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Turkish adaptation of children's perceived use of self-regulated learning inventory

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This research aims to adapt the Children's Perceived Use of Self-Regulated Learning Inventory developed by Vandevelde. The inventory was developed to understand children's self-regulated learning. The sampling in this research included 500 children who are attending primary school at İstanbul in Turkey. First of all, the inventory was translated into Turkish. After the data collection, to understand the factor structure of the data exploratory and confirmatory factor analysis were utilised. Statistical package for social science (SPSS) 22 and Lisrel 8.80 was used to analyse the data. Throughout the exploratory factor analysis, the items of the scale were reduced to 32 items and 3 factor. Confirmatory factor analysis also showed that the structure of the scale was valid. Cronbach alpha coefficient for the total score of the scale was calculated as 0.972. Test re-test reliability was also calculated as 0.999. This study showed that the inventory adapted into Turkish can be considered as valid and reliable.

Key words: Self-regulated learning, primary students, scale adaptation.

INTRODUCTION

Today, the importance of children's taking responsibility for their own learning is emphasized in the learning-teaching process. According to Açıkgöz (2003), a student-centered learning-teaching process is a process in which learners are responsible for the learning process; opportunities for decision-making and self-regulation through different aspects of the learning process are given to learners; and learners are forced to use their mental abilities during learning through complex instructional tasks.

In this context, the concept of self-regulation gains importance. It is defined as an active and constructive process in which students attempt to monitor, organize and control their cognitions, motivations and behaviors within their own learning goals and other environmental conditions once they have established those goals (Pintrich, 2000). The development of students' self-regulation skills provides opportunities to efficiently help them in order to ensure that they effectively fulfill their responsibilities in the learning process (Dignath et al.,

2008). It is emphasized that students with advanced self-regulation skills can control their learning processes themselves; therefore, they can achieve permanent and meaningful learning independently of others (Israel, 2007).

Zimmerman (2000) noted that self-regulation skills can be learned like other skills (Chung, 2000; Paris and Paris, 2001; Winne, 1995; Zimmerman, 1990; Zimmerman and Bandura, 1994; Zimmerman and Martinez-Pons, 1988). Nevertheless, he emphasized that students' self-regulatory competencies should be determined in order to improve their self-regulation skills. In the light of this explanation, it is considered necessary to determine the competence of primary school students in self-regulation.

Research has shown that so far, studies on self-regulation have been conducted with teacher candidates and adult university students in general. For example, Kert (2008) examined the impact of the Electronic Performance Support Systems, which can be defined as computer-based environments facilitating the acquisition of knowledge and skills, on university students' self-regulated learning skills. Moreover, Sarıbaş (2009) examined the effect of the laboratory environment designed to improve self-regulated learning strategies on science teacher candidates' conceptual understanding, scientific process skills and attitudes towards chemistry. Kalaycı (2010) examined the relationship between "cyber idleness" behaviors – that can be defined as the use of the internet in the workplace and the school environment for personal purposes – and self-regulation strategies with regard to university students. Nevertheless, no study could be found in the literature, focusing on self-regulated learning of students at the primary school level, especially in Turkey.

However, determining students' perceptions of self-regulated learning will contribute to their awareness of self-regulated learning. This can be considered as a prerequisite for enhancing students' competence in self-regulation. It will be seen that individuals' being aware of their own self-regulation skills during the primary school age – when their perceptions of learning process and self-efficacy develop – has great importance in terms of educators, students and families in the face of the difficulty of reversing this situation in later ages (Dignath et al., 2008; Whitebread, 2000).

According to Schraw (1998), what a student knows about himself also affects his self-regulating process. It will be useful for students to know factors affecting their performance, their attitudes towards strategy use, and their opinions about the effectiveness of all of those; this way, they can acquire the competence to use appropriate strategies for the content presented to them for their goals (Georgiadis and Efklides, 2000).

