

The Development of the Scale of Writing for Learning: The Validity and Reliability Study

Research Article

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ABSTRACT

The aim of this study is to develop a valid and reliable scale that can be used in determining the perspectives of secondary school students and teacher candidates about using writing as a learning tool. After studies such as scale expert opinions and the evaluation of intelligibility, the scale was conducted to two separate sample consisting of 158 middle school students and 325 teacher candidates. Exploratory and confirmatory factor analyses were performed in order to determine the construct validity of the scale. According to the exploratory factor analysis results; for the middle school sample, the scale consisted of three factors including: Writing as a Learning Tool, Avoidance of Studying by Writing, Writing as a Note Taking Tool with a total of 15 five-Likert type items and for the teacher candidates sample, the scale consisted of three factors including: Writing as a Learning Tool, Difficulty of Studying by Writing, Avoidance of Studying by Writing with a total of 16 five-Likert type items. For the both samples, the three-factor construct of the scale was confirmed by confirmatory factor analysis. The research findings indicated that the Writing for Learning Scale was a valid and reliable scale.

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Keywords:

Writing across curriculum, learning tool, scale development, middle school, teacher candidates

Introduction

Writing is a way of and many different purposes like expressing oneself, communication, transferring information from generation to generation for centuries. From past to present, there have been many different symbols and tools used for writing. Although the occurrence place of writing was accepted as Mesopotamia due to the presence of written clay tablets of the B.C. 3000s, writing began to be used in the regions where the human population started to increase and great civilizations were established. Being used in many different regions is an evidence of the importance of writing in human life (MacGregor, 2017).

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Professor John R. Searle mentioned following statements while analyzing the effect of writing on human consciousness: “If you think of writing as something that only transfers information to the future, then you have not fully understood the meaning of the revolution that comes with it. Writing is an important tool for generating complex ideas. Words have limitation during speaking. You cannot generate complex ideas without taking notes and reviewing them. On the other hand, writing is creative, and when you write, you do not record anything that already exists, you create new things: money, institutions, states, complex forms of society. Writing is indispensable for them” (MacGregor, 2017, p. 94).

With the discussion of the effect of writing on complex thinking and creativity skills, studies on the systematic use of writing as a learning tool, were started in many countries, especially in US and UK since the 1970s. James Britton's studies on writing in Britain in the 1970s revealed that the focus of writing in schools narrowed towards knowledge transferred rather than motivated to think and understand. In addition to this, a group of British educators and researchers have suggested that writing should be integrated with education in all subject areas (Britton, Burgess, Martin, McLeod, ve Rosen, 1975 as cited in Bazerman et al., 2005). According to Emig (1977), the American writing theorist, writing represents not only a useful and specific but also a unique learning method. Contemporary psychologists such as Lev Vygotsky, AR Luria and Jerome Bruner defined that high-level cognitive characteristics such as analysis and synthesis for heuristical “writing” may be developed not only by verbal language, but also by written language. In the light of the ideas of British researchers, Janet Emig (1977) published an article titled as “Writing as a Learning Method” which inspired the development of writing curriculums known as WAC-Writing across curriculum (Tynjälä, Mason & Lonka, 2001).

The mentioned article of Emig, revealed that writing has a strong relationship with learning. According to Emig, learning requires an active, personal and self-regulated structure of organized conceptual relations, which are purified by feedback. Moreover, the same features characterize the text. Writing also requires active organization of personal insights. The similar structure of writing and learning led Emig to hypothesize writing as a unique way of learning. Because, writing, as a process and a product, requires a set of qualities that uniquely corresponded to certain powerful learning strategies (Emig, 1977).

After Emig's studies, the number of WAC-like curriculums (writing in disciplines, writing in the field of learning, language and learning) has increased significantly in all levels of education, from primary school to university (Herrington & Moran, 1992 as cited in Bazerman et al., 2005). Young (2006) defined cross-curricular writing as the use of writing by the student to develop and share knowledge in a discipline or between disciplines. The most important aspect of WAC and its similar curricula are that emphasizing writing as a learning method besides communication.

WAC can be seen as a curriculum designed to provide opportunities for students to write, review and discuss what they write in every course, regardless of their field of expertise and interests. The basic philosophy of WAC is to ensure that students can learn more by writing repeatedly and thus become better thinkers who can communicate better (PennState, 2018). This strategy, which has effects for nearly fifty years, has been implemented at all levels of education, from primary to university. Writing-for-learning or learning-oriented writing activities, which are widely practiced throughout the world today, have emerged as a reflection of WAC.

Writing for Learning or Learning-Oriented Writing

The importance has been given to the use of writing in learning processes increased after Aguirre, 2018 found that writing activates different parts of the brain. While some studies on writing and the effect of writing on the learning process revealed that writing had a positive effect on learning, some studies showed the non-significant effect of writing (Geisler 1994; Schumacher & Gradwohl Nash 1991, Tynjälä, 1998).

