

# Inventory Of Perceived Study Environment: Adaptation For Turkish Language Analysis Of Validity Reliability And Factor Structure

Algılanan Öğrenme Ortamı Envanteri: Türkçeye Uyarlama Geçerlik Güvenirlik Ve Faktör Yapısının İncelenmesi

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### ABSTRACT

Perception, which is a cognitive process, enables us to make sense of our environment through the stimuli we receive through our sensory organs. The meaning that students, one of the most important stakeholders in schools, place on the school and learning environment where they spend most of the day, gain importance in many ways from their motivation levels to their chosen learning approaches. Many scales have been developed to measure students' perceptions of learning environment. Among them, with the Inventory of Perceived Study Environment (IPSE) developed by Wierstra, Kanselaar, Van Der Linden and Lodewijks in 1999, students' perceptions of learning environment compared to their teaching strategies could be determined. The aim of this study was to adapt the IPSE to Turkish language and to examine the language validity, reliability and factor structure. For this purpose, six different sample groups were studied. Firstly, the English-Turkish harmony of each item was examined and translation validity study was conducted. Then, the validity of the items translated into Turkish was examined by looking at the validity of language and meaning. Material discrimination, construct validity and reliability analyzes were finalized. When the factor loadings of the study are examined, there is no factor load below 30. The validity of factor analysis is high. When the Varimax vertical axis rotation technique is examined, it is seen that the total variance of the scale is 54.4%. The fact that the explained variance ratio is above 30% is considered sufficient for the scale studies in behavioral sciences.

**Key Words:** Learning Environment, Perception, Inventory of Perceived Study Environment, Language Validity

### ÖZET

Bilişsel bir süreç olan algı duyu organlarımız sayesinde edindiğimiz uyarılarla çevremizi anlamlandırmamızı sağlamaktadır. Okullardaki en önemli paydaşlardan olan öğrencilerin günün büyük bir kısmını geçirdikleri okul ve öğrenme ortamına yükledikleri anlam onların motivasyon düzeylerinden seçtikleri öğrenme yaklaşımlarına kadar pek çok bakımdan önem kazanmaktadır. Öğrencilerin öğrenme ortamı algılarını ölçmek için pek çok skala geliştirilmiştir. Bunlar arasında 1999 yılında Wierstra, Kanselaar, Van Der Linden ve Lodewijks tarafından geliştirilen Algılanan Öğrenme Ortamı Envanteri (IPSE) ile öğrencilerin kullandıkları öğretim stratejilerine kıyasla öğrenme ortamı algıları belirlenebilmiştir. Bu çalışmanın amacı IPSE'nin Türkçeye uyarlanarak, dil geçerliği, güvenirlik ve faktör yapısının incelenmesidir. Bu amaçla altı ayrı örneklem grubu ile çalışılmıştır. Öncelikle her bir maddenin İngilizce-Türkçe uyumuna bakılmış, çeviri geçerliği çalışması yapılmıştır. Ardından Türkçeye çevrilen maddelerin dil ve anlam geçerliğine bakılarak iç geçerlik çalışması yapılmıştır. Madde ayırt ediciliği, yapı geçerliği ve güvenirlik analizleri yapılan ölçeğe son hali verilmiştir. Çalışmanın faktör yükleri incelendiğinde 30'un altında faktör yükü yoktur. Faktör analizi geçerliği yüksektir. Varimax dik eksen döndürme tekniği kullanılarak incelendiğinde ise ölçeğin toplam varyans miktarının %54.4 olduğu görülmektedir. Açıklanan varyans oranının %30'un üzerinde olması davranış bilimlerinde yapılan ölçek çalışmaları için yeterli görülmektedir.

**Anahtar Sözcükler:** Öğrenme Ortamı, Algı, Algılanan Öğrenme Ortamı Envanteri, Dil Geçerliği

## 1. INTRODUCTION

Perception, which is defined as the interpretation of sensory information, is a process of cognitive interpretation of events or objects by past filters, past experiences, expectations, motivation level, current emotion, thought states and being healthy (Duman, 2008). Perception means adding meaning to the inputs received from the environment through the senses (Şahin, 2011). In other words, it is the provision given as a result of mental processes (Yüksel, 2011).

Perception is often confused with sensation. Sensations are simple-simple physiological experiences and events acquired with sensory organs. Contrary to perception, there is no interpretation in the sensation. Perceptions depend on the senses. In addition, perceptual functioning is shaped according to individual characteristics, culture, experiences, expectations, needs, unconscious tendencies,

conflicts, learned helplessness and value judgments (Duman, 2008). According to Yüksel (2011), sensation is the first time that energy is detected in the external world. In perception, people tend to transform sensory information into various patterns. Previous information affects perception. For example, in order to identify an apple which is a fruit, firstly, the color and shape of the apple are seen; touching the apple to know whether it is soft or hard; bitter, sour, salty or sweet to determine whether the apple must be tasted with the tasting organ. All these are sensations. After these senses of apple are analyzed and synthesized in the mind, apple perception occurs based on previous experiences and knowledge.

A fundamental theoretical issue that psychologists cannot agree on when defining perception is about the extent to which perception depends on the information in the stimulus. According to the approach known as direct perception theory, the process of bottom-up processing is used when receiving and processing sensory data. Without bottom-up processing, the process of perception starts from the lowest sensory level to the most complex cognitive level. One of the greatest advocates of this theory, Gibson believes that our cognitive structure is created by a long evolutionary influence of the external environment.