According to Schunk (1990), in order for learners to reach their learning goals through self-regulated learning, they need to systematically activate their cognitions and behaviors, and continue to do so. Students may have academic knowledge of strategies for self-regulatory skills, but there will be difficulty in assuring qualified learning if they cannot use these strategies systematically and regularly. If students also misinterpret behaviors and their effects, self-regulatory learning strategies will leave them with an effort of no avail in terms of instructional objectives (Winne and Noel, 2002).

At this point, not knowing students' perceptions of self-regulated learning creates limitations in terms of developing these skills in order for them to have self-regulatory competence and in transferring these to the learning environment in a way that contributes to their academic development. No inventory study has been found in Turkey, evaluating the perceptions about the extent to which primary school students use self-regulated learning. In this direction, it was necessary to have a measurement instrument that enables studying self-regulated learning levels of primary school students. For this reason, the purpose of this study was to adapt the "Children's Perceived use of Self-Regulated Learning Inventory" (CP-SRLI) developed by Vandevelde et al. (2013) to Turkish.

METHODOLOGY

Sample

The population of the study consisted of approximately 10,000 4th-grade primary school students who were studying in 43 primary schools in the Bağcılar district of Istanbul province in the 2014 to 2015 academic year. Cohen et al. (2000) states that selecting a sample in the same way as the current study is a generally accepted method in scientific research, and thus calculating the number of subjects in this way has the ability to represent the population. In this direction, the sample of the research consisted of 500 students who were determined by the cluster sampling method for 95% confidence level with 3% confidence interval.

Translation work

The "Children's Perceived Use of Self-Regulated Learning Inventory" developed by Vandevelde et al. (2013) was obtained from the researchers themselves, and the permission was obtained from the researchers for the adaptation to the Turkish language. The following steps were taken when adapting the instrument to the conditions in Turkey: First of all, the English scale was translated into Turkish in two stages. The scale was first translated into Turkish by three educators who knew English well. This translation was evaluated by an educational science expert and a translation expert, and the final shape of the Turkish form was created. In the second stage, the back-translation technique was used. The created Turkish form was once again translated into English by three educators who were fluent in Turkish and English, and a final form was given to the English form by working together with an expert in educational sciences and a translation expert. Finally, the English form – obtained by back-translation – and the original form were evaluated by an expert who was fluent in English. The items that differed according to the evaluation result were reviewed again, the necessary corrections were made, and the form was given its final shape.

Table 1. Kaiser-Meyer-Olkin (KMO) value.

KMO value		0.980
	Approximate chi-square value	26546.554
Bartlett's test for sphericity	SD	2775
	p	0.001

Data collection

In this study, the "Children's Perceived use of Self-Regulated Learning Inventory" developed by Vandevelde et al. (2013) was adapted to Turkish. Within the scope of this adaptation study, data were collected from 4th-grade primary school students in the Bağcılar district of Istanbul province.

Data analysis

In this study, Statistical Package for the Social Sciences (SPSS) and Lisrel software programs were used to analyze the obtained data. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test for Sphericity were performed to determine the suitability of the data for factor analysis. Then, exploratory factor analysis was applied to the data. In order to determine the construct validity of the scale, the principal components factor analysis was applied to the data, and the factors with an Eigen value greater than 1 were taken into consideration. Next, the resultant factor structure was tested using confirmatory factor analysis. Within the scope of the test retest, the scale was applied to the 4th grade primary school students for a second time after a twelve week interval. The Pearson product-moment correlation coefficient was calculated for the reliability of the scale. In addition, the Cronbach alpha internal consistency coefficient was calculated for the entire scale.

RESULTS

In this study, first of all, KMO and Bartlett's Test for Sphericity were applied to determine whether the Children's Perceived use of Self-Regulated Learning Inventory was appropriate for the factor analysis. The KMO value associated with the Children's Perceived use of Self-Regulated Learning Inventory was calculated as 0.980. The value of KMO greater than 60 shows that it is acceptable. The result of the Bartlett's Test for Sphericity of the inventory was found to be significant (x^2=26546.554, p<.001). High results of the both values indicate that the data were suitable for factor analysis. In the light of these findings, an exploratory factor analysis was applied to the data. KMO value and Bartlett's Test for Sphericity result are shown in Table 1.

