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Research

The Self-Regulation Skills Usage Scale in EFL Learning: Development and Validation

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Abstract:

Self-regulation skill is the ability of an individual to plan, monitor, evaluate, and modify their learning process when necessary. It is highly important in foreign language learning because learning a language requires long-term motivation, discipline, and a strategic approach. This study aims to determine the level of high school students' use of self-regulation skills in EFL learning. The scale consists of six items with factor loadings ranging from 0.427 to 0.749 in the first factor (self-awareness), five items with factor loadings ranging from 0.490 to 0.857 in the second factor (planning), five items with factor loadings ranging from 0.573 to 0.730 in the third factor (reviewing), six items with factor loadings ranging from 0.514 to 0.783 in the fourth factor (using learning strategies), four items with factor loadings ranging from 0.671 to 0.818 in the fifth factor (self-evaluation), and four items with factor loadings ranging from 0.595 to 0.741 in the sixth factor (organizing the learning environment). The Cronbach's alpha coefficients of the scale were calculated as 0.946. As a result of the research, it can be said that a valid and reliable scale with 30 items, six sub-dimensions, and a five-point Likert type was obtained. This scale for gathering information on the self-regulation skills of high school students may guide English teachers in refocusing their teaching practices.

Keywords: English as a foreign language (EFL), self-regulated learning skills, high school students, scale development

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INTRODUCTION

Learning a foreign language has been an important goal for education and training from the past to the present. In addition to the contributions of foreign language knowledge to academic and professional life, its contribution to students' intellectual, social, and emotional development is also very important. Learning a foreign language is an important process that develops an individual's cognitive, cultural, and communicative skills. According to the renowned linguist Noam Chomsky, "Language is a tool of thought, and learning a new language makes it possible to see the world from a different perspective" (Chomsky, 2006). Additionally, Stephen Krashen, in his hypotheses about language acquisition, states, "Language learning increases an individual's communicative competence, providing significant advantages not only academically but also socially" (Krashen, 1982). Foreign language learning also strengthens an individual's critical thinking, problem-solving, and intercultural understanding skills.

With the advancement of technology, societies need to communicate more, and the use of foreign languages has become mandatory in daily life, work environments, and personal, social, and international relations. English is the most important of these foreign languages. In Turkey, English is taught as a compulsory subject at every level from the 2nd grade to university. However, despite this education starting in the 2nd grade, the expected quality of English education has not been achieved. Undoubtedly, there are many reasons for this. Many reasons can be listed, such as the insufficiency in the number of teachers and the quality of teacher training, the lack of teaching materials, overcrowded classrooms, and inadequate physical conditions (Önal, 2000). One of the important problems is the incorrect practices in language teaching approaches. In Turkey, language teaching methods based on teacher-centered knowledge transfer had been applied for the past years. Still, realizing that this process was incorrect in an interactive field like language learning, there was a transition to student-centered innovative approaches (Alperen & Hertsch, 2013). Nevertheless, it takes time for innovative approaches to take root and become widespread in education. The transition from teacher-centered teaching to student-centered education, where principles such as self-regulation, autonomy, and self-efficacy, referred to as the spirit of learning strategies by Oxford (2016), are applied, holds significant importance in foreign language teaching, as in other fields.

Students who use self-regulated learning skills are effective learners. Using this skill will enable the student to be a successful learner who takes responsibility for their learning (Ulusoy & Karakuş, 2018). Learning a foreign language using self-regulated learning skills is undoubtedly an important strategy for language learning. Because to learn a language, it is necessary to be effective learners who take responsibility and can manage their learning processes. Many researchers have conducted studies on using self-regulated learning in foreign language learning. For example, Ardasheva, et al. (2017) conducted a meta-analysis study examining the effect of self-regulated learning on foreign language proficiency. The

researchers who revealed the studies in this field stated that the results showed that self-regulated learning is an effective strategy that should be used in foreign language learning. According to Ghanizadeh and Mirzaee (2012), foreign language learners achieve higher success the more active they are motivationally, behaviorally, and metacognitively in their learning. Bernaus and Gardner (2008) revealed a clear relationship between student motivation and language learning success. Garrido-Vargas (2012), in his study of students learning English in the USA, concluded that students who used self-regulation skills were more successful in acquiring academic skills such as setting goals, choosing strategies, and monitoring activities to achieve these goals.

The concept of self-regulated learning, which focuses on the student, is an effective method that needs to be used in the education process. The studies of Vygotsky on cognitive learning and Bandura on social learning have revealed that learning is a cognitive process and each individual has a unique learning nature (Bandura, 1982; Schunk, 1989). Following these researchers, Zimmerman and Schunk started working on the concept of self-regulation in the 1980s, and important researchers such as Pintrich, Winnie, and Greene followed them (Ömür & Çubukçu, 2017; Nodoushan, 2012; Öz, 2020). Shunk and Zimmerman (1989) define self-regulation as the process of the student being the master of their learning. In this process, students must activate their cognitive processes, motivation, and behaviors to achieve their goals.

According to Zimmerman (2002), being a self-regulated learner is not about having a mental ability or acquiring an academic skill. Rather, it is a self-directed process that students use to transform their mental abilities into academic skills. In this process, students must develop internal awareness, self-motivation, and behavioral skills to apply their knowledge appropriately. In this process, the learner first sets goals, determines and applies appropriate learning methods, evaluates the results of these methods, and considers it important to support their internal motivation at every stage. At the end of the process, they set new and higher goals for themselves and restart the process. In his "Self-Regulated Learning Model," Zimmerman (1990) divides self-regulation into three main dimensions: the forethought phase, which includes motivation and goal setting; the performance phase, which is monitored through observation and control processes; and the self-reflection phase, where judgments about the process are made (Eryılmaz & Mammadav, 2017).

Another important researcher who has worked on the concept of self-regulation is Pintrich. Pintrich (2004) defines self-regulation as managing one's learning process using the right learning strategies and motivating oneself. In his learning model based on self-regulation, he examines self-regulation in four dimensions: goal setting and planning, cognitive and behavioral motivation, cognitive strategies, and reflection. Shunk and Greene (2017) define self-regulation as the systematic activation and maintenance of students' cognition, motivation, behaviors, and influences to achieve their goals, emphasizing four common characteristics of self-regulation. First, learners who use self-regulation play an active role in learning metacognitively, cognitively, and behaviourally. Second, they set

goals to develop learning skills and competencies, not just complete tasks. Third, they create a dynamic and cyclical process that includes feedback loops in their learning. Finally, learners place importance on sustaining learning efforts and motivation. Winne and Hadwin (Greene & Azevedo, 2007) define self-regulation as the ability to be an active and strategic learner in metacognitive, motivational, and behavioural learning processes. However, the model created by these researchers has a more complex cognitive architecture because they argue that monitoring and control should be included at every stage of learning. They also suggest that task definition and goal-setting processes should be treated as separate phases. This allows learners to interpret their learning levels in more detail and recognize the impact of their tasks on their future goals. Borkowski's "Process-Oriented Metacognitive Model" asserts that self-regulation skills develop by teaching students learning strategies. Learners first learn the characteristics of a learning strategy and become proficient in understanding under which conditions to apply this skill. Accordingly, self-regulation emerges when students select effective learning strategies and monitor their learning. Through this process-oriented model, students learn how strategic behaviour contributes to their academic success (Ömür & Çubukçu, 2017).

Students who use self-regulation strategies have certain key characteristics. These characteristics are defined by many researchers as follows (Zimmerman & Martinez-Pons, 1986; Dembo & Eaton, 2000; Sunger & Gungren, 2009; Pintrich, 2004; Dörnyei, 2003; Butler & Winne, 1995; Garrido-Vargas, 2012):

- These students monitor their learning using different strategies contrary to their goals.
- They organize their time and study environments efficiently.
- They are generally optimistic about their abilities and future success.
- They use self-regulated learning strategies such as reviewing texts, environmental structuring, information seeking, and goal setting.
- They employ various cognitive strategies to reason, solve problems, and think critically.
- They know how to regulate and control their behaviours.
- They seek help to better structure their learning.
- They know ways to motivate themselves for the lesson.
- They set goals for themselves and monitor, record, and evaluate their progress based on these goals.