Some psychologists, such as Gregory (1973), who consider perception on a constructivist basis, have argued that the perceptual process is not direct, but depends on the receptors' expectations and previous knowledge as well as the information in the stimulus itself. According to this theory, which is known as top-down processing perception, we start the perception process by sensing the sensory data about the receptors, especially when processing the sensory stimulus. The basis of this approach is that people need prior knowledge and experience to process sensory stimulation (Demuth, 2013). When people become familiar with the situation they create expectations for perception during top-down processing, they perceive events and have perceptions accordingly (Schunk, 20007).

The advocates of the Gestalt theory, which criticize the explanations made by the behaviorists and structuralists, believe that the organism reorganizes life by adding something to itself from outside sensations. The mind perceives stimuli as a whole, not in parts. Accordingly, it is more than the sum of all the pieces and the individual tries to understand and listen to the orchestra as a whole rather than analyzing and synthesizing the contribution of each musician in the orchestra while listening to a symphony orchestra (Senemoğlu, 2010).

According to the Gestalt theory, there are five basic principles in perception: shape-ground relationship, proximity, similarity, completion, continuity and simplicity. According to the shape-ground principle, when the stimuli are arranged in the mind, the shape and ground tend to separate automatically. The shape is more striking, more striking than the ground. In some cases there may be situations in which the shape and the ground are displaced and the shape and the ground cannot be determined. However, both are never perceived as shapes. The principle of similarity is that the stimuli, which are similar in the synthesis and organization of stimuli in mind, are collected in the same group. The similarity factor is important for the perception of visual stimuli as well as the perception of visual stimuli. According to the principle of completion, the human mind tends to see the shape as a whole by automatically completing the missing parts of the figure when arranging stimuli. In this way, the organism reaches good, complete, symmetrical wholes, shapes and forms. According to the Gestalt principle of proximity, objects that are physically close to each other are included in a group when editing stimuli. Proximity factor is used continuously when communicating by reading, writing, speaking. Speech is interpreted according to the pauses between words and sentences. In reading and writing, the distinction between words and punctuation marks helps to perceive the distinction between or within sentences. According to the principle of simplicity, the human brain regulates stimuli in the simplest possible way. This law also shows that perception is symmetrical, orderly, towards shape, whole. According to the principle of continuity, the human mind tends to prefer smooth and continuous paths while arranging the stimuli and interpreting the dots or lines in the series (Geniş, 2009; Senemoğlu, 2010).

According to the information processing theory, perception is based on objective characteristics, previous experiences, and expectations of the person. The knowledge that people have already acquired is made to work while making sense to objects, and perception is shaped accordingly. In addition, people store small copies of templates or stimuli in the mind like a USB, and when they encounter a stimulus, they identify the stimulus by comparing it with the template or stimulus in the repository. This process is called template matching according to information processing theory (Schunk, 2007).

According to all these explanations about perception, it has a great place in understanding the expectations, beliefs, values, needs, previous experiences, knowledge and stimuli of the students in the culture learning environment. When designing learning environments in schools, educational situations need to be tailored to meet the needs of students. In other words, the answers to the question of how the learning environments are perceived by the students gain importance in terms of the quality of teaching.

### **1.1. Learning Environment and Perception**

Perceptions and concepts that people have about their environment affect their behavior and reactions to environmental stimuli. For example, the concepts created by teachers about learning and teaching determine how they view the learning environment (Könings, Gruwel and Merrienboer, 2005). Similarly, the perception of the learning environments of the students is shaped according to the meanings attributed to the concepts related to education such as learning, teaching, teaching and teacher. On the other hand, how students perceive teaching determines the quality of the learning process. Although teaching alone does not significantly affect learning, how students perceive teaching affects learning, student behavior and learning outcomes (Entwistle, 1991; Köksal & Çakır, 2011).

According to Könings, Gruven and Merrienboer (2011), the indicators that could improve the courses were obtained by matching the students' preferred learning environments and their perception of existing learning environments. Matching student preferences and perceptions of the current learning environment and employing them in teaching have a significant impact on student motivation.

The students' perception of the learning environment and the internal characteristics of the teacher is a relationship between student achievement and attitude towards the course, students have different learning preferences and there is a meaningful relationship between these preferences and students' perceptions of the students, students generally perceived teachers as controlled, helpful and collaborative; that teachers prefer the most facilitating / personal model / expert teaching styles in the learning environments, that the grades, grade level, teacher gender and the course affect the perceptions, that the students and teachers find the existing learning environment mostly constructivist, the students' constructivist learning environment perceptions there is a low but significant correlation between teachers' perceptions of constructivist learning environment and management support, and there is a positive relationship between constructivist learning environment and students' attitudes towards science course. gender has a significant effect on students' perception of learning environments, motivational beliefs and attitudes towards science; It was also revealed in the studies that female students' perceptions of learning environments were higher than men's motivational beliefs and attitudes towards science (Telli, Den Brok and Çakıroğlu, 1995; Rakıcı, 2004; Üredi, 2006; Arısoy, 2007; Şahin and Yıldırım, 2010).

Gupta & Fisher (2011), Fisher, Fraser and Cresswell (1995) emphasized the role of communication in learning environments and made interpersonal relationships between teachers and students. Gupta & Fisher (2011) concluded that students perceived their teachers as leaders, carers and friends, but the majority of students found their teachers meticulous. There was no difference between the genders in the study. It was emphasized that the research findings could be used to make learning environments more meaningful and interactive.