Some research revealed that writing is less effective than studying for an exam when the aim of the study is only memorizing information (Penrose, 1992). However, this shows that writing has no effect on memorization. According to Piolat (2007), research reveal that writing internally encourages the individual to memorize. However, in this case, the individual memorizes the points chosen and considered important by his/herself, not the same information included by the source (Faber, Morris, & Lieberman, 2000; Morgan, Slotte & Lonka, 1999; Spires, 1993). Besides, writing is an effective tool for learning when high-level learning such as critical, creative or reflective thinking is aimed (Tierney, O'Flahavan, & McGinley 1989). According to Weinstein and Mayer (1986), writing can stimulate and support the use of cognitive learning strategies. It also helps to synthesize information, examine relationships and results, and create conceptual frameworks and outlines. In general, writing is an effective learning tool when the aim is to improve understanding, change students' ideas, and improve their thinking skills, but it is less effective when the goal is to simply accumulate / memorize knowledge (Schumacher & Gradwohl Nash 1991).

According to Tynjälä (2001), writing is a tool that combines theoretical and practical knowledge. Since it is effective in the production of spontaneous ideas, before the writing process begins, it is not known exactly how the final form of writing will be (Klein, 1999). The studies of writing for learning have an important contribution to learning process by creative and constructivist effect of writing. Writing for learning develops individuals' systematic, critical, creative and reflective thinking skills, and communication and working skills (Tynjälä, 1998); and also transforms ideas into more consistent and grounded knowledge (Rivard & Straw, 2000). By increasing the permanence of scientific knowledge, it helps to establish a link between old and new knowledge. According to Tynjälä (2001), this helps individuals to control their learning processes. This effect of writing on learning shows that it can be used not only in disciplines such as Turkish and Literature where writing is frequently used and but also in many other disciplines. The related literature shows that writing can be used for learning in various disciplines such as science, mathematics and history from primary to higher education (Ackerman, 1993; Bangert-Drowns, Hurley, & Wilkinson, 2004; Klein, 1999).

Considering the impact of writing on learning, it is becoming more and more important in today's world to be used not only as a means of communication but also as a means of making information permanent, creating new information and questioning. It is necessary to show that students do not only use writing in compulsory situations (exam, note taking during lectures, etc.) but also, they can use writing to deepen their understanding in any subject or content area. The use of writing as a learning tool is considered important both in terms of increasing the quality of teaching and achieving the objectives of the curriculum. However, in order to use writing as a learning tool, the views of teachers and students about writing and using writing as learning tool are very important. Primary school is accepted as a formal period in which writing is planned and programmed. The first years of primary school are the periods in which writing is learned, and the next years are the periods in which writing skills develop and feelings and thoughts are written down on an independent level (Kodan, 2016). In these years, students focus on learning to write rather than using writing as a learning tool. In secondary school years, instead of learning to write, the use of writing as transferring feelings and thoughts on paper emerges (Kodan, 2016; Temur, 2009). Teachers are the others who have important roles in writing. They use writing for transferring their feelings and thoughts and also help students to use writing as a learning tool. According to Öztürk and Günel (2015), teachers' correct use of writing for learning purposes in their classroom practices helps to improve students' conceptual understanding, expressing and developing their feelings and thoughts, and linking their newly acquired knowledge with their old knowledge. In this context, it is important to determine the opinions of both students and teacher candidates of education faculty about using writing as a learning tool. In this study, it was aimed to develop a scale to determine the perspectives of secondary school students and teacher candidates about using writing as a learning tool.

Method

The information about participants of the study, development process of the data collection tool and data collection, and the analysis are presented in the following part of this study aims to develop a scale in order to determine the perspectives of secondary school students and teacher candidates about using writing as a learning tool.

Participants

It is mentioned that the sample size should be at least five or ten times larger than the number of items in the scale in factor analysis studies, (Tavşancıl, 2019). Accordingly, for the 18-item scale, the number of participants in the study should be at least 90. In this respect, the participants of the study consist of 158 (167) middle school students studying in 6th, 7th and 8th grades of a secondary school in Kırıkkale city center in the first semester of 2018-2019 academic year and 325 (330) teacher candidates studying in undergraduate programs in different departments of the Faculty of Education of Kırıkkale University in the second semester of 2018-2019 academic year. Information on gender, class and departments of the participants are presented in Table 1.

Table 1. Demographic Information of Participants

Middle School Sample	f	%
Gender		
Female	87	55.1
Male	71	44.9
Grade		
6th grades	53	33.5
7th grades	56	35.4
8th grades	49	31
Total	158	100
Teacher Candidates Sample		
	f	%
Gender		
Female	241	74.2
Male	84	25.8
Grade		
1th grades	145	44.6
2th grades	105	32.3
3th grades	75	23.1
Department		
Science Education	45	13.8
Mathematics Education	19	5.8
<u>Computer and Instructional Technologies Education</u>	30	9.2
Guidance and Psychological Counselling	50	15.4
Preschool Education	38	11.7
Primary Education	62	19.1
<u>Social Studies Education</u>	37	11.4
Turkish Education	44	13.5
Total	325	100