It is believed that self-regulation is a crucial aspect of learning English as a foreign language, based on the theoretical and research findings. Considering the characteristics of self-regulated learners identified by researchers, self-regulated learning can be examined under the following key concepts: goal setting, use of learning strategies, time and

environment management, self-motivation, self-awareness, self-evaluation, and cognitive and behavioural control.

The use of self-regulation skills in foreign language teaching has been examined using quantitative (Wolters & Hussain, 2015) and qualitative methods (Tsuchiya, 2018). In their experimental study, Vardar and Arsal (2014) aimed to improve students' English attitudes, achievements, and self-regulation skills with the eight-week English course they structured to improve their self-regulation skills. Using two scales, Eken (2017) examined the relationship between English learning strategies and self-regulated learning. Güngör (2022) determined the importance of using self-regulated learning strategies in learning English. Many scale development studies have been conducted on self-regulated learning skills (Weinstein, et al., 1987; Pintrich & De Groot, 1990; Pintrich, et al., 1991; Brown, Miller & Lawendowski, 1999; Aslan & Gelişli, 2015; Kilis & Yıldırım, 2018; Eryılmaz & Mammadov, 2017; Durmaz, 2012; Hong & O'Neil Jr., 2001). The purpose of developing these scales is to measure the level at which primary, secondary school, and college students use self-regulation skills or to what extent they can utilize different dimensions of self-regulation. However, despite studies examining the relationship between English and self-regulation skills, no scale development study has been found that focuses on high school students learning English using self-regulation skills. Zimmerman (1998) noted that self-regulation should be considered context-specific structures deliberately employed to support students' success in a given subject. The development of the "Self-Regulation Skills Usage Scale in EFL Learning" (SRSUS) is expected to fill this gap in the field. This instrument will give English teachers a reliable and practical way to collect data on high school students' self-regulation skills, which will help them direct and focus on their teaching practice in the classroom. Additionally, it can be used to assess how well teaching methods and resources aim to boost students' confidence and control over their English language acquisition. This study is guided by the following research questions.

- What are the sub-factors that constitute the SRSUS?
- What are the item analysis results for the items associated with each sub-factor of SRSUS?
- What are the outcomes of the reliability analyses (e.g., Cronbach's alpha) conducted for each sub-factor of SRSUS?
- What is the validity and reliability of the SRSUS?

METHOD

This study aimed to develop a scale on high school students' ability to use the self-regulated learning method while EFL learning. Exploratory sequential design was used as the method of the research. According to this design, during the scale development process, an item pool was created with qualitative data and supported by quantitative data (Creswell & Plano Clark, 2011). In a qualitative context, a case study was conducted to examine the ability of high school students to use the self-regulation method while learning English. In

the quantitative context, a survey method was conducted in which the created item pool was tested. In the study, convenience sampling was used for different data collection stages. The samples of this study are stated in Table 1. Using the convenience sampling method, researchers included students from accessible schools based on their willingness to participate.

Table 1

Data Collection, Samples, and Sampling Method

Data collection tool	Sampling Method	Sample
Interview form	Convenience sampling	16 high school students
Pre-application (items clarification)	Convenience sampling	10 high school students (11th Grade) 3 field experts
Trial Application (Exploratory Factor Analysis)	Convenience sampling	263 high school students (9th, 10th, 11th & 12th Grade)
Confirmatory Factor Analysis	Convenience sampling	200 high school students (9th, 10th, 11th & 12th Grade)

According to Table 1, sixteen high school students studying at various levels of high school in Afyonkarahisar's Çay district in the 2022-2023 academic year answered the questions on the interview form, which was created to determine the categories related to the use of self-regulation skills while EFL learning. An item pool was created due to the analysis of the data collected with this form. The item pool was cleared of errors by the opinions of three field experts, and the item comprehensibility levels were measured by applying it to ten high school students. The item pool took its final form with the necessary corrections. Examining the scale's face validity was the main purpose of the pre-application, which ensured that students understood the items as the researchers had intended (Cohen, et al., 2000). Munby (1997) thinks asking a representative subsample about their understanding of the items is the most important way to verify face validity. For the trial application, 263 high school students from various high school types determined by convenience sampling method in Afyonkarahisar's Çay district were reached. The data of five high school students who did not answer the scale sincerely and did not follow the instructions were excluded from the study. Thus, the data of 258 high school students were analyzed.

Participants

In scale development studies, it is necessary to reach five times more people than the item pool created for the trial application (Büyüköztürk, 2002). The data from 250-300 participants will suit the 50-item item pool. Within the scope of the research, 258 high school students participated in the data collection phase. The demographic characteristics of these students are shown in Table 2.

Table 2

Distribution of the Students' Demographic Information

Demographic Characteristics		N
Grade Level	9th Grade	76
	10th Grade	45
	11th Grade	123
	12th Grade	14
Total		258

According to Table 2, 76 are 9th-grade students, 45 are 10th-grade students, 123 are 11th-grade students, and 14 are 12th-grade students.

Development of the Scale (SRSUS)

This scale, developed to measure the self-regulation skills of high school students in EFL learning, is a 5-point Likert type. Responses to the items on the scale consist of five options, from strongly disagree to strongly agree. As the score obtained from the scale increases, the degree of use of self-regulation skills in EFL learning increases. The steps taken to develop the SRSUS are outlined below, and the stages are shown in Figure 1.