Various scales were used in these studies on the role of perception in learning environments. Some of the important scales developed for the assessment of classroom learning environments are as follows (Fraser, 1998):

Learning Environment Inventory-LEI (Fraser, Anderson and Walberg, 1982); Classroom Environment Scale-CES (Moos and Trickett, 1974); Individualized Classroom Environment Questionnaire-ICEQ (Rentoul and Fraser); My Class Inventory-MCI (Fisher and Fraser, 1986); College and University Classroom Inventory (CUCEI (Fraser and Treagust, 1986)); Questionnaire on Teacher Interaction- QTI (Wubbels and Levy, 1993); Science Laboratory Environment Inventory- SLEI (Orion, Hofstein, Repairs and Giddings, 1997); Constructivist Learning Environment Survey (CLES (Taylor, Fraser and Fisher, 1997); and What is Happening in this Class?

In 1999, the Inventory of Perceived Study Environment (IPSE) was developed by Wierstra, Kanselaar, Van Der Linden and Lodewijks. The IPSE likert type consists of 36 items and eight scales. *Reproduction (emphasis on student reproduction of teaching content) Connectedness (instruction is directed on internal relations in the learning domain) Application (instruction is directed on application contexts) Involvement (interactive ways of teaching) Personalisation (distance teacher – student) Participation (student has a say in method and content of instruction) Individualisation (attention to a student's self-steering regarding content and form of the teaching-learning process) Task orientation (structure, explicit clearness of instructional goals and procedures).*

In the studies conducted in our country, the abovementioned measuring tools were used. In this study, Wiersta et al. Perceived Learning Environments Inventory developed by TurkStat will be adapted to Turkish, and language validity, reliability and factor structure studies will be conducted.

## 2. METHOD

The information about the six sample groups used in the study is as follows: Firstly, for the validity study of the Perceived Learning Environment Inventory, the English-Turkish harmony of each item was examined. In this sense, the language validity sample of the study consisted of English instructors working in various higher education institutions and 22 volunteer English language specialists working as English teachers in secondary education institutions.

After the validity of the translation, 18 volunteer Turkish language experts were employed to study the validity of language and meaning of the Turkish form. 11 of the experts work as Turkish teachers in primary education institutions affiliated to the Ministry of National Education, 5 as Turkish Language and Literature teachers in secondary education institutions and 2 as Turkish Language Instructors in higher education institutions.

In order to determine whether there was a linguistic equivalence between the English-Turkish forms of the scale, 33 students attending the final year of a state university were interviewed.

A sample group consisting of educational sciences experts was formed for the internal validity study of the scale. It was examined whether these experts had a PhD degree in the field of educational sciences or worked as a faculty member in the departments of educational sciences in the faculties of education. In this sense, in the internal validity study sample group, 1 was a faculty member in the department of guidance and psychological counseling, 1 was a faculty member in the department of education management and supervision, 8 was a faculty member in the curriculum and 3 in primary mathematics teaching. The department consists of 15 volunteer educational sciences experts, 2 of whom are classroom teachers.

As a result of the language validity study of the Perceived Learning Environment Inventory, the universe of this study is secondary education students because it is thought that the inventory will be applied to secondary school students. In this universe, 244 students attending 9th and 10th grades selected by purposive sampling voluntarily participated in the study for the validity and reliability

analyzes of the scale study. 105 of these students are male and 139 are female. The distribution of the students in the sample group according to grade level is as follows: 92 (37%) are Grade 9 and 152 (63%) are Grade 10 students.

For the test-retest reliability study of the scale, 33 prospective teachers attending the department of English Language Teaching at a public university were determined.

## 2.1. Data Collection Tool

In the research, the original English version of the Perceived Learning Environment Inventory (Wiersta et al., 1999), the English-Turkish Translation and Validation Form developed by the researcher, the Turkish Language and Meaning Validity Form, and the Turkish Form of the Perceived Learning Environment Inventory created after the validity of the language were obtained. Three forms were used as data collection tools in this study. The application period of the scale was between fifteen and twenty minutes.

## 2.2. Operation

Perceived Learning Environment Inventory was developed by Wiersta, Kanselaar, Van Der Linden and Lodewijks (1999). First of all, the permission required for adaptation of the scale to Turkish was obtained as a result of correspondence from Mr. Gellof Kanselaar via e-mail. After obtaining permission, the scale items were translated into Turkish. At this stage, six English language experts independently translated each of the items of the scale. These experts then compared the items they translated. As a result of this comparison, only one expression was determined for each item and a Turkish translation form was created. After this stage, translation validity form was prepared (See Table 1). This form was prepared with the original English items on the left side, the items translated from English into Turkish, and the 10-degree scale used to determine the validity of the translation.

**Table 1.** Translation Validity Form of Perceived Learning Environment Inventory

English Item	Turkish Item	Degree
The teacher talks individually with students	Öğretmen öğrencilerle bireysel olarak görüşür.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0 1 2 3 4 5 6 7 8 9 10
Students are given indications as to how to study the subject matter	Öğrenciler konuyu nasıl çalışacakları konusunda yönlendirilirler.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0 1 2 3 4 5 6 7 8 9 10
Students have a say in how course time is spent	Öğrenciler ders süresinin nasıl kullanılacağı konusunda söz sahibidirler.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0 1 2 3 4 5 6 7 8 9 10

The experts in the English-to-Turkish translation sample group were asked to read the English and Turkish items and evaluate the extent to which the Turkish items met the English items in terms of language and meaning. Experts scored between 0 and 10 for each item when making this assessment. In this sense, if the Turkish item does not meet the English item in terms of language and meaning at all, a range of 0 (zero) or 10 (ten) is used. A column is reserved on the far right side for the opinions and explanations of the experts regarding the scale items.