Development of Data Collection Tool

An item pool of 37 items was developed by the researcher based on the scales used for writing as a learning tool (Balachandran, Venkatesaperumal, Clara, & Shukri, 2014; Daly & Miller, 2013; Dobie & Poirrier, 1996; Hall, 2016) and the other related studies on the subject in the literature. The first version of the scale was prepared with the items selected from the item pool. This initial version was expertized by a group of thirteen academicians from different areas as assessment and evaluation, educational management, curriculum and teaching, classroom teaching, science education, guidance and psychological counseling and Turkish education, in order to assess the content validity, comprehensibility in terms of language and expression, and the similarity of the items. Necessary arrangements were made in line with the suggestions from the experts and then the scale was presented to the opinion of a group of 15 students and 20 teacher candidates in order to evaluate the features such as comprehensibility and easy response. In line with all the recommendations, 19 items which were not suitable or overlapping were removed from the scale and made ready for implementation by finalizing the scale.

Data Collection

The 18 itemed scale with a five-point Likert-type as “1-Never”, “2-Rarely”, “3-Occasionally”, “4-Usually” and “5-Strongly Agree” was conducted to 330 teacher candidates and 167 students. During this process, the researcher informed the participants about the scale and asked them to fulfill the scale completely. The participants answered the scale in between 15-20 minutes. 158 of the scales applied to secondary school students and 325 of the scales applied to teacher candidates could be used for analysis, and nine students and five teacher candidates' scales were excluded because of being outlier or missing data.

Data Analysis

In order to examine the construct validity of the scale, exploratory factor analysis based on the principal component analysis method was performed. In the exploratory factor analysis, 0.30 was adopted as the lower limit of the factor load value in deciding whether or not the items remained on the scale. According to Büyüköztürk (2017), a factor load value of 0.45 or higher is acceptable for included by the scale. However, for a small number itemed scale, this limit can be drawn up to 0.30. In the related literature, there is a widespread opinion that a factor loading should be at least 0.30, but there are also those who argue that this loading may be different (Şencan, 2005). According to Tabachnick and Fidell (2001), the factor loading value of each variable should be 0.32 and above as a rule of thumb. Comrey and Lee (1992) suggested that if a factor loading can be accepted as “excellent” if the value is 0.71 (explains 50% of the variance), as “very good” if it is 0.63 (explains 40% of the variance), as “good” if it is 0.55 (explains 30% variance), as “moderate” if it is 0.45 (explains 20% of the variance), and as “weak” if it is 0.32 (explains 10% of the variance). Therefore, in this study, 0.30 was accepted as the lower limit for deciding to keep the items on the scale.

Confirmatory factor analysis was performed in order to confirm that the structure revealed by exploratory factor analysis is acceptable. CFA is an analysis in which a predetermined and confined structure is tested as a model and is used to evaluate the construct validity (Floyd & Widaman, 1995; Kline, 2010; Maruyama, 1998). As a result of the CFA, more than one index is obtained and it is appropriate to evaluate more than one index rather than a single index to evaluate whether the model is validated or not (Jöreskog & Sörbom, 1993; Marsh & Hocevar, 1988). The confirmatory factor analysis results of the Scale of Writing for Learning were evaluated by considering χ^2/df ratio, GFI, RMSEA, SRMR, CFI and NNFI goodness of fit indices. The Cronbach-Alpha, internal consistency coefficient, was calculated in order to determine the reliability of The Scale of Writing for Learning.

Findings

Exploratory and confirmatory factor analysis were performed to examine the construct validity of the Scale of Writing for Learning. The exploratory and confirmatory factor analysis were applied separately to the data obtained from secondary school students and teacher candidates. This part firstly represents the data about the sample of secondary school students and then the sample of the teacher candidates.

Findings Related to Secondary School Sample

In order to test whether the factor analysis can be conducted or not, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett sphericity test values were calculated. KMO value provides information about the sample adequacy, and The Bartlett Sphericity test analysis whether the variables correlate with each other or not. The fact that KMO value is higher than 0.60 and Bartlett test is significant shows that the data are suitable for factor analysis (Büyüköztürk, 2017). The results (KMO = 0.89; $\chi^2 = 922.223$; $p = 0.00$) showed that the collected data was suitable for factor analysis.

Results of exploratory factor analysis

Principal component analysis was performed with the 18 itemed-scale. The eigenvalue graph indicated that the scale had a 4-factor structure and these factors explained 55.11% of the total variance. It is accepted that the factor loadings of the items to be included in each factor in the scale are 0.30 and above. If the factor loading of an item are very close to each other at different factors, it is recommended to remove that item from the scale (Bryman & Cramer, 2001; Büyüköztürk, 2017). During the analysis an item with a factor loading value below 0.30 was not determined on the scale. In addition, it was determined that three items in the scale were found to be under more than one factor and showed overlapping properties. Therefore, three items (2, 8, 17) were excluded from the scale. Factor analysis was performed again with the remaining items. As a result of the analysis, it was found that the scale had a three-factor structure and explained 50.51% of the total variance. The factor loading values of the items ranged between 0.42 and 0.79. In Table 2, the factor structure obtained from the exploratory factor analysis of the Scale of Writing for Learning, the eigenvalues of the factors, the variance ratios explained and the factor loading values rotated by the Direct Oblimin method of the items are presented.