KMO value associated with the Children's Perceived use of Self-Regulated Learning Inventory was calculated as 0.980. These values were high and thus indicated that a factor analysis could be applied and that there was a correlation between the items (Ntoumanis, 2001). The value of KMO greater than 60 shows that it is acceptable. The result of the Bartlett's Test for Sphericity of the inventory was found to be significant (x^2=26546.554,

p<0.001). High results of the both values indicate that the data were suitable for factor analysis. In the light of these findings, an exploratory factor analysis was applied to the data.

In this direction, a rotation was applied using the varimax technique to the factor matrix representing the factor loadings of the items, and a rotated component matrix was obtained. When we evaluated the rotated component matrix in terms of overlaps by determining the factor load acceptance level as 0.40, the items that did not form a factor alone and had no factor load above the acceptance level were removed from the inventory. Şencan (2005) states that this process should be repeated step by step until the item overlaps are eliminated. Accordingly, the analysis process was repeated until the items that were overlapping and did not constitute a factor on their own were eliminated. The rotated component matrix obtained as a result of these analyzes is shown in Table 2.

If a variable has a large load as an absolute value under a certain factor, it means that that variable is in close relation with that factor (Kalayci, 2010). If there are 350 or more cases, the factor load should be 0.30 or above. Factor loads of 0.50 or above are considered to be quite good, so the factor load acceptance level for the exploratory factor analysis of the scale was set at 0.40 (Hair et al., 1998; Kalayci, 2010). In line with that, the items that had a factor load value of less than 0.40 and were overlapping were eliminated. For this reason, the following items were removed from the scale: 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 22, 25, 26, 27, 28, 33, 34, 36, 37, 38, 40, 41, 42, 44, 45, 46, 49, 51, 52, 53, 54, 55, 56, 60, 61, 62, 68, 69, 71, 75. Moreover, when determining the number of factors, it is necessary to evaluate each factor's contribution to the total variance (Çokluk et al., 2014). Accordingly, the total variance values obtained as a result of the analysis are shown in the Table 3.

When the data in Table 3 are examined, it is seen that the 32 items in the scale were collected under 3 factors that had Eigen Values greater than 1. It is seen that the first factor in the scale contributed 38.375% to the variance. The first and second factors together accounted for 51.834% of the total variance. 3 factors – the first, second and third factors together – accounted for 63.307% of the total variance. Confirmatory factor analysis was applied to the data obtained from the exploratory factor analysis. The path diagram obtained as a result of the confirmatory factor analysis is presented in Figure 1.

Table 2. Rotated component matrix table.

Items	Factors		
	1	**2**	**3**
M11	0.818	-	-
M19	0.811	-	-
M18	0.797	-	-
M20	0.783	-	-
M1	0.771	-	-
M65	0.770	-	-
M67	0.757	-	-
M66	0.748	-	-
M64	0.747	-	-
M17	0.736	-	-
M24	0.720	-	-
M21	0.705	-	-
M57	0.699	-	-
M23	0.695	-	-
M50	0.684	-	-
M63	0.680	-	-
M70	0.672	-	-
M29	0.668	-	-
M32	0.657	-	-
M30	0.631	-	-
M9	0.621	-	-
M31	0.558	-	-
M73	-	0.720	-
M74	-	0.660	-
M58	-	0.660	-
M59	-	0.640	-
M72	-	0.632	-
M48	-	-	0.816
M43	-	-	0.714
M35	-	-	0.685
M39	-	-	0.555
M47	-	-	0.421