After completing the translation phase of the scale into Turkish, the validity of language and meaning of the Turkish form was examined. At this stage, a form in which the items translated from English into Turkish were used on the left and grading items in the range of 0 (zero) to 10 (ten) were used on the right. As in the previous form, for the language and meaning validity form of the Perceived Learning Environment Inventory, a range of 0 (zero) was used if the Turkish items did not meet the validity in terms of language and meaning at all, and 10 (ten) if fully met. A column on the far right is reserved for descriptions. Turkish language experts were asked to evaluate the validity of each item in terms of language and meaning using the form. An example of the form is presented in Table 2.

**Table 2:** Language and Meaning Validity Form of Perceived Learning Environment Inventory

Items	Degree										
	0	1	2	3	4	5	6	7	8	9	10
Öğretmen öğrencilerin kavramları tek tek öğrenmelerini bekler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Öğretmen öğrencilerden öğrendiklerini uygulamalarını bekler.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Öğretmen, öğrencilerin problemleriyle ilgilenir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

After looking at the validity of language and meaning of Turkish items, it was requested that each item be translated back from Turkish to English by another language expert. The original items of the scale and the items that were rejected by the linguist were compared. At this stage, it was observed that the original version of the scale coincided with the reverse version.

At the last stage, the sample group consisted of 35 prospective teachers who were teaching English at a state university, which was determined by purposive sampling method, and the English form of the scale was applied two weeks later and the Turkish form was applied two weeks later. After this application, paired group t-test and Pearson product moments correlation analysis were performed. Thus, the language validity stage of the scale was completed.

For the content validity study of the Perceived Learning Environment Inventory, 15 volunteer educational sciences experts were employed. In this sense, the Turkish validity of the items was completed on the left, a rating range between 0 (zero) and 10 (ten) was determined in the middle and a 10-degree form was used with the explanation part at the far right for the experts to give their opinions. Experts evaluated the degree to which each item in the Turkish form related to content validity was able to measure the perception of learning environment of secondary school students in the range of 0 (zero) if the item did not measure the learning environment perceptions of secondary school students at all, and 10 (ten). An example of the form is presented in Table 3.

**Table 3:** Example of Content Validity Form of Perceived Learning Environment Inventory

Item	Degree										
Öğretmen öğrencilerle bireysel olarak görüşür.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Öğrenciler konuyu nasıl çalışacakları konusunda yönlendirilir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Öğrenciler ders süresinin nasıl kullanılacağı konusunda söz sahibidir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lawshe analysis was performed to see whether the scale items included the desired property to measure. Lawshe (1975) analysis consists of six stages. These stages:

- Formation of a group of field experts,
- Preparation of candidate scale forms,
- Obtaining expert opinions,
- Obtaining coverage validity rates for substances,
- Obtaining content validity indices for the scale,
- The scope is defined as the creation of the final form according to the validity ratios / index criteria.

This technique requires a minimum of 5 and a maximum of 40 expert opinions. Experts rate each item as “item measures the targeted structure”, “item related to structure but unnecessary” or “item does not measure the targeted structure derecelendirme. Accordingly, expert opinions about each item are collected and coverage validity rates are obtained. This ratio is obtained by missing the ratio of the number of experts indicating the belirten necessary ”opinion on each item to the total number of experts reporting on the matter (Yurdugül, 2005).

According to Lawshe (1975), the minimum Lawshe coverage validity rates in the  $p = .05$  confidence interval for different number of experts are presented in Table 4.

**Table 4.** Lawshe Content Validity Rates Minimum Values

Experts	Minimum Degree	Experts	Minimum Degree
5	0.99	11	0.59
6	0.99	12	0.56
7	0.99	13	0.54
8	0.78	14	0.51
9	0.75	15	0.49
10	0.62	16	0.29

Item discrimination, construct validity and reliability analyzes of the scale items were conducted with 9th and 10th grade students who were determined by sampling method. The Turkish form of the students whose content validity has been completed is “I strongly disagree” (1) “I do not agree” (2), “I do not agree slightly” (3), “I agree slightly” (4) “I agree” (5) and “I totally agree” (6).

In order to calculate item discrimination scores of scale items, item total and item remaining values were determined and Pearson product-moment correlation analysis was applied to the obtained data. In addition, independent group t-test was applied to the mean of 27% of the participants in the lower and upper groups to determine the substance discrimination. For construct validity, exploratory factor analysis was performed. Cronbach Alpha coefficient was used for the internal reliability of the scale. In addition, SPSS 11.5 program was used in the validity and reliability analyzes of the scale.

### 3. RESULTS

#### 3.1. Translation & Linguistic Validity Findings

In this study, it was determined that the Turkish translation of each item of the scale ranged between 9.7 and 7.8. The lowest translation eligibility score was calculated for item 26, which states “The teacher expects the student to learn everything exactly as presented in the lesson or in the book” [ $X = 7.8$ ,  $S = 1.8$ ]. The highest translation eligibility score was calculated for item 4, which included “students ask questions or answer questions during the course” [ $X = 9.7$ ,  $S = 0.8$ ]. 25 of 36 items were found to be over 9.00. The scores expressing the opinions expressed by the experts about the compliance scores of the Turkish translation of the scale with the original English for each item are presented in Table 5.