Table 2. The Results of The Exploratory Factor Analysis of The Scale of Writing for Learning (Sample of Secondary School)

Factor 1 Writing as a Learning Tool		Rotated Factor Loading Values
1	I understand the subject more easily when I study by writing.	0.52
10	Seeing my thoughts on paper makes it easier for me to organize them.	0.42
12	When I write, I think that I repeat the subject.	0.63
13	Studying by writing helps me to focus.	0.69
14	I become aware of my shortcomings when I share my writings with others.	0.59
15	When I study by writing I get feedback on how much I understand the subject.	0.62
16	I can visualize information more easily when I study by writing.	0.56
18	I think writing improves my success.	0.76
Eigenvalue: 5.05 Explained variance: % 33.68		
<i>Factor 2 Avoidance of Studying by Writing</i>		
4	I have trouble while writing to summarize a topic.	0.79
9	I think I've lost time when I study by writing.	0.49
11	I find it difficult to write my ideas in a clear way.	0.74
Eigenvalue: 1.31 Explained variance: % 8.74		
<i>Factor 3 Writing as a Note Taking Tool</i>		
3	I summarize to identify important points while studying.	0.67

5	Before I start writing, I write short notes to outline what I will write.	0.78
6	I write and take notes to learn a topic.	0.69
7	I think what I have learned is more permanent, when I study by writing.	0.60
Eigenvalue: 1.21 Explained variance: % 8.08		

As a result of the exploratory factor analysis, which was used to measure the students' use of writing for learning purposes, it was seen that the scale consists of 3 factors. Considering the items in each dimension of the scale, the factors were given as: First Factor: Writing as a Learning Tool, Second Factor: Avoidance of Studying by Writing, Third Factor: Writing as a Note Taking Tool.

As can be seen in Table 2, "Writing as a Learning Tool", which is the first dimension of The Scale of Writing for Learning, has 8 items and factor loading values of items vary between 0.42 and 0.76. The variance explained by this factor is 33.68%. In the second dimension of the scale, "Avoidance of Studying by Writing", there were three items and the factor loading values of the items ranged between 0.49 and 0.79. The variance explained by this factor is 8.74%. In the third dimension of the scale, "Writing as a note-taking tool", there are four items and factor loading values of the items vary between 0.60 and 0.78. The variance explained by this factor is 8.08%. The total variance explained by three different factors is approximately 50%. Scherer, Wiebe, Luther and Adams (1988) stated that the variance rates in Social Sciences ranging from 40% to 60% were acceptable (as cited in Tavşancıl, 2019).

Results of confirmatory factor analysis

In addition to the exploratory factor analysis conducted to examine the construct validity of the scale, confirmatory factor analysis (CFA) was performed to determine the extent to which the observed data fit the three-factor model. Confirmatory factor analysis aims to assess the degree of fit of a model of proposed factors (latent variables) with real data (Şimşek, 2007).

One of the ways to define the model's fit to the data is to calculate the ratio of Chi-Square to the degree of freedom. The ratio below 5 and equal to 5 is considered as an acceptable value (Kline, 2010; Sümer, 2000). Other commonly used indices are Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Residual (RMR), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI). GFI, AGFI, NFI, NNFI and CFI values of 0.90 and above are good fit (Hooper, Coughlan & Mullen, 2008; Hu & Bentler, 1999; Sümer, 2000; Thompson, 2004); RMR, SRMR or RMSEA value of 0.05 and below is considered to be perfect fit, 0.08 and below is accepted as moderate fit (Brown, 2006; Raykov & Marcoulides, 2008).

Table 3. Fit Statistics for Factor Structure

Fit Indices	Value
χ^2/df	0.97
GFI	0.93
AGFI	0.90
RMSEA	0.00
RMR	0.089
SRMR	0.051
CFI	1.00
NFI	0.93
NNFI	1.00

The correlation matrix of 15 items was used as the data of CFA. The fit indices presented in Table 3 show that the observed data fit well to the proposed three-dimensional model. The ratio calculated by confirmatory factor analysis (χ^2 / df) is 0.97 and this value shows that the proposed factor model fits with the

data (Kline, 2010). The indices of GFI equals to 0.93, AGFI equals to 0.90, CFI equals to 1.00, NFI equals to 0.93, NNFI equals to 1.00, RMR value equals to 0.089, SRMR value equals to 0.051 and RMSEA value equals to 0.00 show that the model has a three-factor structure. The coefficients of item-factor relationships calculated by confirmatory factor analysis are illustrated in Figure 1.