For the confirmatory factor analysis, x2/sd ratio was assessed first. This ratio stands out as 1.72 in the model and corresponds to a perfect fit for the model, as it is below 3 (Kline, 2005). When the RMSEA value of the analysis results is examined, it is seen that a fit index of 0.039 was obtained. A RMSEA value smaller than 0.05 indicates an excellent fit (Jöreskog and Sörbom, 1993). When the GFI and AGFI indices of the table are examined, it is seen that their values are 0.91 and 0.90, respectively. Hooper et al. (2008) noted that these values point to a good fit for the model. The table shows that the RMR fit index is 0.053 and the fit index of the standardized RMR is 0.035. It can be said that the RMR and standardized RMR fit indices in terms of these values indicate a perfect fit (Brown, 2006). When the NFI, NNFI and CFI fit indices in the table are examined, it is seen

that NFI has a value of 0.98, NNFI and CFI have a value of 0.99. According to Çokluk et al. (2014), NFI indicate a perfect fit. According to Sumer (2000), NNFI and CFI indicate a perfect fit for the model. As a result, it is seen that the model obtained through the factor analysis, as was, was confirmed and valid.

Reliability

Cronbach's Alpha provides information on whether all of the items included in the inventory are measuring the characteristics to be measured by the whole of the inventory. Croanbach's Alpha also provides information on whether the items in each factor in the inventory measure the characteristic to be measured by the relevant factor. Cronbach's Alpha coefficients of the items in the study were calculated. The Cronbach's Alpha internal consistency coefficient of the inventory was calculated as .973 for the first factor, .839 for the second factor, .794 for the third factor, and .972 for the entire inventory. These coefficients were at a good level for the factors individually as well as for the entire inventory. They show that the inventory has internal consistency reliability. The 106 students who participated in the first implementation were tested again after twelve weeks. The Pearson correlation coefficient was calculated using the total test scores based on the data obtained from this test application. The Pearson correlation coefficient answers the question whether there is a significant relationship between two variables (Kalaycı, 2010). In this study, the Pearson correlation coefficient was found to be $r = 0.999$. This value suggests that there is a high, positive and significant relationship between test - retest total test scores of the scale.

DISCUSSION

Research shows that the effective use of self-regulation skills has a positive influence on the academic development of individuals. However, it shows that these skills can be transferred to individuals just like the other skills; and for that to happen, the primary school period is very important. Moreover, in conveying these skills, it has a special importance for educators to assess students' perceptions about self-regulated learning and their ability to use such skills in order for students to acquire these skills.

In their study with form teachers on the development of self-regulated learning skills of primary school students, Doğan and Şahin-Taşkın (2014) reached the conclusion that teachers have an important role in the development of students' self-regulation skills. Studies of Boekaerts (1999) and Zimmerman (2002) also support this. Zimmerman (2000) stated that it is necessary to have knowledge about students' use of self-regulation skills.

Table 3. Total variance values obtained.

Item	Initial Eigen values			Extraction sum of squares			Rotation sum of squares		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	17.502	54.693	54.693	17.502	54.693	54.693	12.280	38.375	38.375
2	1.717	5.366	60.059	1.717	5.366	60.059	4.307	13.459	51.834
3	1.039	3.248	63.307	1.039	3.248	63.307	3.671	11.473	63.307
4	0.756	2.362	65.669	-	-	-	-	-	-
5	0.712	2.224	67.893	-	-	-	-	-	-
6	0.653	2.039	69.933	-	-	-	-	-	-
7	0.629	1.966	71.898	-	-	-	-	-	-
8	0.610	1.907	73.806	-	-	-	-	-	-
9	0.563	1.758	75.564	-	-	-	-	-	-
10	0.544	1.701	77.265	-	-	-	-	-	-
11	0.539	1.686	78.950	-	-	-	-	-	-
12	0.508	1.586	80.536	-	-	-	-	-	-
13	0.492	1.537	82.074	-	-	-	-	-	-
14	0.452	1.413	83.486	-	-	-	-	-	-
15	0.434	1.356	84.842	-	-	-	-	-	-
16	0.413	1.290	86.132	-	-	-	-	-	-
17	0.399	1.248	87.380	-	-	-	-	-	-
18	0.376	1.174	88.554	-	-	-	-	-	-
19	0.349	1.090	89.644	-	-	-	-	-	-
20	0.337	1.052	90.696	-	-	-	-	-	-
21	0.310	0.970	91.667	-	-	-	-	-	-
22	0.308	0.962	92.628	-	-	-	-	-	-
23	0.294	0.918	93.547	-	-	-	-	-	-
24	0.292	0.911	94.458	-	-	-	-	-	-
25	0.272	0.850	95.307	-	-	-	-	-	-
26	0.255	0.797	96.105	-	-	-	-	-	-
27	0.253	0.792	96.897	-	-	-	-	-	-
28	0.221	0.692	97.589	-	-	-	-	-	-
29	0.210	0.657	98.245	-	-	-	-	-	-
30	0.202	0.633	98.878	-	-	-	-	-	-
31	0.199	0.621	99.499	-	-	-	-	-	-
32	0.160	0.501	100.000	-	-	-	-	-	-