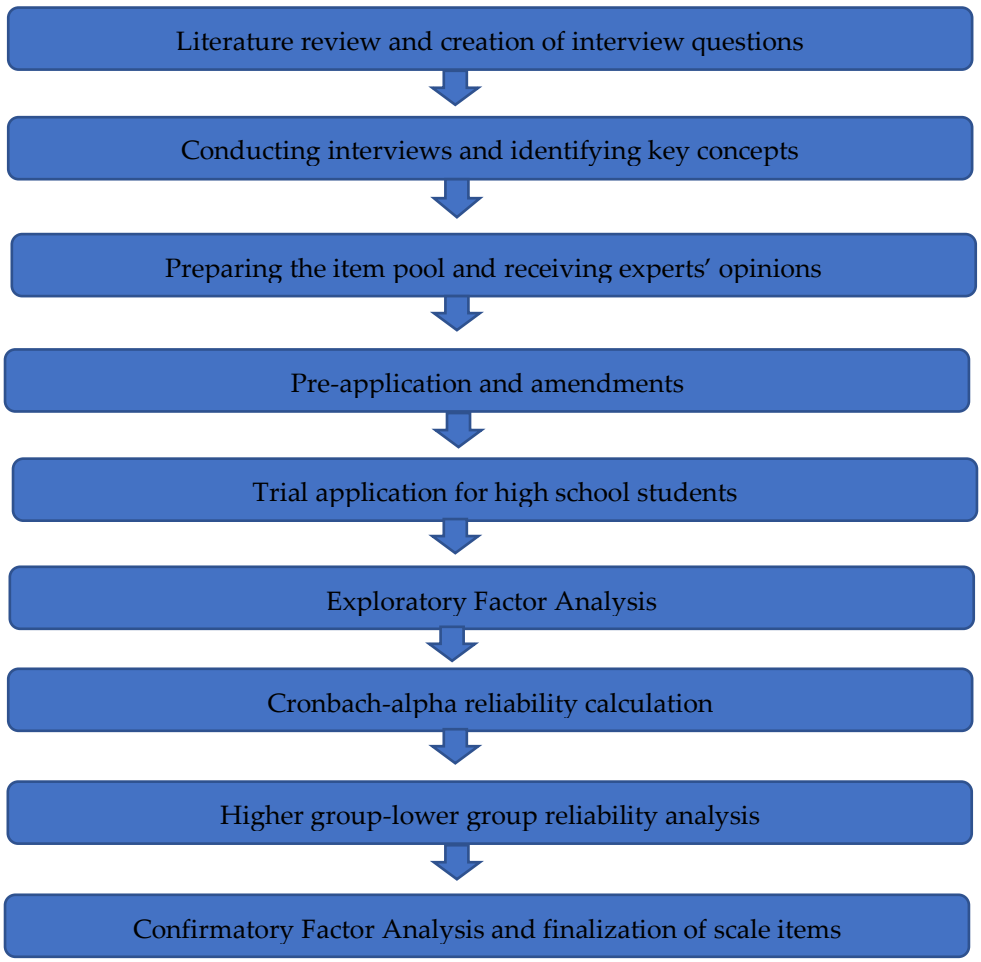


Figure 1. Development Stages of the SRSUS

According to Figure 1, to develop a scale, the first step is to review the literature about the self-regulation skills of high school students in EFL learning and to write down interview questions to elicit the students' ideas. The second step includes conducting interviews with the high school students. Key concepts are identified in light of the information from the literature review and interviews. At the third step, an item pool is prepared and then presented to the experts for their ideas on the clarity of the items. Three specialists in scale development in education sciences were asked to comment on this item pool. In accordance with their suggestions, this assessment instrument was completed. Five items were removed because they were identical to others, and thirteen were changed for lack of clarity. The fourth step includes the pre-application and corrections after the feedback on the pre-application. Ten students participated in this pre-application step to check the items' intelligibility. Four items with language and expression issues were fixed following the pre-application. The next two steps include trial application and exploratory factor analysis. The other two steps include the reliability analysis as the Cronbach-Alpha test and item analysis. The last step includes confirmatory factor analysis and the final version of the SRSUS.

Qualitative Data

The first part of the study, "Interview Form on the Use of Self-Regulation Skills in EFL learning," was prepared by benefiting from the literature to describe the level of use of self-regulation skills by high school students. This form was applied to 16 high school students and the obtained data were converted into codes by performing descriptive content analysis. Descriptive content analysis is a method of creating a code pool and themes/categories following the purpose of the study in qualitative analysis approaches (Ültay, Akyurt, Ültay, 2021). Three experts examined the qualitative data collected in the research, and the inter-coder agreement coefficient of the codes was calculated as 80 % with the formula “Reliability = Consensus / (Agreement + Disagreement) x 100”. As a result of the reliability coefficient being over 70 %, it can be said that the key concepts on which the items are based are reliable (Miles & Huberman, 1994).

Quantitative Data

The five key concepts obtained in line with the students' answers to the Interview Form on the Use of Self-Regulation Skills in EFL learning were increased to nine through the support of the literature and the item pool. The item pool was graded on a 5-point Likert type, a preliminary application was made to ten students, and the necessary arrangements were made with the help of three experts. They assisted in deleting poorly phrased items to remove needless uncertainty and rephrasing unclear lines to create concise and simple statements (Barnette, 2000). As a result, a 50-item scale was developed for trial application. During the trial application, the developed scale was applied to 263 students from 9th, 10th, 11th and 12th grades in different public schools in Afyonkarahisar's Çay district. As the analysis of the quantitative data, the answers of 258 students were evaluated. Exploratory

factor analysis (EFA) was used to determine the scale's validity. Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity tests were used to determine its suitability for factor analysis. Cronbach's Alpha was used to determine the reliability of the data. To determine the distinctiveness of the data, a 27% t-test was conducted between the lower and higher groups.

Preparing the Item Pool

While examining the research topic, first, the studies on the concept of self-regulation were analyzed through a literature review (Zimmerman ve Martinez-Pons, 1986; Dembo & Eaton, 2000; Sunger & Gungren, 2009; Pintrick, 2004; Dörnyei, 2003; Butler ve Winne, 1995; Garrido – Vargas, 2012). Particularly benefiting from the study of Zimmerman and Martinez-Pons (1990) on student differences in self-regulated learning, the "Interview Form on the Use of Self-Regulation Skills in EFL Learning" was created. These questions, listed in Table 3, were asked of sixteen high school students.

Table 3

The Questions on the Interview Form

Questions
1. Do you have a method to help you learn and remember English topics? If yes, please explain.
2. Do you have a special method to help you plan and do your English homework? If yes, please explain.
3. When completing homework assignments, such as English grammar exercises, do you use a specific method to check them after you're done? If yes, please explain.
4. Do you have a special preparation method for English exams or quizzes? If yes, please explain.
5. Do you have a special motivation method while studying English? If yes, please explain. Do you leave your English studies to the last minute or plan to do them on time?
6. Do you have a special way of organizing your workplace? If yes, please explain. How do you organize the environment if you have difficulty concentrating on English studies?

The responses to the interview form were analyzed and compared with the literature, and nine key concepts were identified. These key concepts are “using learning strategies”, “reviewing”, “time management”, “organizing the learning environment”, “self-motivation”, “self-awareness”, “mental control”, “goal setting”, and “self-evaluation”. A pool of 50 items was created based on these nine key concepts.

Ethical considerations

Ethical requirements throughout this research were followed to guarantee that the study's dependability and integrity were never jeopardized. The information on ethics committee approval is given below:

Ethical Review Board: Social and Human Sciences Scientific Research and Publication Ethics Committee

Date of Ethics Review Decision: 19.03.2025

Ethics Assessment Document Issue Number: 2025/88]

FINDINGS

In this research section, findings regarding the analyses performed are included.

Exploratory Factor Analysis

In scale development studies, the exploratory factor analysis (EFA) technique is used to explain the existing structure more easily. In the study carried out with this analysis method, it was determined which items measured which factors. Items that do not work can thus be recognized and removed from the scale (Orçan, 2018). First of all, to determine the suitability of the data for factor analysis, the KMO (Kaiser-Meyer-Olkin) value was examined and calculated as 0.951. The integrity of the scale was measured with the Bartlett test, and it was found to be significant at p = 0.000. According to the EFA results, the same values were re-examined after the items were removed from the scale, and it was determined that the KMO value decreased to .928, given in Table 4.

Table 4

First Analysis and Final Analysis of KMO and Bartlett Test Results

First Analysis Results			**Final Analysis Results**		
Kaiser–Meyer–Olkin value		0.951	Kaiser–Meyer–Olkin value		0.928
Barlett Test	sig.	0.000	Barlett Test	sig.	0.000

As a result of preliminary analysis, eight factors were found. These factors explained 64.66 % of the total variance. The scree plot regarding the number of factors of the items is given in Figure 2. The number of factors retained can be assessed using the scree plot (Cattell, 1966).