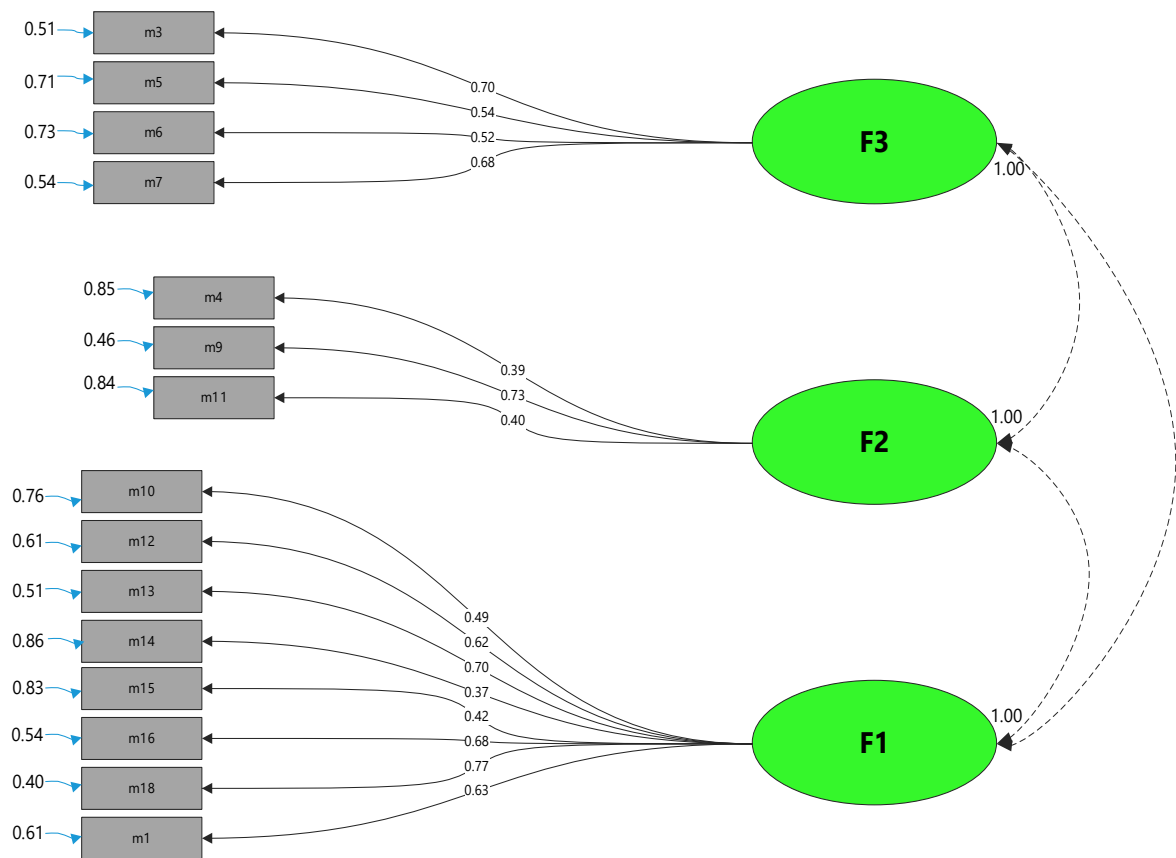


Figure 1. The Item-Factor Relationship of the Scale of Writing for Learning

As shown in Figure 1, path coefficients vary between 0.37 and 0.77. According to Şimşek (2007), values of 0.30 and above can be considered as moderate level. It is seen that all values given in the model are between 0.40-0.86 so the model is acceptable.

Findings Related to Teacher Candidates Sample

In order to test whether the factor analysis can be conducted or not, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett sphericity test values were calculated. KMO value provides information about the sample adequacy, and The Bartlett Sphericity test analysis whether the variables correlate with each other or not. The results (KMO = 0.91; $\chi^2 = 2751.491$; $p = 0.00$) showed that the collected data was suitable for factor analysis.

Results of exploratory factor analysis

Principal component analysis was performed with the 18 itemed-scale. The eigenvalue graph indicated that the scale had a 4-factor structure and these factors explained 61.29% of the total variance. During the analysis an item with a factor loading value below 0.30 was not determined on the scale. In addition, it was determined that three items in the scale were found to be under more than one factor and showed overlapping properties. Therefore, three items (5, 15) were excluded from the scale. Factor analysis was performed again with the remaining items. As a result of the analysis, it was found that the scale had a three-factor structure

and explained 58.78% of the total variance. The factor loading values of the items ranged between 0.42 and 0.86. In Table 4, the factor structure obtained from the exploratory factor analysis of the Scale of Writing for Learning, the eigenvalues of the factors, the variance ratios explained and the factor loading values rotated by the Direct Oblimin method of the items are presented.

