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Developing an attitude scale for cursive handwriting: Validity and reliability study

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The aim of this study is to develop an attitude scale for designating the attitudes of primary school pre-service teachers towards cursive handwriting. In the process of developing draft scale a 57-item draft scale on cursive handwriting has been formed. While developing the scale, related literature was searched, pre-service teachers' opinions were asked and experts' ideas were benefited. Content validity of draft scale has been reviewed by field specialists and after removing 2 items from scale, pretest of the new 55-item scale has been performed on 379 students. Subsequent to pretest, item analysis of scale; item-sum, item-residual correlations, item distinctiveness, factor analysis and internal consistency on the validity and reliability have been examined respectively. To measure construct validity of scale, exploratory and confirmative factor analyses have been utilized. For exploratory factor analysis (EFA), the scale has been directed to 379 prospective teachers and for confirmative factor analysis (CFA) it has been directed to 254 primary school pre-service teachers. In exploratory factor analysis, SPSS package program and in confirmative factor analysis LISREL program has been utilized. Confirmative factor analysis revealed that this 41-item scale consists of 2 factors. Cronbach alpha internal consistency coefficients measured for these factors are respectively .94 and .93. Total Cronbach alpha internal reliability coefficient of the scale is .96. Thus it has been concluded that this scale is a valid and reliable tool that can be used to detect the attitudes of primary school pre-service teachers towards cursive handwriting.

Key words: Cursive handwriting, scale for attitude, validity, reliability.

INTRODUCTION

The primary aim of writing is to enable a permanent transfer of people's thoughts. Note-taking and registering others' ideas which are inherent qualities of writing seem to be not-so-vital needs in this modern age which witnesses enormous growth of voice recorders. The truth is that writing is the reflection of an inner dialogue; it is an actual thinking act. To enable healthy performance of thinking process, ideas on mind need to be turned into writing which is a combination of mind and hand skills. Thought and skill are the kind of abilities that must function concurrently. Within that context, writing can be defined as transfer of power of thinking to paper by using hand. Throughout its historical process, the transformation of line from a visual value into a symbolic value has reached its peak via writing and writing has been valued as aesthetic image of words. Writing which has changed from an artistic asset into a teaching and instruction instrument then to the most common means of self-expression has been, parallel to the spread of information, an indispensable part of teaching and learning.

Act of writing must follow a pace that does not interrupt speed of thought. The system of symbols must flow in a progressive and connected manner and avoid sharp

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turns that undermine process of thought. While thoughts run from our brain to the nerves on our fingertips, the pencil we hold must be moving fast enough to orchestrate this flow. Within this framework, the links presiding in character transitions in cursive handwriting provide extraordinary opportunities in changing sentences into symbols without slowing down the process of thinking. Cursive and connected writing of alphabet enables writing maximum numbers of words on paper without even lifting the pencil. Via handwriting, ideas stored in short-term memory but not yet registered in long-term memory shall be shielded by writing language before they are lost eternally.

An acclaimed handwriting is considered a precondition of academic success (Graham et al., 1997). The most significant elements in writing, which is one of the most effective and permanent communication tool, are speed and readability (Akyol, 2001). Handwriting process includes a series of complex event (Turan, 2010). The most characteristics and distinguishing feature of cursive handwriting is noting down the words in left to right direction without any interruption (Fitzgerald, 2004). Such uninterrupted flow of characters allows the text to be functional, active and continuous and also enables students to store in their minds the letters and ideas that shall be put on paper (Tarnowski and O'reilly, 2003). It is acknowledged that cursive handwriting provides numerous advantages in teaching and mental development; the facts that it is written faster, enables quick recognition of words, numbers and markings, prevents act of spelling, promotes kinesthetic intelligence as well as physical and mental development, improves in-depth thinking and concentration make cursive handwriting an effective tool (Gunes, 2007).

One of the most salient benefits of handwriting is that it enables personalization of writing, just as the uniqueness in fingertips handwritings which are products of hand skills differ greatly. Cursive handwriting reflects something from the character and personality of individuals. As the same building painted by two artists may not be the same, plastic art dimension of writings may also differ. Since people can express their thoughts and feelings in a variety of ways through handwriting they grab a chance to make them eternal via handwriting unique to its owner. This personalized condition is one of the satisfying ends that motivate one to use handwriting and it can be reached through the gates opening to the magical world of writing.

Writing exhibits cognitive, affective and kinesthetic dimensions (Rosenblum et al., 2003; Tseng and Cermak, 1993). Cognitive aspect of writing comprises of mental process of information, senses and images in an ordered manner; affective dimension consists of simplicity, fluency, beauty and readability of written expression. Using notebook, paper and pencil and coordination of muscle movements while writing and proper placement of characters make up kinesthetic dimension of writing (Guleryuz, 2002; Koksal, 1999). An effective writing process requires coordinated functioning of the three dimensions. One failure detected in one of these dimensions results in an interruption in writing process, lack of interest and will towards writing.