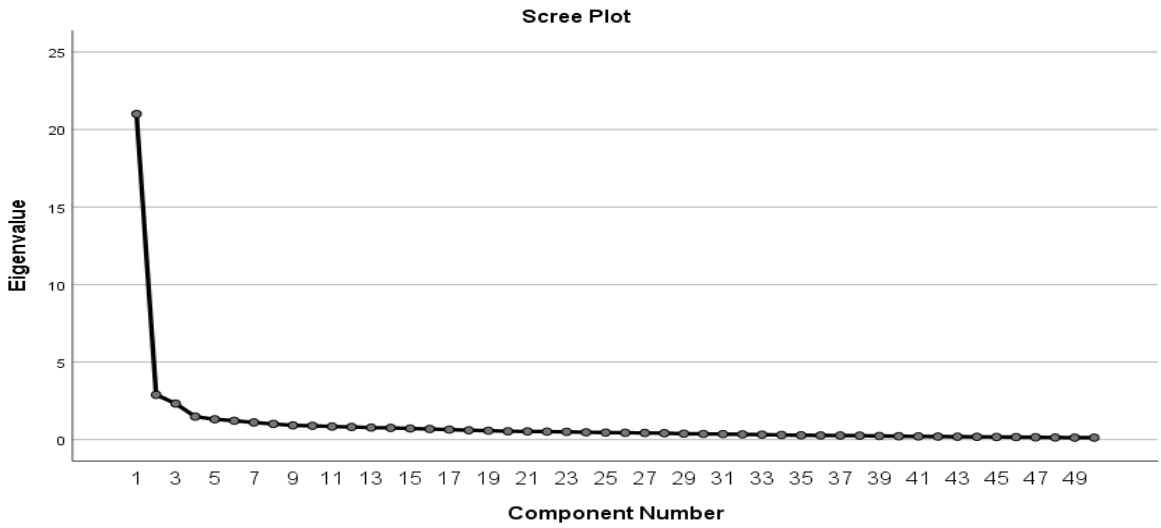


Figure 2. The Scree Plot of the SRSUS

According to Figure 2, the breaking point starts with the 5th component, and from the 6th component, the line becomes straight. To determine the factor loadings more clearly during the analysis process, the varimax rotation process, which is frequently used in social sciences, was used (Büyüköztürk, 2012). 20 items were removed from the initial pool of 50 based on psychometric and statistical criteria derived from exploratory factor analysis. Specifically, items were eliminated due to low factor loadings (below the commonly accepted threshold of 0.40), lack of association with any meaningful factor, or poor alignment with the theoretical structure of the scale. These items—11, 13, 15, 16, 25, 28, 30, 31, 33, 36, 37, 38, 39, 40, 41, 42, 43, 45, 49, and 50 (item number)—either failed to contribute adequately to explained variance, showed low communalities, or weakened internal consistency. Their removal aimed to enhance the scale's construct validity, internal reliability, and conceptual clarity (Costello & Osborne, 2005). The total variance explained by high school students' level of use of self-regulation skills in EFL learning is given in Table 5. The cumulative variance can be used to determine whether a sufficient number of factors have been kept, factor loadings demonstrate how strongly each item is associated with a certain component, and eigenvalues reflect the relative importance of each factor (Field, 2009).

Table 5

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12,068	40,227	40,227	12,068	40,227	40,227	3,612	12,039	12,039
2	2,414	8,047	48,273	2,414	8,047	48,273	3,429	11,429	23,468
3	1,966	6,552	54,825	1,966	6,552	54,825	3,312	11,039	34,507
4	1,182	3,939	58,765	1,182	3,939	58,765	3,268	10,895	45,402
5	1,159	3,864	62,629	1,159	3,864	62,629	3,184	10,612	56,014
6	1,087	3,625	66,254	1,087	3,625	66,254	3,072	10,240	66,254
7	,856	2,853	69,107						
8	,761	2,536	71,643						
9	,725	2,416	74,059						
10	,668	2,227	76,286						
11	,609	2,030	78,316						
12	,580	1,935	80,251						
13	,552	1,840	82,091						
14	,529	1,765	83,855						
15	,496	1,653	85,508						
16	,454	1,514	87,022						
17	,403	1,343	88,364						
18	,398	1,326	89,690						
19	,377	1,255	90,945						
20	,354	1,180	92,126						
21	,327	1,090	93,216						
22	,293	,977	94,192						
23	,272	,907	95,099						
24	,257	,855	95,955						
25	,241	,805	96,760						
26	,234	,781	97,540						
27	,225	,750	98,290						
28	,183	,609	98,899						
29	,178	,592	99,492						
30	,153	,508	100,000						

Descriptive Features of the Total Variance of the SRSUS

According to Table 5, the total variance explanation rate of the items in all sub-factors was 66.25%. In social sciences, it is considered sufficient for the variance explained to be between 40% and 60% (Büyüköztürk, 2012). The rotated components matrix for the SRSUS and the anti-image correlations of the items are shown in Table 6.

Table 6

The Rotated Components for the SRSUS and the values of anti-image correlations

Items	**Components**						**Anti image cor.**
A1: I know how to increase my desire to study English.	,749	,012	,104	,242	,217	,174	,932[a]
A2: I know my strengths in English learning.	,747	,124	,267	,167	,138	,223	,908 [a]
A3: I check my strengths in learning English.	,676	,220	,089	,200	,108	,053	,939 [a]
A4: I try to improve my weaknesses in English learning.	,600	,204	,264	,244	,258	,270	,949 [a]
A5: I set goals for myself in English learning that are difficult to achieve.	,564	,219	,236	,113	,411	,213	,957 [a]
A6: I evaluate my performance in English learning.	,427	,248	,231	,305	-,012	,100	,911 [a]
B1: I regularly review English course topics from various sources.	,099	,857	,102	,134	,073	,154	,870 [a]
B2: I allocate the necessary time to study for English class.	,085	,852	,170	,094	,089	,128	,890 [a]
B3: I arrange regular study hours to study English.	,182	,655	,297	,254	,019	,074	,937 [a]
B4: I make a study plan to study English better.	,292	,574	,224	,100	,169	,408	,929 [a]
B5: I hang English worksheets in the environment where I will study English.	,163	,490	,211	,104	,024	,347	,965 [a]
C1: I use various methods to prepare for English exams or quizzes.	,115	,193	,730	,091	,200	,101	,928 [a]
C2: If I struggle with English course subjects, I get help from different sources (lecture videos, textbooks, etc.).	,122	,125	,710	,157	,091	,238	,929 [a]
C3: I review the mistakes I made in English questions or exercises.	,193	,246	,675	,046	,297	,290	,942 [a]
C4: I use various methods to check my English homework.	,341	,228	,611	,197	,082	,288	,956 [a]
C5: I get help from various sources to correct the mistakes I make in the questions in English exercises.	,260	,280	,573	,151	,148	,275	,958 [a]
D1: I use learning strategies (memorizing words, reading English books, listening to music, using similarities and associations, learning phrases, etc.) that will help me learn English.	,139	,042	,217	,783	,188	,218	,894 [a]

D2: I use online applications that teach English.	,176	,046	,009	,744	,177	,226	,850 [a]
D3: I make friends online who are native speakers of English or with whom I can chat in English.	,144	,238	,052	,727	-,058	-,137	,861 [a]
D4: I watch foreign movies to help me learn English.	,268	,156	,452	,565	,249	-,051	,947 [a]
D5: I use resources such as English movies, music, and books to improve my English.	,244	,265	,112	,554	,097	,145	,952 [a]
D6: I use different methods to help me learn English words.	,403	,114	,162	,514	,308	,267	,952 [a]
E1: Being successful in English class motivates me.	,019	,072	,116	,093	,818	,127	,876 [a]
E2: I know that learning English is necessary for me.	,151	,181	,246	,035	,785	,052	,897 [a]
E3: If I fail in English, I look for the fault in myself.	,263	-,047	,090	,228	,718	,242	,934 [a]
E4: If I fail in English, I question the reasons.	,402	,006	,149	,199	,671	,204	,926 [a]
F1: While doing English homework, I remove objects that will distract me from my study environment.	,174	,219	,258	,075	,141	,741	,946 [a]
F2: I organize my environment to study more easily while studying English.	,202	,191	,239	,129	,234	,722	,942 [a]
F3: I make sure the environment is quiet while studying English.	,223	,130	,187	,240	,311	,681	,934 [a]
F4: I ensure that my working environment is comfortable for studying English.	,160	,453	,266	,049	,064	,595	,921 [a]

After the rotation process was applied, the results in Table 6 are obtained. Accordingly, it can be seen that there are six items in the 1st factor, five items in the 2nd factor, five items in the 3rd factor, six items in the 4th factor, four items in the 5th factor, and four items in the 6th factor. The factor loadings should be at least .40. (Martens & Webber, 2002). According to Table 6, factor load values for the 30 items in the scale vary between 0.857 and 0.427. When the factor loading values on the scale are examined, it can be said that they are high since they generally have values above 0.60. The results of the anti-image correlations of the items are more than 0.5 so none of the items have been deleted (Wu, et al., 2023). The first sub-factor was named "self-awareness", the second sub-factor was named "planning", the third sub-factor was named "reviewing", the fourth sub-factor was named "using learning strategies", the fifth sub-factor was named "self-evaluation," and the sixth sub-factor was named "organizing the learning environment". Detailed information about the naming of the sub-factors is given below:

1. Self-Awareness: The first six items of the scale were related to foreign language learners' awareness of their current state in the learning process, recognizing their strengths and weaknesses. Therefore, this sub-dimension was named self-awareness.

2. Planning: Items 7 to 11 of the scale were related to the students setting short and long-term goals to guide their learning processes. Therefore, this sub-dimension was named planning.