Table 4. The Results of The Exploratory Factor Analysis of The Scale of Writing for Learning (Sample of Teacher Candidates)

Factor 1 Writing as a Learning Tool		Rotated Factor Loading Values
1	I understand the subject more easily when I study by writing.	0.86
2	Studying by writing and taking notes make it easier to remember topics.	0.85
3	I summarize to identify important points while studying.	0.56
6	I write and take notes to learn a topic.	0.75
7	I think what I have learned is more permanent, when I study by writing.	0.86
8	I organize my thoughts and ideas more easily when I write.	0.68
10	Seeing my thoughts on paper makes it easier for me to organize them.	0.60
12	When I write, I think that I repeat the subject.	0.81
13	Studying by writing helps me to focus.	0.85
14	I become aware of my shortcomings when I share my writings with others.	0.32
16	I can visualize information more easily when I study by writing.	0.76
18	I think writing improves my success.	0.76
Eigenvalue: 6.86 Explained variance: % 42.89		
<i>Factor 2 Difficulty of Studying by Writing</i>		
4	I have trouble while writing to summarize a topic.	0.74
11	I find it difficult to write my ideas in a clear way.	0.81
Eigenvalue: 1.45 Explained variance: % 9		
<i>Factor 3 Avoidance of Studying by Writing</i>		
9	I think I've lost time when I study by writing.	0.81
17	I avoid studying by writing.	0.60
Eigenvalue: 1.08 Explained variance: % 6.78		

As a result of the exploratory factor analysis, which was used to measure the students' use of writing for learning purposes, it was seen that the scale consists of 3 factors. Considering the items in each dimension of the scale, the factors were given as: First Factor: Writing as a Learning Tool, Second Factor: Difficulty of Studying by Writing, Third Factor: Avoidance of Studying by Writing.

As can be seen in Table 4, "Writing as a Learning Tool", which is the first dimension of The Scale of Writing for Learning, has 12 items and factor loading values of items vary between 0.32 and 0.86. The variance explained by this factor is 42.89%. In the second dimension of the scale, "Difficulty of Studying by Writing", there were two items and the factor loading values of the items ranged between 0.74 and 0.81. The variance explained by this factor is 9%. In the third dimension of the scale, "Avoidance of Studying by Writing", there are two items and factor loading values of the items vary between 0.60 and 0.81. The variance explained by this factor is 6.78%. The total variance explained by three different factors is approximately 59%.

Results of confirmatory factor analysis

In addition to the exploratory factor analysis conducted to examine the construct validity of the scale, confirmatory factor analysis (CFA) was performed to determine the extent to which the observed data fit the three-factor model.

Table 5. Fit Statistics for Factor Structure

Fit Indices	Value
X ² /sd	3.30
GFI	0.89
AGFI	0.85
RMSEA	0.084
RMR	0.034
SRMR	0.046
CFI	0.96
NFI	0.95
NNFI	0.96

The correlation matrix of 16 items was used as the data of CFA. The fit indices presented in Table 5 show that the observed data fit well to the proposed three-dimensional model. The ratio calculated by confirmatory factor analysis (χ^2 / df) is 3.30 and this value shows that the proposed factor model fits with the data (Şimşek, 2007). The indices of GFI equals to 0.89, AGFI equals to 0.85, CFI equals to 0.96, NFI equals to 0.95, NNFI equals to 0.96, RMR value equals to 0.034, SRMR value equals to 0.046 and RMSEA value equals to 0.84 show that the model has a three factor structure. The coefficients of item-factor relationships calculated by confirmatory factor analysis are illustrated in Figure 2.