**Table 5.** English-Turkish Conformity Scores of Perceived Learning Environment Inventory

Item No	$\bar{X}$	S	Item No	$\bar{X}$	S
1	9.7	0.9	19	9.2	1.4
2	9.0	1.3	20	8.1	1.7
3	9.1	0.9	21	9.1	1.1
4	9.7	0.8	22	9.3	1.2
5	8.4	1.4	23	9.3	0.8
6	9.4	0.9	24	9.1	1.4
7	9.2	1.0	25	9.2	1.2
8	8.1	1.7	26	7.8	1.8
9	8.8	1.3	27	8.7	1.7
10	9.3	1.0	28	8.1	1.9
11	8.6	1.8	29	9.3	1.3
12	8.0	2.3	30	9.2	1.4
13	9.3	1.1	31	8.8	1.4
14	9.3	1.2	32	9.0	1.4
15	9.1	1.6	33	9.1	1.6
16	9.0	1.7	34	9.3	1.0
17	9.3	1.2	35	9.1	1.2
18	8.1	1.7	36	9.1	1.3

According to the evaluation of Turkish language experts, the language and meaning validity scores of each item in the Turkish form ranged between 9.9 and 7.5. The lowest language and meaning eligibility score was calculated for item 11, which included “Students actively participate in class” [ $X = 7.5$ ,  $S = 1.7$ ]. The highest validity of language and meaning validity score was calculated for

item 8 which included “The teacher deals with the problems of the students” [ $\bar{X} = 9.9, S = 0.2$ ]. 15 items out of 36 items were found to be over 9.00. The scores expressing the opinions expressed by the Turkish Language experts about the Turkish language and meaning compliance scores for each item are presented in Table 6.

**Table 6.** Turkish Language and Meaning Validity Eligibility Scores of Perceived Learning Environment Inventory

Item No	$\bar{X}$	S	Item No	$\bar{X}$	S
1	9.0	1.2	19	9.3	0.8
2	9.1	1.0	20	8.8	1.5
3	8.4	1.4	21	9.1	1.3
4	8.9	1.7	22	8.8	1.8
5	8.3	2.1	23	9.6	0.6
6	9.0	1.1	24	9.3	0.8
7	9.8	0.5	25	8.1	1.6
8	9.9	0.2	26	8.7	1.4
9	8.0	1.7	27	8.8	1.3
10	9.5	0.8	28	8.1	1.9
11	7.5	1.7	29	8.7	1.3
12	8.3	1.4	30	8.9	1.3
13	9.3	0.8	31	8.4	1.7
14	9.3	1.0	32	8.5	1.5
15	9.3	1.0	33	8.7	1.6
16	8.7	1.6	34	8.5	1.8
17	9.3	0.8	35	8.8	1.3
18	8.5	1.5	36	9.0	1.0

In order to measure the linguistic equivalents of the Turkish and English forms, the original English form of the scale was applied to 33 prospective teachers who were studying in the last year of a teaching faculty of a faculty of education determined by intentional sampling method and the Turkish form of the scale was applied two weeks later. Then, paired t-test and Pearson product moments correlation analysis were used as linguistic equivalence criteria between the scores obtained from the two applications. As a result of the paired group t-test, no significant difference was found between the means of answers given to the English-Turkish forms of all items in the scale. In addition, Pearson product-moment correlation analysis showed that there was a significant relationship between the mean scores of responses to the English-Turkish forms of all items. This is considered to be the same meaning as the original and Turkish translations of the English language items with no significant differences. The paired group t-test and Pearson product moments correlation results for the linguistic equivalents of the items of the scale are presented in Table 7.

**Table 7.** Results of the paired group t-test and Pearson Moment Correlation Analysis to Determine the Linguistic Equivalence of the Items of the Perceived Learning Environment Inventory

Paired Items	$\bar{X}$	S	T	p	r*	Paired Items	$\bar{X}$	S	t	p	r*
1	İNG 5.6	.62	1.0	.05	.47	19	İNG 6.4	.35	.41	.00	.44
	TR 5.0	.60					TR 6.3	.33			
2	İNG 5.1	.43	.89	.06	.46	20	İNG 6.6	.31	-97	.13	.46
	TR 4.7	.41					TR 7.0	.34			
3	İNG 6.5	.31	-.57	.99	.61	21	İNG 7.5	.37	-1.47	.52	.45
	TR 6.6	.28					TR 8.0	.25			
4	İNG 7.1	.28	-1.2	.35	.73	22	İNG 7.2	.35	-98	.14	.57
	TR 7.4	.25					TR 7.5	.30			
5	İNG 6.0	.39	-.76	.09	.66	23	İNG 6.6	.40	-28	.17	.44
	TR 6.2	.36					TR 6.7	.40			
6	İNG 7.6	.30	-1.5	.95	.41	24	İNG 7.3	.30	-1.2	.43	.40
	TR 8.1	.25					TR 7.7	.29			
7	İNG 6.1	.39	-.80	.05	.56	25	İNG 6.4	.42	1.8	.01	.42
	TR 6.4	.41					TR 5.5	.44			
8	İNG 6.3	.33	-1.7	.03	.43	26	İNG 6.6	.36	.80	.01	.43
	TR 6.9	.30					TR 6.3	.35			
9	İNG 7.3	.41	-1.3	.77	.41	27	İNG 5.7	.37	.28	.01	.44



