modeling with Small Samples: Test Statistics." *Multivariate Behavioral Research*, vol. 34, no. 2, 1999, pp. 181-197.

Büyüköztürk, Şener. *Sosyal Bilimler İçin Veri Analizi El Kitabı*. Pegem Akademi, 2009.

Cansoy, Ramazan. "21st Century Skills According to International Frameworks and Building them within the Education System." *Journal of the Human and Social Science Researches*, vol. 7, no. 4, 2018.

Cigerci, Mehmet Fatih. "Primary School Teacher Candidates and 21st Century Skills." *International Journal of Progressive Education*, vol. 16, no. 2, 2020, pp. 157-174.

Clayton, Christine D. "Curriculum Making as Novice Professional Development: Practical Risk Taking as Learning in High-Stakes Times." *Journal of Teacher Education*, vol. 58, no. 3, 2007, pp. 216-230.

Clark, Deborah D. *A Study of West Virginia Teachers: Using 21st Century Tools to Teach in a 21st Century Context*. Marshall University, 2008.

Çelebi, Mustafa, and Şeyda Sevinç. "Öğretmenlerin 21. Yüzyıl Becerilerine İlişkin Yeterlik Algılarının ve Bu Becerileri Kullanım Düzeylerinin Belirlenmesi." *6. Uluslararası Multidisipliner Çalışmaları Kongresi*, 2019.

Yılmaz, Veysel, and H. Eray Çelik. *LISREL 9.1 ile Yapısal Eşitlik Modellemesi: Temel Kavramlar - Uygulamalar - Programlama*. Anı Yayıncılık, 2013.

Dede, Chris. "Comparing Frameworks for 21st Century Skills." *21st Century Skills: Rethinking How Students Learn*, edited by J. Bellanca, and R. Brandt, Solution Tree Press, 2010, pp. 51-75.

Dicke, Theresa, et al. "Beginning Teachers' Efficacy and Emotional Exhaustion: Latent Changes, Reciprocity, and the Influence of Professional Knowledge." *Contemporary Educational Psychology*, vol. 41, 2015, pp. 62-72.

Ekici, Gülay. "The Effects of the Classroom Management Lesson on Preservice Teachers' Teacher Sense of Self-Efficacy." *H.U. Journal of Education*, vol. 35, 2008, pp. 98-110.

Ekici, Gülay, et al. "Analysis of Resources on 21st Century Skills." *Journal of Research in Education and Teaching*, vol. 6, no. 1, 2017, pp. 124-134.

Garba, Sani., et al. "Toward the Use of 21st Century Teaching-Learning Approaches: The Trend of Development in Malaysian Schools within the Context of Asia Pacific." *International Journal of Emerging Technologies in Learning*, vol. 10, no. 4, 2015, pp. 72-79.

Goldschmidt, Pete, and Geoffrey Phelps. "Does Teacher Professional Development Affect Content and Pedagogical Knowledge: How Much and for How Long?" *Economics of Education Review*, vol. 29, 2010, pp. 432-439.

Gökçe, Erten. *İlköğretim Öğretmenlerinin Yeterlikleri*. Ankara University, 1999.

Güneş, Ahmet Melih, and Bekir Buluç. "The Relationship between Classroom Teachers' Technology Use and their Self Efficacy Beliefs." *TÜBAV Bilim Dergisi*, vol. 10, no. 1, 2017, pp. 94-113.

Gürültü, Ercan, et al. "Secondary School Teachers' Competencies in the Use of 21st Century Skills." *Hacettepe University Journal of Education*, vol. 35, no. 4, 2020, pp. 780-798.

Hamlı, Duygu, et al. "Temel Eğitimde 21. Yüzyıl Becerilerinin Sınıf Öğretmenlerinin Görüşlerine Göre İncelenmesi." *Current Debates on Social Sciences*, edited by Alpaslan Ceylan, et al, Bilgin Kültür Sanat Yayınları, 2020, pp. 94-107.

Hotaman, Davut. "An Investigation of Pre-Service Teachers' Perceptions of Teacher Personality Characteristics." *Kuramsal Eğitim Bilim Dergisi*, vol. 5, no. 12, 2012, pp. 186-201.

Hu, Li-tze., and Peter M Bentler. "Evaluating Model Fit." *Structural Equation Modeling: Concepts, Issues, and Applications*, edited

by Rick H. Hoyle, Sage Publication, 1995, pp. 76-99.

Jamilah Sulaiman, and Siti Noor Ismail. "Teacher Competence and 21st Century Skills in Transformation Schools 2025 (TS25)." *Universal Journal of Educational Research*, vol. 8, no. 8, 2020.

Karasar, Niyazi. *Bilimsel Araştırma Yöntemi*. Nobel Akademi, 2009.