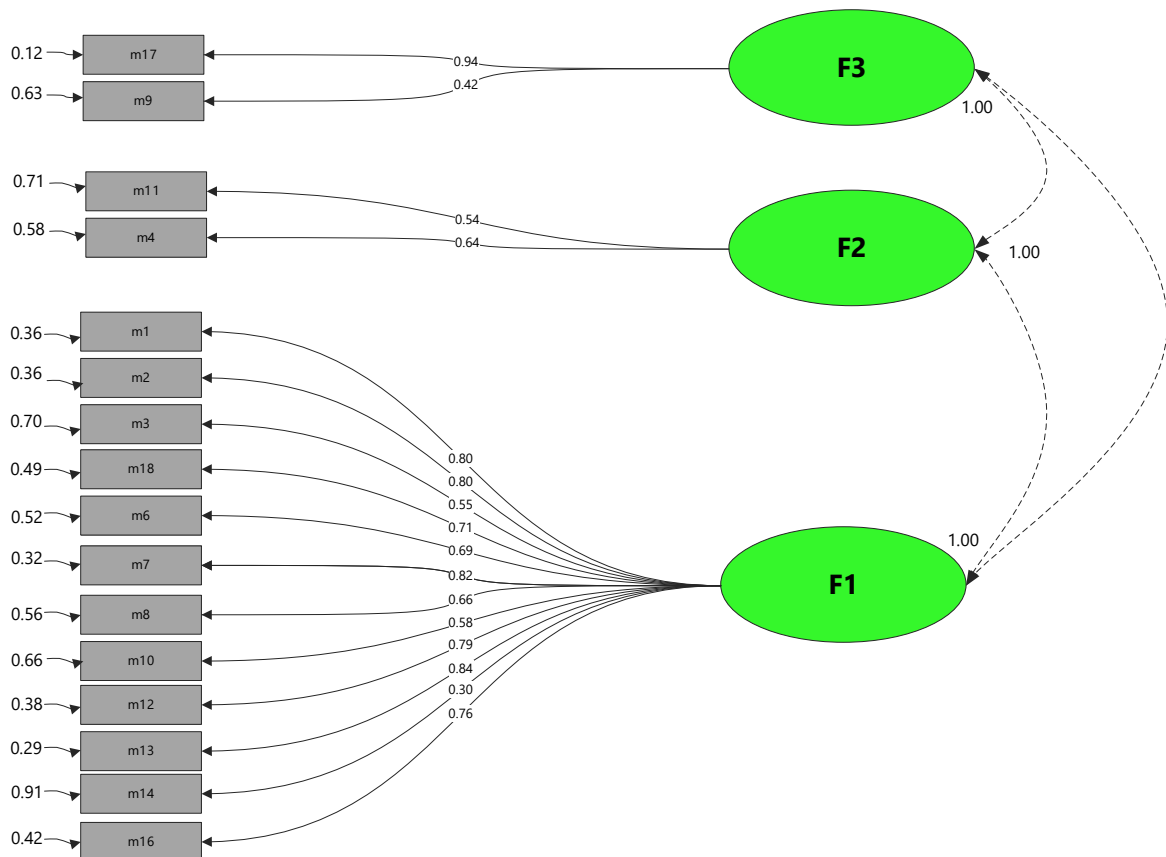


Figure 2. The Item-Factor Relationship of the Scale of Writing for Learning

According to Kline (2010), values of 0.30 and above can be considered as moderate level. As shown in Figure 2, all values given in the model are between 0.30-0.94 so the model is acceptable.

Findings of the Reliability Analysis of the Scale of Writing for Learning

In order to investigate the construct reliability of the scale, composite reliability and average variance extracted coefficients was determined and a correlation analysis of the internal consistency evaluated with Cronbach's alpha was performed. Table 6 and 7 presents the composite reliability and average variance extracted coefficients and Cronbach-Alpha internal consistency coefficients, which are calculated to determine the reliability of the Scale of Writing for Learning for the secondary school and teacher candidates samples.

According to Hair, Black, Babin and Anderson (2019, p. 775), the composite reliability coefficient between .60 and .70 is seen as an acceptable value, whereas it is seen as a satisfactory value between .70 and .95. A value above .95 indicates that reliability is unrealistic and is not an acceptable value. The average variance extracted coefficient explained .50 and above is seen as an acceptable value. However, according to Fornell and Larcker (1981), if the composite reliability coefficient is .60 and above, the values of .40 and above are also accepted for the average variance extracted coefficient.

Cronbach Alpha coefficients below 0.40 indicate that the scale is not reliable, the coefficients between 0.40 and 0.59 indicate low reliability, the coefficients between 0.60 and 0.79 indicate good reliability, and the coefficients between .80-1.00 indicate high reliability (Tabachnick & Fidell, 2007; Tavşancıl, 2019). According to Child (2006), the Cronbach's Alpha values greater than 0.60, and according to Sipahi, Yurtkoru and Zinko (2008) the values of 0.70 and above, and for the dimensions include small number of questions, the values 0.60 and above indicate that the scale is reliable.

Table 6. The Composite Reliability, Average Variance Extracted and Cronbach-Alpha Internal Consistency Coefficients of The Scale of Writing for Learning (The Sample of Secondary School)

The Scale of Writing for Learning	Composite Reliability Coefficients	Average Variance Extracted Coefficients	Cronbach-Alpha Internal Consistency Coefficients
Total Scale			0.83
F1 Writing as a Learning Tool	0.82	0.37	0.80
F2 Avoidance of Studying by Writing	0.72	0.47	0.53
F3 Writing as a Note-taking Tool	0.72	0.47	0.70

Table 6 indicated that the combined reliability coefficients of The Scale of Writing for Learning in the secondary school sample are above .70, but the average variance extracted coefficients are below .50. However, the high combined reliability coefficients indicate that the average variance extracted above .40 is acceptable. The Cronbach-alpha internal consistency coefficient of the dimension of "Writing as a Learning Tool", which is the first dimension of the scale, is 0.80. For the second dimension named "Avoidance of Studying by Writing" it is equal to 0.53, and for the third dimension, "Writing as a Note-taking Tool", it is 0.70. The Cronbach-alpha internal consistency coefficient for the overall scale was 0.83. It is seen that the coefficients vary between 0.53 and 0.83 for the overall scale and sub-dimensions. The internal consistency coefficients were found to be high in reliability; and the reliability of the sub-dimensions is moderate. In the second dimension, "Avoidance of Studying by Writing", the low coefficient can be attributed to the presence of a small number of items under this dimension. It can be said that the scale has a reliable structure in accordance with the composed reliability, the average variance extracted and the Cronbach-alpha internal consistency coefficients.