	TR	6.8	.38					TR	5.6	.41			
10	İNG	6.8	.35	-1.3	.32	.56		İNG	6.7	.29			
	TR	7.2	.29				28	TR	6.5	.31	.64	.02	.40
11	İNG	5.3	.43	-1.0	.69	.41		İNG	6.6	.27			
	TR	5.7	.43				29	TR	6.4	.34	.81	.01	.43
12	İNG	7.3	.33	-.26	.23	.42		İNG	6.9	.29	-.91	.12	.41
	TR	7.4	.31				30	TR	7.2	.36			
13	İNG	7.7	.26	.23	.78	.46		İNG	6.7	.39	1.7	.00	.52
	TR	7.6	.24				31	TR	6.1	.40			
14	İNG	7.1	.29	-.45	.15	.50		İNG	6.9	.40	.00	.08	.41
	TR	7.3	.23				32	TR	6.9	.33			
15	İNG	7.5	.31	.23	.73	.67		İNG	5.9	.52	-.17	.03	.42
	TR	7.5	.31				33	TR	6.0	.45			
16	İNG	6.1	.42	-.93	.05	.44		İNG	4.7	.63	1.7	.00	.66
	TR	6.5	.43				34	TR	3.8	.54			
17	İNG	8.0	.32	-.79	.37	.51		İNG	7.2	.39	.15	.07	.47
	TR	8.2	.27				35	TR	7.1	.35			
18	İNG	6.5	.40	-.13	.05	.44		İNG	7.3	.35	1.5	.30	.47
	TR	6.5	.43				36	TR	6.7	.35			

$n=33$ ,  $SD=32$ ,  $*p<.01$

### 3.2. Validity & Reliability Scores

Content validity assessment scores of the Perceived Learning Environment Inventory ranged from 9.5 to 6.0. Since 15 experts participated in this study, the minimum content validity rate for this study was .49 (Lawshe, 1975). In this 36-item scale, KGOs ranged from 0.6 to 1.0, and all of the scale items provided content validity in measuring students' perceptions of learning environment. In line with the opinions of the experts, because of the "or" conjugation in items 4 and 36, these items were divided into two separate items and the scale was continued with 38 items. Table 8 shows the content validity coefficients of all items.

**Table 8.** Content Validity Coefficients of Perceived Learning Environment Inventory

Item No	$\bar{X}$	S	KGO	Item No	$\bar{X}$	S	KGO
1	6.0	1.9	0.6	19	9.5	0.7	1.0
2	9.0	1.1	1.0	20	9.0	0.9	1.0
3	8.5	1.1	1.0	21	8.5	1.7	1.0
4	6.6	1.9	0.6	22	8.6	1.5	1.0
5	7.8	1.8	1.0	23	9.0	1.4	1.0
6	8.8	1.1	1.0	24	9.0	1.4	1.0
7	6.1	1.9	0.6	25	6.6	1.9	0.6
8	8.8	1.6	1.0	26	8.6	1.3	1.0
9	8.3	1.0	1.0	27	8.2	1.3	1.0
10	9.0	0.9	1.0	28	7.8	1.8	1.0
11	6.1	1.8	0.6	29	8.5	1.1	1.0
12	6.0	1.6	0.6	30	7.8	1.8	1.0
13	9.1	1.3	1.0	31	6.2	1.9	0.6
14	6.6	1.9	0.6	32	6.3	1.9	0.6
15	9.1	1.1	1.0	33	6.6	1.9	0.6
16	7.8	1.8	1.0	34	6.2	2.2	0.8
17	6.2	1.9	0.6	35	8.2	1.9	1.00
18	6.3	1.9	0.6	36	9.1	1.3	1.00

After the content validity, item-total and item-remainder correlations were calculated on the data collected from 244 9th and 10th grade students in order to determine the adequacy of the items in the scale to distinguish the individuals. Item total correlation numbers ranged from .63 to .05. Items other than Article 17 are statistically significant. When the item-remaining correlations are examined, the number of item-remaining correlations varies between .61 and -.02. Items other than Articles 10, 17, 34 are statistically significant. In Table 9, item total and item remaining correlation coefficients of all items are given.

**Table 9.** Results of Pearson Product Moment Correlation Analysis to Determine Item-Total and Item-Remaining Correlations of Perceived Learning Environment Inventory

Item No	Item Total	Item Remainder	Item No	Item Total	Item Remainder	Item No	Item Total	Item Remainder
	R	r		r	r		r	r
Item 1	0.42	0.37	Item 14	0.63	0.60	Item 27	0.42	0.38
Item 2	0.57	0.53	Item 15	0.48	0.43	Item 28	0.50	0.45
Item 3	0.31	0.31	Item 16	0.53	0.49	Item 29	0.51	0.47
Item 4	0.47	0.46	Item 17	0.05	-0.02	Item 30	0.52	0.47
Item 5	0.45	0.41	Item 18	0.59	0.55	Item 31	0.48	0.42
Item 6	0.49	0.45	Item 19	0.49	0.44	Item 32	0.51	0.46
Item 7	0.46	0.42	Item 20	0.50	0.46	Item 33	0.48	0.48
Item 8	0.54	0.50	Item 21	0.44	0.39	Item 34	0.16	0.09
Item 9	0.44	0.40	Item 22	0.44	0.39	Item 35	0.25	0.19
Item 10	0.10	0.04	Item 23	0.61	0.61	Item 36	0.42	0.36
Item 11	0.45	0.41	Item 24	0.60	0.56	Item 37	0.63	0.59
Item 12	0.21	0.15	Item 25	0.58	0.54	Item 38	0.55	0.50
Item 13	0.47	0.48	Item 26	0.24	0.17			

In order to determine the item discrimination power of the scale items, independent group t-test was applied to the mean scores of the upper and lower 27% of the groups. According to the independent group t-test results, there was a significant difference between the mean scores of the lower and upper groups of the items obtained at the level of  $p < .001$  for all test items. In this sense, there is a significant difference between the low score and the high score obtained from the scale. In other words, it can be said that the scale is distinctive in measuring the desired property. In Table 10, independent group t-test results are given to determine the discriminative power of all items.