3. Reviewing: Items 12 to 16 focused on students recognizing their learning deficiencies and modifying and improving their learning strategies when necessary. Hence, these items were categorized under the reviewing sub-dimension.

4. Using Learning Strategies: Items 17 to 22 of the scale included questions about foreign language learners applying various learning techniques to understand better and retain information. Therefore, this sub-dimension was named using learning strategies.

5. Self-Evaluation: Items 23 to 26 contained questions about helping foreign language learners identify and assess their progress, motivation levels, and sources of learning deficiencies. Therefore, this sub-dimension was named self-evaluation.

6. Organizing the Learning Environment: Items 27 to 30 included questions about students' optimizing their study environment to make it more efficient while learning a foreign language. Therefore, this sub-dimension was named organizing the learning environment.

In addition, varimax factor loading, common factor variance, item-total correlation coefficient, t scores, and significance values (p) of each sub-factor were also calculated. These values are shown in Table 7.

Table 7

Item Analysis of the SRSUS

	Items	Varimax Factor Load	Common Factor Variance	Item-total correlation coefficient	t	p
Self-awareness	A1	,749	,708	,605	10,017	0,000
	A2	,747	,740	,679	12,101	0,000
	A3	,676	,568	,542	10,924	0,000
	A4	,600	,670	,738	14,341	0,000
	A5	,564	,648	,696	13,703	0,000
	A6	,427	,400	,516	9,723	0,000
Planning	B1	,857	,801	,535	11,184	0,000
	B2	,852	,795	,531	9,840	0,000
	B3	,655	,621	,571	12,661	0,000
	B4	,574	,669	,688	15,410	0,000
	B5	,490	,442	,510	9,040	0,000

Reviewing	C1	,730	,643	,557	10,316	0,000
	C2	,710	,625	,567	9,514	0,000
	C3	,675	,727	,685	14,906	0,000
	C4	,611	,670	,698	15,282	0,000
	C5	,573	,595	,666	13,003	0,000
Using Learning Strategies	D1	,783	,764	,606	11,519	0,000
	D2	,744	,667	,496	8,493	0,000
	D3	,727	,630	,353	6,382	0,000
	D4	,565	,685	,641	11,709	0,000
	D5	,554	,480	,540	8,883	0,000
	D6	,514	,631	,693	13,335	0,000
Self-evaluation	E1	,818	,713	,440	7,327	0,000
	E2	,785	,737	,539	8,288	0,000
	E3	,718	,705	,557	9,308	0,000
	E4	,671	,715	,625	10,391	0,000
Organizing the Learning Environment	F1	,741	,719	,617	12,807	0,000
	F2	,722	,727	,664	13,279	0,000
	F3	,681	,719	,685	13,218	0,000
	F4	,595	,662	,612	13,302	0,000

According to Table 7, it can be seen that the internal consistency coefficients of the factors and their totals are high. The item-total correlation was calculated, and it is recommended that items with a value less than 0.20 shouldn't be included in the scale (Büyüköztürk, 2012, p. 171). The item-total correlation values were between .353 and .738. Therefore, no items were removed from the scale. The data from the scale were summed and ranked, and two groups of 27 % lower and 27 % higher were created. Examining the average scores provided to each item by the end groups is another use for item analysis (lower-higher group) (Tavşancıl, 2010, p. 55). The differences between their item average scores were found to be statistically significant. This demonstrates the internal consistency of the test (Büyüköztürk, 2012, p. 171). The variance and Cronbach alpha coefficients explained by each factor are given in Table 8. The Cronbach alpha coefficient indicated each factor's internal consistency reliability. Exploratory research often uses a loose cut-off of 0.60; an acceptable scale requires an alpha of 0.70 or higher, and a "good" scale requires a cut-off of 0.80 (Cohen et al., 2000).

Table 8

The Number of Items, % of Explained Variance, and Cronbach Alpha Values of the SRSUS

Sub-factors	Number of Items	% of Explained Variance	Cronbach Alpha
1st sub-factor	6	12.039	.840
2nd sub-factor	5	11.429	.862
3rd sub-factor	5	11.039	.846
4th sub-factor	6	10.895	.864
5th sub-factor	4	10.612	.872
6th sub-factor	4	10.240	.852
Total	30	66.254	.946

According to Table 8, the first sub-factor accounted for 12.039 % of the total variance, followed by the second sub-factor as 11.429 %, the third sub-factor as 11.039 percent, the fourth sub-factor as 10.895 %, the fifth sub-factor as 10.612 %, and the last sub-factor as 10.240 %. The alpha coefficient of the 1st factor (self-awareness) is 0.840, the alpha coefficient of the 2nd factor (planning) is 0.862, the alpha coefficient of the 3rd factor (reviewing) is 0.844, the alpha coefficient of the 4th factor (using learning strategies) is 0.864, the alpha coefficient of the 5th factor (self-evaluation) is 0.872, and the alpha coefficient of the 6th factor (organizing the learning environment) is 0.852. The total alpha value of the scale is 0.946. Since this value needs to be 0.70 or above, it shows that the test results are reliable (Büyüköztürk, 2012, p. 171). In this case, it can be said that the SRSUS has a very high reliability. If only a single test or a single administration is feasible, the test may be randomly divided into two halves, and the equivalence of performance between these two parts can be evaluated using the split-half method (Gipps, 2011). According to the correlation analysis conducted using this method, a correlation coefficient of .813 was found between the two halves of the test, indicating that the test can be considered reliable. The correlation coefficients of the sub-factors are shown in Table 9.

Table 9

The Correlation Coefficients of the Sub-factors

Factors	N	1st Factor	2nd Factor	3rd Factor	4th Factor	5th Factor	6th Factor
1st Factor	258	1	.555	.641	.655	.577	.258
2nd Factor	258	.555	1	.625	.474	.321	.624
3rd Factor	258	.641	.625	1	.523	.500	.666
4th Factor	258	.655	.474	.523	1	.471	.467
5th Factor	258	.577	.321	.500	.471	1	.508
6th Factor	258	.258	.624	.666	.467	.508	1

According to Table 9, it is seen that there is mostly a significant but moderate relationship between the factors. A high-level relationship is indicated by a correlation coefficient between 0.70 and 1.00, a moderate-level relationship by 0.70 and 0.30, and a low-level relationship by 0.30 and 0.00 (Büyüköztürk 2012, p. 32).