Table 7. The Composite Reliability, Average Variance Extracted and Cronbach-Alpha Internal Consistency Coefficients of The Scale of Writing for Learning (The Sample of Teacher Candidates)

The Scale of Writing for Learning	Composite Reliability Coefficients	Average Variance Extracted Coefficients	Cronbach-Alpha Internal Consistency Coefficients
Total Scale			0.82
F1 Writing as a Learning Tool	0.93	0.54	0.91
F2 Difficulty of Studying by Writing	0.75	0.60	0.51
F3 Avoidance of Studying by Writing	0.77	0.51	0.56

Table 7 showed that the combined reliability coefficients of The Scale of Writing for Learning in the secondary school sample are above .70 and the average variance extracted coefficients are below .50. The Cronbach-alpha internal consistency coefficient of the dimension of "Writing as a Learning Tool", which is the first dimension of the scale, is 0.91. For the second dimension named "Difficulty of Studying by Writing" it is equal to 0.51, and for the third dimension, "Avoidance of Studying by Writing", it is 0.56. The Cronbach-alpha internal consistency coefficient for the overall scale was 0.82. It is seen that the coefficients vary between 0.51 and 0.91 for the overall scale and sub-dimensions. The internal consistency coefficients were found to be high in reliability; and the reliability of the sub-dimensions is moderate. In the second dimensions, "Difficulty of Studying by Writing" and "Avoidance of Studying by Writing", the low coefficient can be attributed to the presence of a small number of items (2) under these dimensions. It can be said that the scale has a reliable structure in accordance with the composed reliability, the average variance extracted and the Cronbach-alpha internal consistency coefficients.

Conclusion and Discussion

In this study, it is aimed to develop a valid and reliable data collection tool which can be used to determine the use of writing as a learning tool by secondary school students and teacher candidates. Initially prepared 18 itemed Scale of Writing for Learning was conducted to two separate groups consisting of secondary school students and teacher candidates. The validity and reliability analysis of the scale were performed on the data obtained during the construction process of the scale. For the secondary school sample, as a result of exploratory factor analysis, it was determined that the items loaded into three factors: Writing as a Learning Tool, Avoidance of Studying by Writing, and Writing as a Note Taking Tool. Three items were excluded from the scale due to their high factor loading values in more than one factor. It was determined that for the sample of teacher candidates, the items loaded on three factors as Writing as a Learning Tool, Difficulty in Studying by Writing, and Avoiding Studying by Writing. Two items were also excluded from the scale due to their high factor loading values at more than one factor.

Confirmatory factor analysis was conducted to the data gathered from exploratory factor analysis of the 15 itemed-scale for the secondary school sample and 16 itemed-scale for the sample of teacher candidates. As a result of the confirmatory factor analysis of the Scale of Writing for Learning for both samples, χ^2 / df ratio, GFI / AGFI, RMSEA, RMR / SRMR, CFI and NFI / NNFI fit indices were evaluated and all of the indices were adequately adjusted for model fit. As a result, it was decided that these structures were adequate for both samples. In addition, the internal consistency coefficients indicate that the reliability of the scale is acceptable.

The final version of the scale consists of 15 items for the sample of Secondary School and 16 items for the sample of teacher candidates. All the items are scored as 1-Never, 2-Rarely, 3-Occasionally, 4-Generally and 5-Always. Items 4, 9 and 11 for secondary school sample, and items 4, 9, 11 and 17 for teacher candidates'

sample are reversed items. The lowest score for the secondary school sample was 15 and the highest score was 75. The lowest score that can be obtained from the scale for teacher candidates is 16 and the highest score is 80. Arithmetic mean scores obtained from the scales are taken into consideration in determining the participants' use of writing as a learning tool. Considering the calculation of the range spread of the scale with the formula of "range spread / number of groups" (Tekin, 1996), the arithmetic mean intervals that are taken as basis in the evaluation of the research findings are; "1,00-1,80 = Never", "1,81-2,60 = Rarely", "2,61-3,40 = Occasionally", "3.41-4.20 = Usually" and "4,21-5,00 = Always".

It was determined that the measurement tool for the sample of secondary school students and teacher candidates had a similar three-factor structure. In addition, the Writing as a Learning Tool and Avoidance of Writing factors are common factor in both samples. When the basic structure of the scale is considered, the factor with the highest variance explained is the first factor (Writing as a Learning Tool). This shows that the scale has similar results for both groups. Accordingly, it can be said that in addition to being a learning tool, writing is an undesirable practice for both samples. The other factor for the secondary school sample is Writing as a Note-Taking Tool and for the teacher candidates sample is Difficulty in Writing. This shows that secondary school students differentiate writing as both a learning tool and a note-taking tool. On the other hand, teacher candidates think that they have difficulty in studying by writing.

The results indicate that the Scale of Writing for Learning is a valid and reliable instrument that can be used to measure the use of writing as a learning tool for Secondary School students and teacher candidates. In line with the findings, it can be stated that the instrument developed within the scope of this study will eliminate a significant deficiency in the related literature and be a qualified measurement tool that can be used in future studies. In addition, if the scale is used in different groups such as high school students and teachers, it would be useful to produce validity and reliability evidence for these groups.

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