This necessitates a valid and reliable inventory that is appropriate for primary school students. In the Turkish literature, no inventory study was found measuring the self-regulation skills of especially the primary school students. For this reason, it is thought that this study made a significant contribution to the literature.

In this study, the inventory developed by Vandevelde et al. (2013) with the original name "Children's Perceived use of Self-Regulated Learning Inventory" (CP-SRLI) was adapted for 4th grade primary school students to Turkish with the following name: "Çocukların Öz-düzenlemeli Öğrenmeyi Kullanımı Envanteri" (ÇÖÖKE). In order to adapt the inventory to Turkish, studies were first made to ensure the language validity. In this process, translation and back translation processes were carried out by academicians who were fluent in English language.

During the administration of the inventory, one-to-one interactions took place with students, and the suitability of the translation was determined for the students' vocabulary level. The data obtained by administering the inventory on the sample were tested in terms of validity and reliability through the SPSS and LISREL programs in the computer environment. It was concluded that the inventory was a valid and reliable measurement instrument. With the validity and reliability values obtained in the direction of the research objectives, it was concluded that the Turkish form "Çocukların Öz-düzenlemeli Öğrenmeyi Kullanımı Envanteri" (ÇÖÖKE) is appropriate to use for 4th grade primary school students.

This inventory study, adapted to Turkish, will enable educators to determine the self-regulation skills of primary school students and students' perceptions of
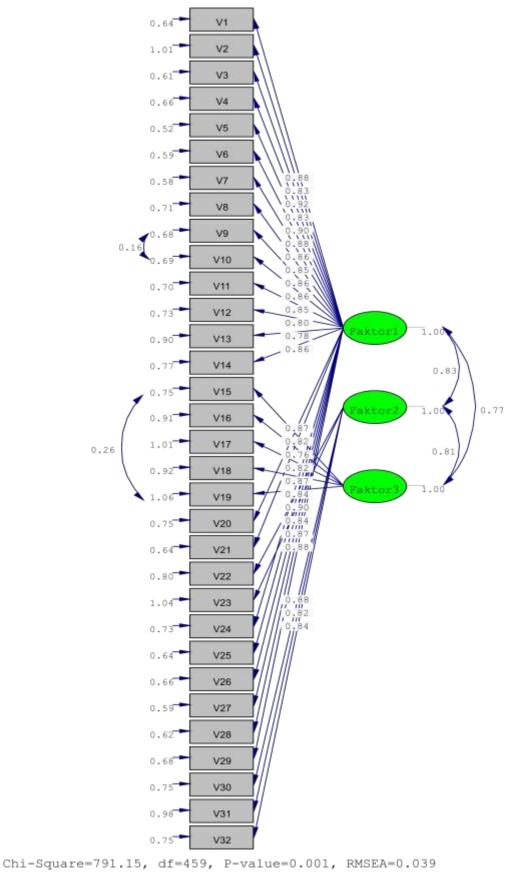
Chi-Square=791.15, df=459, P-value=0.001, RMSEA=0.039

Figure 1. Path diagram.

these skills. This will contribute to the development of students' self-regulatory skills and thus to their academic development. For this reason, it is considered that this study should be taken into account in determining the self-regulation skills and perceptions of primary school students.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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