**Table 10.** Independent Group T-Test Results to Determine the Discriminatory Power of Scale Items

Item No	T	p	Item No	T	p	Item No	T	p	Item No	t	p
1	-34,91	.00	11	-30,64	.00	21	-36,29	.00	31	-49,29	.00
2	-37,39	.00	12	-42,98	.00	22	-41,16	.00	32	-41,28	.00
3	-58,25	.00	13	-33,68	.00	23	-34,76	.00	33	-45,14	.00
4	-31,55	.00	14	-32,19	.00	24	-33,72	.00	34	74,64	.00
5	-31,38	.00	15	-38,03	.00	25	-39,46	.00	35	-39,32	.00
6	-49,23	.00	16	-30,85	.00	26	-57,51	.00	36	58,49	.00
7	-38,03	.00	17	-50,89	.00	27	-31,51	.00	37	33,55	.00
8	-36,30	.00	18	-32,63	.00	28	-55,26	.00	38	-41,99	.00
9	-34,37	.00	19	-30,78	.00	29	-35,31	.00			
10	-52,48	.00	20	-30,26	.00	30	-33,34	.00			

Factor analysis is a type of statistics that provides a more meaningful and summary presentation of the data compared to the relationship between the data (Kangwa & Olubodun, 2003). This type of statistics is made to reveal whether items on a scale are divided into fewer factors that exclude each other (Balci, 2000; Turgut & Baykul, 1992). In this scale, factor analysis was started with 38 items. As a result of exploratory factor analysis, the eigenvalue of the items were collected in 7 sub-scales greater than 1. The loads of the factors obtained were between 452 and 795. As a result of the fact that the subscales formed as a result of factor analysis did not show parallelism with the original factor structure of the scale, the subscales obtained for Turkish were named. In Table 11, subscales and factor load values obtained as a result of factor analysis are given.

**Table 11.** Factor Analysis Results of Perceived Learning Environment Inventory

Sub-Scales	Reproduction	Connectedness	Individualisation	Application	Involvement	Personalisation	Task Orientation
Item 25	,688						
Item 24	,662						
Item 33	,631						
Item 23	,543						
Item 15	,523						
Item 29	,502						
Item 18	,480						
Item 32	,476						
Item 14	,460						
Item12		,706					
Item 26		,704					
Item 17		,637					
Item 10		,560					
Item 35		,524					
Item 28			,655				
Item 36			,626				
Item 37			,554				
Item 38			,452				
Item 07				,685			
Item 20				,680			
Item 16				,653			
Item 13				,647			
Item 27				,554			
Item 04					,795		
Item 05					,694		
Item 11					,598		
Item 09					,453		
Item 01						,763	
Item 02						,708	
Item 08						,664	
Item 22							,649
Item 21							,626

As a result of Varimax Vertical Axis Rotation Technique, it is seen that the items in the scale are collected in 7 sub-scales. The total variance sum collected in 7 subscales was 54.4%. In factor analysis studies, the lower limit of the total variance explanation rate of the loads is accepted as 40% (Kline, 1994). The eigenvalues of the subscales and the amount of variance explained are shown in Table 12.

**Table 12.** The Variance Percentages and Eigenvalues Explained by the Scales of Perceived Learning Environment Inventory

Sub-Scales	Eigenvalue	Açıklanan Varyans
1. Reproduction	24.2	12
2. Connectedness	4.4	7.3
3. Individualization	5.5	7.5
4. Application	8.9	9
5. Involvement	4.3	7.3
6. Personalization	3.8	6.6
7. Task Orientation	3.4	4.7
Total	54,5	54,4

In order to determine the internal consistency of the scale, Cronbach Alpha coefficient was examined. The Cronbach's alpha subscales ranged from .41 to .83, while the overall scale was .88.

**Table 13.** Cronbach's alpha coefficients of the subscales of perceived learning environment inventory

Sub-Scales	Cronbach Alpha
1. Reproduction	.83
2. Connectedness	.66
3. Individualization	.71
4. Application	.62
5. Involvement	.68
6. Personalization	.73
7. Task Orientation	.41
Overall Scale	.88

#### 4. DISCUSSION

In this study, Wierstra et al. (1999), the adaptation of the Perceived Learning Environment Inventory into Turkish, and its validity, reliability and factor structure were investigated. The study was carried out in eight stages. Firstly, the Turkish-English translation validity was made. This stage was followed by the language and semantic validity of the Turkish form, the language equivalence between the Turkish and the English form, content validity, determination of item total-item correlations, and item discrimination. Finally, internal consistency was determined and construct validity was examined.

When the translation validity findings of the scale were examined, it was concluded that the scale was compatible with the original English items. The average of the items of the scale was 7.8 out of 10 and 9.7 out of 10 points. According to these findings, it can be said that the Turkish translation of the scale coincides with the original English version.

Language and meaning suitability of each item in the Turkish form of the scale varies between 9.9 and 7.5. There is no item under 7.5. In this sense, it can be said that the Turkish form is in the structure of language and meaning.

As a result of the paired group t-test to determine the linguistic equivalence of the scale items, no significant difference was found between the averages of the answers given to the English-Turkish forms of all items in the scale. The findings obtained from the translation and language validity study of the Perceived Learning Environment Inventory; It shows that the scale can be used in Turkish.

As a result of the exploratory factor analysis, the eigenvalues of the items were collected in 7 subscales greater than 1, and the factor load value was between .452 and .795. The fact that a variable has a factor load of less than 30 is considered to be low level and such items should be removed from the scale (Kline, 1994). When the factor loadings of the study are examined, it is seen that there is no factor load below 30. In this sense, the validity of factor analysis seems to be high. When the Varimax vertical axis rotation technique is examined, it is seen that the total variance of the scale is 54.4%. The explained variance ratio is above 30% is considered sufficient for scale studies in behavioral sciences.