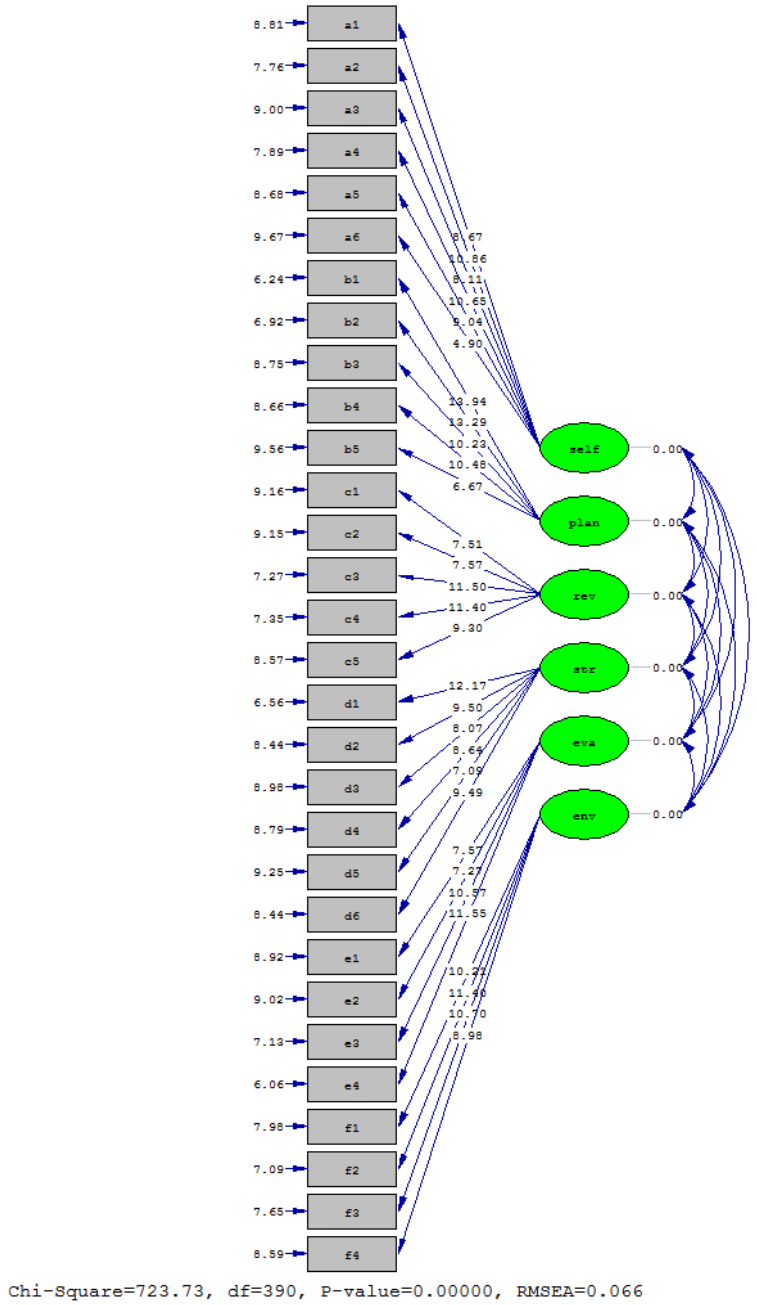
Confirmatory Factor Analysis

It was necessary for CFA to cross-validate the EFA results using a different independent sample (Dimitrov, 2012). The items in the "self-awareness" factor are displayed as a1–a6; the items in the "planning" factor are displayed as b1–b5; the items in the "reviewing" factor are displayed as c1–c5; the items in the "using learning strategies" factor are displayed as d1–d6; the items in the "self-evaluation" factor are shown as e1-e4 and the items in the "organizing the learning environment" are shown as f1-f4. CFA was carried out by taking into account 200 samples' responses. According to Harrington (2009, p. 46), a sample size greater than 200 is a potentially acceptable number for many models. The coefficients of this model tested using CFA were calculated for subscale and composite scale reliability.

CFA First Level

T values for the latent variables that account for the observed variables are indicated by the arrows on the path diagram for the SRSUS, which is displayed in Figure 3.

Figure 3. Significance Levels and t Values of the Explanation Ratios of the Observed Variables of the Latent



Variables for the SRSUS

Schermelleh-Engel, Moosbrugger, & Müller (2003) state that t values greater than 2.58 indicate significance at the 0.1 level. The x^2 statistic, comparative fit index (CFI; Bentler, 1990), non-normed fit index (NNFI; Bentler & Bonett, 1980), root mean square error of approximation (RMSEA; Steiger, 1990), and standardized root-mean-square residual (SRMR; Hu & Bentler, 1999) were used to evaluate the model fit. According to Figure 3, the SRSUS's parameter estimations are significant at the .01 level. The chi-square value is 723.73, and the df value is 390. Accordingly, $\chi 2$/df is 1.85. Compliance is at its highest level when

this ratio is smaller than 3 in large samples (Kline, 2011). RMSEA value is 0.066. The RMSEA value should be less than 0.07 to indicate a good fit level (Stieger, 2007). Therefore, the RMSEA value is at a good fit level.

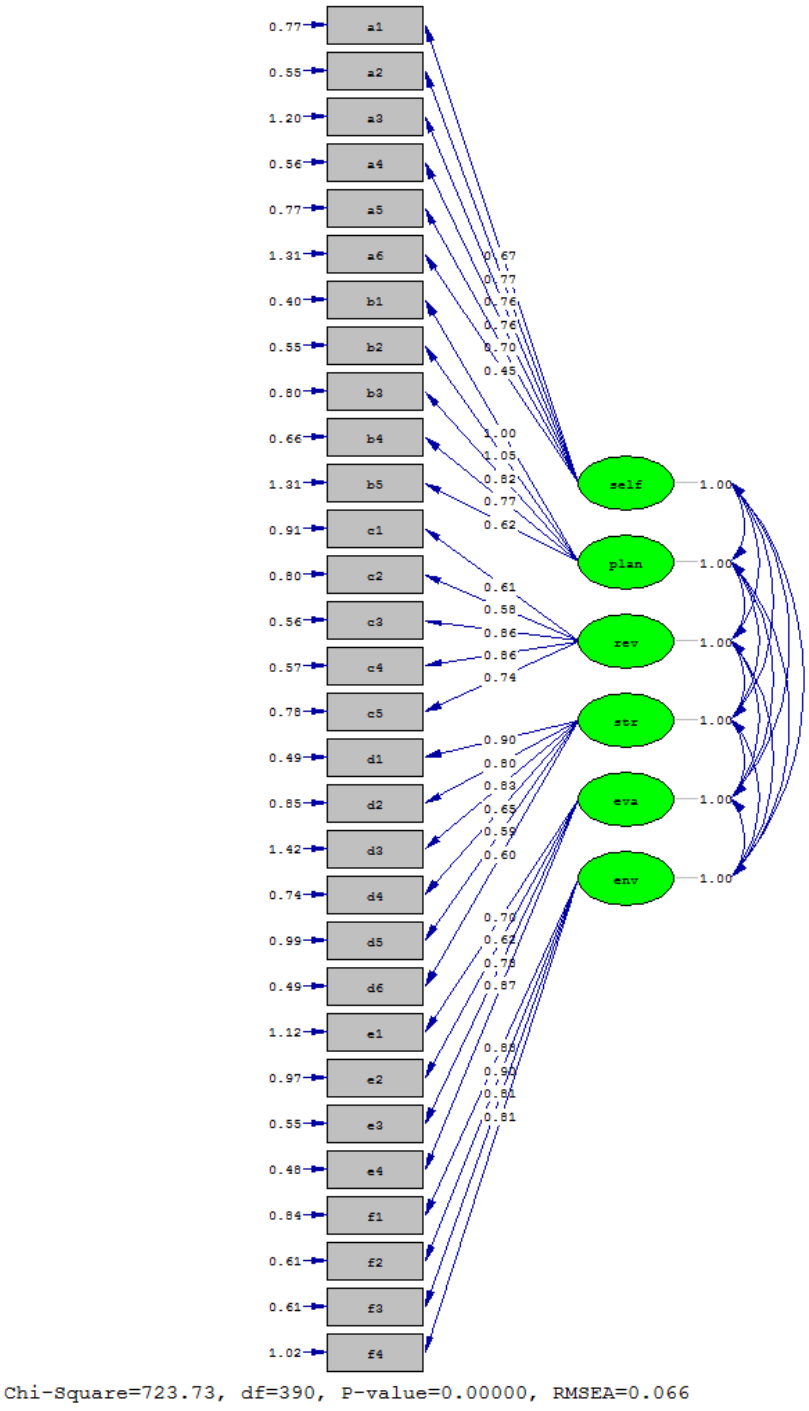


Figure 4. Error Variances in the SRSUS Path Diagram

Following an analysis of the observed variables' error variances in Figure 4, it is discovered that they are within acceptable values. In this case, the analysis included even the items with the largest error variance (1.42) (Kline, 2011).

