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; Cigerci, 2020; Gunes 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), 13,281 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

| Gender       | N  | %   |
|--------------|----|-----|
| Female       | 370| 80.6|
| Male         | 89 | 19.4|

| Age          | N  | %   |
|--------------|----|-----|
| 20-29        | 96 | 20.9|
| 30-39        | 172| 37.5|
| 40-49        | 108| 23.5|
| 50+          | 83 | 18.1|

| Location of the School | N  | %   |
|------------------------|----|-----|
| Metropolitan           | 212| 46.2|
| Country                | 170| 37.0|
| Village                | 51 | 11.1|
| Town                   | 19 | 4.1 |
| Other                  | 7  | 1.5 |

| Faculty of Graduation | N  | %   |
|-----------------------|----|-----|
| 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 .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 Göksun (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 (χ2/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: Altunkaynak, 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 Table 2.

### Table 2: The Regression Matrix

| Independent variable | Dependent variable | β     | Std. Error | Beta | t      | P     | R     | R2   | F     | p     |
|----------------------|--------------------|-------|------------|------|--------|-------|-------|------|-------|-------|
| 21st Century Teacher Skills | 21st Century Skills | .420  | .023       | .657 | 18.651 | .000  | 0.657 | 0.432 | 347.87 | .000  |

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

| Measurement Model |  | β1 | β2 | S.E. | C.R. | P     |
|-------------------|---|----|----|------|------|-------|
| Generative Skills | <-| 21st Century Teacher Skills | 0.548 | 1 |
| Flexible Teaching Skills | <-| 21st Century Teacher Skills | 0.383 | 0.128 | 7.039 | <0.001 |
| Affirmative Skills | <-| 21st Century Teacher Skills | 0.599 | 0.052 | 9.851 | <0.001 |
| Technopagogical Skills | <-| 21st Century Teacher Skills | 0.699 | 0.072 | 10.853 | <0.001 |
| Administrative Skills | <-| 21st Century Teacher Skills | 0.908 | 0.085 | 12.071 | <0.001 |
| Learning and Innovation Skills | <-| 21st Century Skills | 0.745 | 1 |
| Information, Media and Technology Skills | <-| 21st Century Skills | 0.655 | 0.072 | 12.778 | <0.001 |
| Life and Career Skills | <-| 21st Century Skills | 0.806 | 0.054 | 15.148 | <0.001 |

**Structural Equation Model (SEM)**

| 21st Century Skills | <-| 21st Century Teacher Skills | 0.803 | 0.766 | 0.076 | 10.021 | <0.001 |

β₁: Standard coefficients, β₂: 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
test 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 self-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).

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 (Schaufler 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.
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