#### REFERENCES

- Arısoy, N. (2007). *Examining 8th grade students' perception of learning environment of science classrooms in relation to motivational beliefs and attitudes*. Doktora Tezi, ODTÜ: Ankara.
- Baloğlu, N. & Karadağ, E. (2008). Öğretmen yetkinliğinin tarihsel gelişimi ve ohio öğretmen yetkinlik ölçeği: Türk kültürüne uyarlama dil geçerliği ve faktör yapısının incelenmesi. *Educational Administration: Theory and Practice*, 56, 571-606.
- Demuth, A. (2013). Perception theories. *Faculty of Philosophy and Arts · Trnava University in Trnava*.
- Duman, B. (2008). Eğitim ve öğretimle ilgili temel kavramlar. Duman, B. (Ed.) *Öğretim İlke ve Yöntemleri* (s.3-129). Ankara: Maya Akademi.

Fisher, D., Fraser, B., and Cresswell, J. (1995) Using the "Questionnaire on teacher interaction" in the professional development of teachers. *Australian Journal of Teacher Education*: Vol. 20: Iss. 1, Article 2.

Geniş, T. (2009). Psikolojiye giriş. Plotnik, R. (Çev.). *Introduction to Psychology*. İstanbul: Kaknüs Yayınları

Gupta, A. & Fisher, D. L. (2011). Technology supported science classroom environment in relation to selected learning outcomes: An Indian study. *MIER Journal of Educational Studies, Trends & Practices*: Vol. 1 (1)

Fraser, B. J. (1998). Science learning environments: assessment effects and determinants. *The International Handbook of Science Education*, 527–564.

Gregory, R. L. (1973). The confounded eye. R. L. Gregory and E. H. Gombrich (Eds). *Illusion in nature and art*. (49-95). Duckworth.

Kangwa, J. and Olubodun, J. (2003). An investigation into home owner maintenance awareness, management and skill-knowledge enhancing attributes, *Structural Survey*, Vol. 21 No. 2, pp. 70-78. <https://doi.org/10.1108/02630800310479061>

Kline, P. (1994). *An easy guide to factor analysis*. Newyork: Routledge.

Köksal, B. and Cakir, M. (2011). Liselerdeki öğrenme ortamı profillerinin belirlenmesi: bir küme analizi çalışması. *Eğitim Bilimleri ve Uygulama*, 10 (20), 161-179.

Könings, K. D., Brand-Gruwel, S., & van Merriënboer, J. J. G. (2005). Towards more powerful learning environments through combining the perspectives of designers, teachers and students. *British Journal of Educational Psychology*, 75, 645-660.

Könings, K. D., Brand-Gruwel, S. & van Merriënboer, J. J. G. (2011). The fit between students' lesson perceptions and desires: Relations with student characteristics and the importance of motivation. *Educational Research*, 53, 439-457.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563-575.

Rakıcı, N. (2004). *Eight grade students' perceptions of their science learning environment and teacher interpersonal behaviour*. Unpublished master thesis. Ankara: Middle East Technical University. Ankara, Turkey.

Schunk, D. H. (2007). *Learning theories: an educational perspective* (5th Edition). USA: Prentice Hall.

Senemoğlu, N. (2010). *Gelişim öğrenme ve öğretim* (17. Baskı). Ankara: Pegem Akademi.

Şahin, S. and Yildirim, S. (2010). Öğrenme tercihleri ve ders algisi. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, Cilt 11, Sayı 3, Page 153-168.

Telli, S., Cakiroglu, J., & den Brok, P. (2006). Turkish secondary education students' perceptions of their classroom learning environment and their attitude towards Biology. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary Approaches to Research On Learning Environments: World Views* (pp. 517-542). Singapore: World Scientific.

Turgut, F. ve Baykul, Y. (1992). *Ölçeleme teknikleri*. Ankara: ÖSYM Yayınları.

Wierstra, R.F.A., Kanselaar, G., Van der Linden, J.L. and Lodewijks, H.G.L.C. (1999). Learning environment perceptions of European university students. *Learning Environments Research* 2, 79–98.

Wiersta, R. F. A., Kanselaar, G., Van der Linden, J. L., Lodewijks, H. G. L. C. Ans Vermunt, J. D. (2003). The impact of the university context on European students' learning approaches and learning environment preferences. *Higher Education*, 45, 503-23.

Üredi, L. (2006). *İlköğretim I. ve II. kademe öğretmenlerinin öğretim stili tercihlerine göre öğretmenlik mesleğine ilişkin algılarının incelenmesi*. Yayınlanmamış Doktora Tezi. Marmara Üniversitesi Eğitim Bilimleri Enstitüsü. İstanbul.

Yuksel, G. (2011). Bilişsel Öğrenme Kuramı. B. Duman (Ed.), *Öğretim İlke ve Yöntemleri*. (45-73). Ankara: Pegem Akademi.

Yurdugül, H. (2005). Ölçek Geliştirme Çalışmalarında Kapsam Geçerliği İçin Kapsam Geçerlik İndekslerinin Kullanılması, *XIV. Ulusal Eğitim Bilimleri Kongresi, Pamukkale Üniversitesi Eğitim Fakültesi*, 28-30 Eylül Denizli, Retrieved from <http://yunus.hacettepe.edu.tr/~yurdugul/3/indir/PamukkaleBildiri.pdf>