Table 10

Goodness of Fit Indexes of the SRSUS According to the Structural Model

The goodness of fit indexes	Values of SRSUS	Perfect fit values	Acceptable fit values
χ2 /df	1.85	0 ≤ χ2 /df ≤ 2	2 < χ2 /df ≤ 3
RMSEA	.066	0 ≤ RMSEA ≤ .05	.05 < RMSEA ≤ .08
Comparative Fit Index (CFI)	.83	.97 ≤ CFI ≤ 1.00	.95 ≤ CFI < .97
Standardized RMR	.079	0 ≤ SRMR ≤ .05	.05 < SRMR ≤ .10
Goodness of Fit Index (GFI)	.80	.95 ≤ GFI ≤ 1.00	.90 ≤ GFI < .95
Adjusted Goodness of Fit Index (AGFI)	.77	.90 ≤ AGFI ≤ 1.00	.85 ≤ AGFI <.90
NNFI	.82	.97 ≤ NNFI ≤ 1.00	.95 ≤ NNFI < .97

Source: Schermelleh-Engel, Moosbrugger & Müller (2003)

According to Table 10, χ^2/df ratio is 1.85. This shows the value of perfect fit. RMSEA value is .066. The RMSEA value is, therefore, at an acceptable level. The value of CFI is .83 and is close to the acceptable fit value. According to Hu and Bentler (1999), CFI values above .95 typically indicate "good" fit. There is no clear cutoff point for CFI that would indicate "bad" fit (McDonald & Ho, 2002). The value of SRMR is .079 and it is between the acceptable fit values. The goodness of fit index indicates that the GFI, AGFI, and NNFI values are close to acceptable fit values. Although the CFI value falls below the threshold for good fit, the RMSEA value, SRMR value, and χ^2/df ratio are within acceptable ranges. Therefore, these results support the SRSUS' factor structure. All items on the scale have factor-loading values greater than 0.30. Therefore, it may be said that everything has a purpose (Sardohan Yıldırım, 2023).

CFA Second Level

In Figure 5, the significance levels of the t values of the observed variables are given after performing the second level of confirmatory factor analysis for SRSUS.

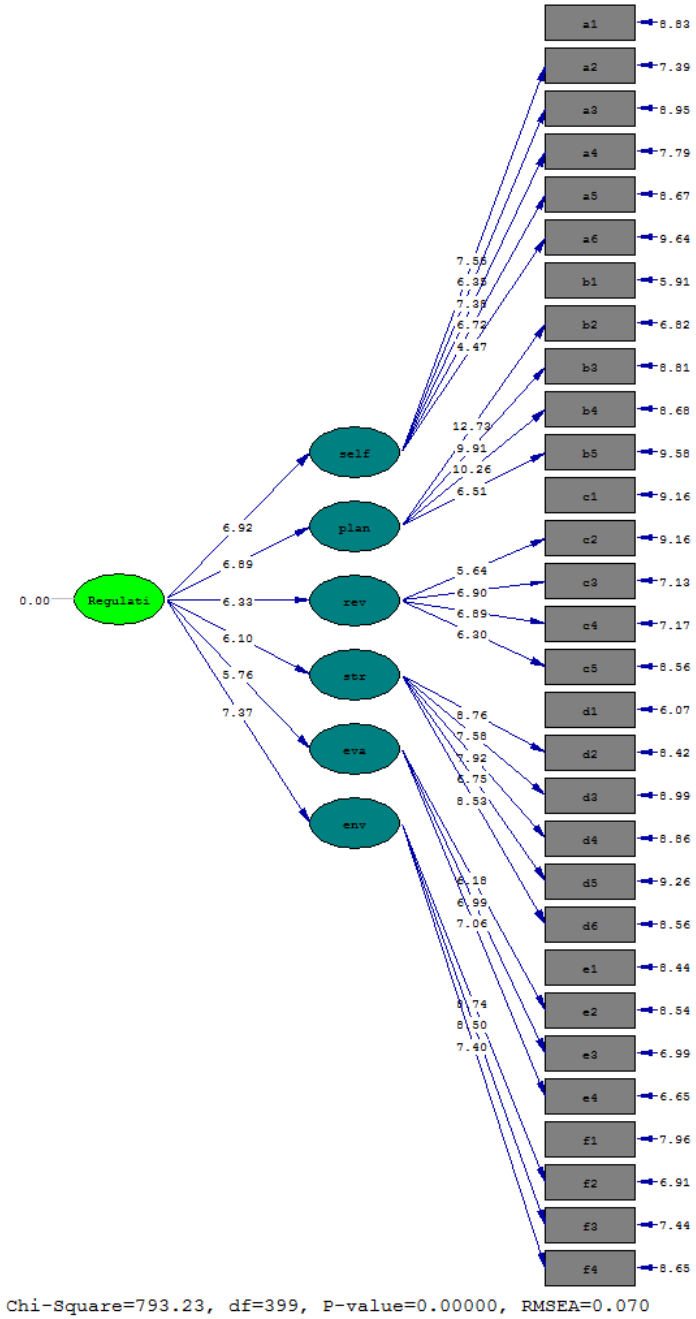


Figure 5. t Values of SRSUS according to 2nd Level of CFA

Figure 5 shows the t values of SRSUS according to 2nd Level of CFA on the arrows. The parameter estimates are significant at the .01 level. The chi-square value is 793.23, and df value is 399 in Figure 5. Accordingly, $\chi 2/df$ ratio is 1.98. Kline (2011) states compliance is perfect if the $\chi 2/df$ ratio is less than 3. RMSEA value is .070. According to Brown (2015), the RMSEA value must be near or less than 0.06. The value of CFI is .82. The value of SRMR is .089. This value has an acceptable fit, according to Table 10. NNFI value is .80, CFI value is

.82, GFI value is .79, and AGFI value is .76. According to the goodness of fit index, these values are close to acceptable ones. These findings thus support the factor structure of the SRSUS. Error variances of the 2nd level of the SRSUS in the path diagram are shown in Figure 6.

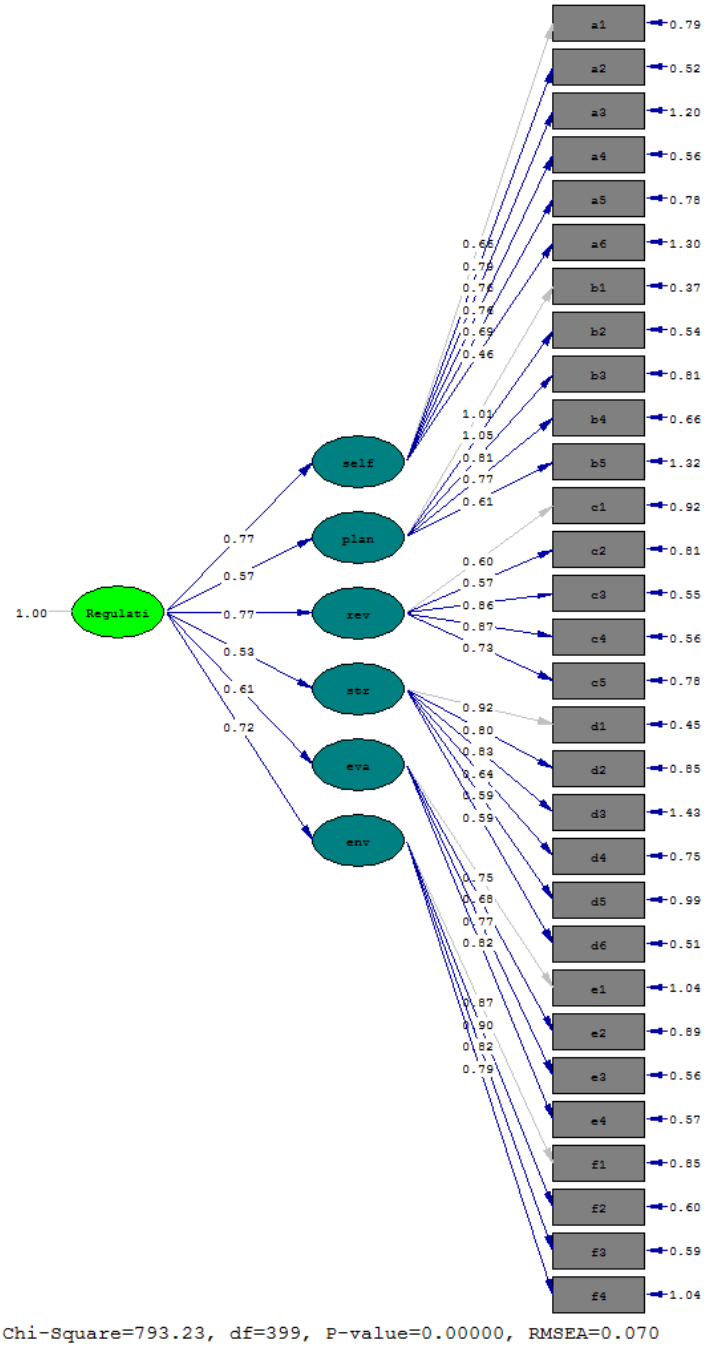


Figure 6. Error Variances in the SRSUS Path Diagram (2nd Level)

It can be seen that the error variances of the observed variables in Figure 6 are within acceptable values. Even the items with the largest error variance (1.43) were considered for the study (Kline, 2011).