Kıyasoğlu, Ertuğ., and Çeviker Ay Şule. "What are the Views of Classroom Teachers on Their Levels of Using 21st Century

Learner and Teacher Skills?" *e-Kafkas Journal of Educational Research*, vol. 7, 2020, pp. 240-261.

Koh, Joyce Hwee, et al. "Technological Pedagogical Content Knowledge (TPACK) and Design Thinking: A Framework to Support ICT Lesson Design for 21st Century Learning." *The Asia-Pacific Education Researcher*, vol. 24, no. 3, 2015, pp. 535-543.

Kozikoğlu, İshak, and Nebi Altunova. "The Predictive Power of Prospective Teachers' Self-efficacy Perceptions of 21st Century Skills for their Lifelong Learning Tendencies." *Journal of Higher Education and Science*, vol. 8, no. 3, 2018, pp. 522-531.

Kunter, Mareike, et al. "Professional Competence of Teachers: Effects on Quality and Student Development." *Journal of Educational Psychology*, vol. 105, no. 3, 2013, pp. 805-820.

Landmann, Mareike. "Development of a Scale to Assess the Demand for Specific Competencies in Teachers after Graduation from University." *European Journal of Teacher Education*, vol. 36, no. 4, 2013, pp. 413-427.

Laxmi, Vijay, and Gobind Singh Gure. "Techno-Pedagogy, Practices in Teacher Education." *International Journal of Enhanced Research in Educational Development*, vol. 4, no. 6,2016, pp. 33-40.

Lee, Sing Kong. *Preparing 21st-century teachers: Singapore's Approach*, 2012.

Leigh, Andrew, and Sara Mead. "Lifting Teacher Performance." *Policy Report - Progressive Policy Institute*, 2005.

Melvin, Lonnie. *How to Keep Good Teachers and Principals: Practical Solutions to Today's Classroom Problems*. R&L Education, 2011.

Orhan-Göksün, Derya, and Adile Aşkım-Kurt. "The Relationship between Pre-Service Teachers' Use of 21st Century

Learner Skills and 21st Century Teacher Skills." *Education and Science*, vol. 42, 2017, pp. 107-130.

Orhan-Göksün, Derya. *Öğretmen Adaylarının 21.yy. Öğrenen Becerileri ve 21. yy. Öğreten Becerileri Arasındaki Ilişki*. Anadolu Üniversitesi, 2016.

Pedhazur, Elazar J. *Multiple Regression in Behavioral Research: Explanation and Prediction*. Harcourt Brace, 1997.

Raykov, Tenko, and George A. Marcoulides. "On Multilevel Model Reliability Estimation from the Perspective of Structural Equation Modeling." *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 13, no. 1, 2006, pp. 130-141.

Rigdon, Edward. E. "CFI versus RMSEA: A Comparison of Two Fit Indexes for Structural Equation Modeling." *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 3, no. 4, 1996, pp. 369-379.

Saavedra, Anna Rosefsky, and V. Darleen Opfer. "Learning 21st-century Skills Requires 21st-century Teaching." *Phi Delta Kappan*, vol. 94, no. 2, 2012, pp. 8-13.

Schauffler, Geneva, and R. Douglas Greer. "The Effects of Intensive Tact Instruction on Audience-Accurate Tacts and Conversational Units." *Journal of Early and Intensive*

Behavior Intervention, vol. 3, no. 1, 2006, pp. 121-134.

Shevlin, Mark, and Jeremy N. Miles. "Effects of Sample Size, Model Specification and Factor Loadings on the GFI in Confirmatory Factor Analysis." *Personality and Individual Differences*, vol. 25, no. 1, 1998, pp. 85-90.

Shihab, Mahmud. *Web 2.0 Tools Improve Teaching and Collaboration in High School English Language Classes*. Nova Southeastern University, 2008.

Sirait, Swando. "Does Teacher Quality Affect Student Achievement? An Empirical Study in Indonesia." *Journal of Education and Practice*, vol. 7, no. 27, 2016, pp. 34-41.

Sümer, Nebi. "Structural Equation Modeling: Basic Concepts and Applications." *Türk Psikoloji Yazıları*, vol. 3, no. 6, 2000, pp. 49-74.

Şimşek, Ömer Faruk. *Yapısal Eşitlik Modellemesine Giriş: Temel İlkeler ve LISREL Uygulamaları*. Ekinoks Yayınları, 2007.

van Laar, Ester, et al. "The Relation between 21st-Century Skills and Digital Skills: A Systematic Literature Review." *Computers in Human Behavior*, vol. 72, 2017, pp. 577-588.

Wilborn, Jhon Wallace. *Teacher Self-Efficacy: Common Core State Standards within a 21st Century Skills Framework*. Liberty University, 2013.

Zaragoza, Mireia Civis, et al. "The Teacher of the 21st Century: Professional Competencies in Catalonia Today." *Educational Studies*, vol. 47, no. 2, 2021, pp. 217-237.

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