DISCUSSION

This study aimed to find out which factors explain self-regulation skills in EFL learning. Therefore, the researchers developed an instrument that focuses on using self-regulation skills in learning English as a foreign language. As a result of the analysis conducted, 20 items were removed from the scale, which initially consisted of 50 items. The scale applied to 258 high school students, consisted of six sub-factors and 30 items. The Cronbach Alpha coefficient for the overall scale of 30 items was calculated as 0.946. As a result of the exploratory and confirmatory factor analysis, the scale includes six sub-factors and they explained 66,25 % of the total variance. Confirmatory factor analysis was used to ensure that the factors identified by the exploratory factor analysis were accurate and the findings of the analysis supported the factor structure. The scale's factors demonstrated internal consistency. The item total and item discrimination indexes were analyzed for each item. For the item discrimination analysis, the independent sample t-test was used to analyze the difference between the item average scores of the lower 27 percent and higher 27 percent groups formed according to the test's total scores. The difference was found to be significant in the item discrimination analysis. Finally, the developed scale, SRSUS (Self-Regulation Skills Usage Scale in EFL Learning), had 30 items. Positive correlations were found among the six factors examined in this study. Especially, "self-awareness" strongly relates to "using learning strategies", and "reviewing," which shows their close connection with each other.

According to the self-regulated learning perspective, students are believed to actively participate in their learning process. Students are expected to create meanings, objectives, and strategies using internal and external knowledge and information. Students are expected to make comparisons of their objective or criterion to determine if the learning process should continue in its form or change. Students can set learning goals, track their progress, and then modify and control their behavior and thought processes to achieve these goals (Sadler, 1989; Pintrich, 2004; Boekaerts & Cascallar, 2006). In this current study, two sub-factors called "self-awareness" and "using learning strategies" include items that emphasize students' desires, goals for learning English and the tactics they use to make learning English easy and fun. According to Pintrich (2004), the self-regulated learning perspective assumes that students can keep an eye on, manage, and control some elements of their motivation, behavior, thought processes, and some parts of their environments. In the present study, there are also items to assess the degree of students' evaluation of their performance and control on the learning environment. The sub-factor named "organizing the learning environment" included items like removing distractful objects, and making the environment quiet and comfortable. One of the key elements of effective self-regulated learning, and one considered essential for implementing learning strategies, is the capacity to self-monitor and self-evaluate the learning process and outcome (Zimmerman, Bonner, & Kovach, 1996). This study's "self-evaluation" sub-factor matched this distinctive self-regulated learning feature. It has been proposed that those good at self-regulation should

plan their approach to a task before they do it. Following the implementation of their plan, they should evaluate the procedure and results (Ertmer & Newby, 1996). In the present study, the "planning" sub-factor consisted of items related to planning study hours and time for studying English, etc.

In Moilanen's (2007) study, a 36-item adolescent self-regulatory inventory has been developed taking into short-term and long-term regulation account. It focuses on activating, monitoring, maintaining, inhibiting, and adapting adolescents' emotions, thoughts, attention, and behavior. Tsuchiya (2019) has developed a scale to measure the quality of a learner's self-regulated learning (SRL) for English as a foreign language in a higher education level. The scale comprises five factors: self-efficacy, planning, effort, self-monitoring, and evaluation/reflection. Toering et al. (2012) developed a 50-item SRL scale for general learning based on the SRL process, adding effort and self-efficacy after initially assuming the four factors of planning, self-monitoring, evaluation, and reflection. Zheng and his friends developed an Online Self-regulated English Learning scale comprising six factors: goal setting, time management, environment structuring, help-seeking, task strategies, and self-evaluation (Zheng, et al., 2018). Tseng, et al., (2017) developed a scale to assess English as a foreign language learners' self-regulatory capacity and found four factors: emotional control, goal control, awareness control, and boredom control (Tseng, et al., 2017).

In this current study, the first factor (self-awareness) consisted of 6 items; the second factor (planning) consisted of 5 items; the third factor (reviewing) consisted of 5 items; the fourth factor (using learning strategies) consisted of 6 items, the fifth factor (self-evaluation) consisted of 4 items, and the sixth factor (organizing the learning environment) consisted of 4 items. This 30-item scale was developed for high school students and is simpler than the one that Tsuchiya (2019) developed for university students. Tsuchiya (2019) categorizes his scale into three phases: forethought, performance, and self-reflection. However, the factors included in the developed scale are not named under any specific phase and show a close interrelationship. The correlations between the self-awareness factor and the reviewing factor, between the self-awareness factor and the using learning strategies factor, and between the reviewing factor and the organizing the environment factor are higher than with other factors. In fact, the correlation between the reviewing factor and the organizing the environment factor approaches a high level.

The sub-factors of this developed scale mainly parallel with the results of the study by Zheng, et al. (2018), and they have some common features, such as planning and evaluation, put forward by the studies of Tsuchiya (2019) and Toering et al. (2012). The measurement tool that Zheng et al. (2018) developed exhibits certain differences compared to the instrument developed in the present study. Unlike the current tool, it includes four items under the subfactor of goal setting, which appears to carry greater weight relative to the other subfactors. Additionally, it comprises items related to time management, thereby addressing how university students manage their time while learning English. Finally, it is

noteworthy that the instrument contains items that involve seeking assistance from others in the environment as part of efforts to enhance self-regulation skills.

LIMITATIONS AND RECOMMENDATIONS

This study is limited to assess high school students' self-regulation skills in learning English. The following recommendations are offered:

- Thanks to the developed scale, appropriate studies can be conducted to determine high school students' self-regulation skills in learning English as a foreign language.
- As a result of observations and interviews with the students, research can be conducted on the factors that positively or negatively affect self-regulation skills in learning English as a foreign language.
- Changes in students' self-regulation and its impact on many criteria variables, including achievement and attitude, can be investigated through longitudinal studies.
- In this study, convenience sampling was employed as the sampling method for all the stages, limiting the research results. For future research, it is recommended to ensure greater diversity in sample selection by utilizing different types of sampling methods and by including various rural regions of the country to enhance the generalizability of the findings.
- Furthermore, the instrument's validity can be strengthened in subsequent studies by implementing concurrent or predictive validity analyses.

CONCLUSION

This study developed a 5-point Likert-type "Self-Regulation Skills Usage Scale in EFL Learning" to determine high school students' self-regulation skills in learning English as a foreign language. In conclusion, the developed scale can be used in the literature as a valid and reliable scale to measure high school students' self-regulation skills in EFL learning. Although there are many scales and studies on self-regulation in the literature, since there is no study measuring the self-regulation skills of high school students in learning English, the SRSUS was developed. With the total score obtained from this scale, reliable results can be obtained that determine to what extent high school students use their self-regulation skills in learning English.

Future researchers are urged to modify and apply the "Self-Regulation Skills Usage Scale in EFL Learning" (SRSUS) in digital and mixed learning environments in light of the study's findings. It is crucial to assess the validity and reliability of the scale in technology-mediated situations since the nature of self-regulated learning may differ. Comparative research could also examine any variations in students' self-regulation abilities across traditional, digital, and hybrid learning settings. Researchers may also examine how different digital tools and platforms impact the use and development of self-regulation skills

in EFL instruction. Further data on how self-regulation changes in these dynamic learning environments may be obtained through longitudinal studies.

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Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the

datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

All authors, [Gürbüz Ocak], [Neşe Kaya], and [Nilda Hocaoğlu], contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

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