Conducted researches manifest that the hardships people experience in handwriting during their early primary education are the key determinants of the difficulties they experience in the next academic years (Harvey and Henderson, 1997). Therefore it is a must that teachers who shall instruct handwriting and prospective teachers receiving in-service training should be well aware of cognitive, affective and kinesthetic dimensions of writing; possess basic knowledge on writing methods and techniques and practice successfully what they have learnt. That is because the success of an education system is linked to the qualities of teachers who shall be responsible for the implementation of this system (Kavcar, 1987). Most teachers fail to focus on teaching of writing since they receive not sufficient training on teaching of writing techniques during their teacher training program (Phelps and Stempel, 1989). It has been widely reported that teachers receive insufficient training on teaching of writing and possess misleading perceptions on the development of writing skills (Graham et al., 2008). These findings demonstrate that during teacher training programs teaching of writing is not accentuated enough. Additionally, it is stated that attitudes that shall be developed by prospective teachers during their pre-service training shall be substantially effective in forming their commitment to teaching profession and teaching techniques that they shall employ in professional life (Sarac, 2002). Thus it is reasonable to argue that attitudes that shall be developed by prospective teachers during their pre-service training shall be substantially effective in forming their commitment to cursive handwriting. Detecting attitudes of prospective teachers towards cursive handwriting shall provide vital contributions to both prospective teachers and researchers who shall focus on this particular topic. It is believed that attitude scale developed for cursive handwriting shall provide further valid and reliable data for the researches covering this subject.

The Ministry of National Education of Turkey (MEB) reorganized all elementary school curricula in light of constructivism in 2004 to 2005 academic years. Since 2005, as part of a comprehensive curriculum reform, cursive handwriting is being taught to beginning writers at Grade 1. Accordingly, teacher training programs were revised and cursive handwriting were practice in calligraphy (handwriting) techniques courses since there was no scale development studies specifically for cursive handwriting in teacher education program. Furthermore, when the related literature had been examined, it was found that there were no scale development studies about attitudes toward cursive handwriting at university level. Therefore a scale for attitude towards cursive

Table 1. Demographic characteristics of participants.

Exploratory factor	Analysis study group	f	%
University	Adiyaman University	148	39.0
	Harran University	103	27.1
	Canakkale University	128	33.7
Grade	2nd grade	234	61.7
	3rd grade	112	29.5
	4th grade	33	8.70
Gender	Female	206	54.3
	Male	173	45.6
Confirmatory factor	**Analysis study group**		
University	Adiyaman University	254	100
Grade	3rd grade	162	63.8
	4th grade	92	36.2
Gender	Female	121	47.6
	Male	133	52.4

handwriting in teacher education should be developed to reflect pre-service teachers' views on this matter. For this reason, a Likert type scale with five degrees titled "Scale for Attitude towards Cursive Handwriting" was decided to be developed in this study.

PURPOSE

The purpose of this study is to develop a valid and reliable instrument identifying primary school pre-service teachers' attitudes towards cursive handwriting.

LIMITATIONS OF THE STUDY

In terms of its scope and benefited data the research has been limited to:

(i) Attitude scale developed to identify primary school pre-service teachers' attitudes of towards cursive handwriting,
(ii) 599 primary school pre-service teachers totally,
(iii) 2nd, 3rd and 4th grade class teaching students in Adiyaman, Harran and Canakkale Universities' Faculties of Education and who received caligraphy techniques course.

METHOD

This study is a scale developing study for determining the attitude of primary school pre-service teachers towards cursive handwriting.

Sample of study

Research participants have been selected via purposeful sampling method. . Primary school pre-service teachers from four different universities' education faculty class teaching departments and who have received writing techniques course have constituted research population. To the ends of obtaining data on construct validity of scale, particular scale has been applied on collectively 392 students studying at Adıyaman, Harran and Canakkale Universities. Upon eliminating the surveys of students who failed to complete the scale accurately or fully, surveys collected from 379 students have been included in research. 41-item scale that has been formed upon completing factor and item analyses has been, to perform Confirmatory Factor Analysis (CFA) implemented on 254 students from Adiyaman University Education Faculty Department of Primary Education and who have received writing techniques course. Table 1 provides the distribution of participants with respect to university, grade and gender.

According to Table 1, for exploratory factor analysis of all the participants constituting study group, 148 (39%) study at Adiyaman, 103 (27%) at Harran 128 (34%) at Canakkale University. 234 (62%) 2nd grade students, 112 (29%) 3rd grade students and 33 (9%) 4th grade students have partaken in research. Of all the participants 206 (54%) are female, 173 (46%) are male. As regards study group that received confirmatory factor analysis of research the group consists of 254 students from Adiyaman University. Of all the students 162 (63.8%) are 3rd grade, 92 (36.2%) are 4th grade students and 121 (47.6%) are female, 133 (52.4%) are male.

Development process of the scale

Prior to writing items related to attitude for cursive handwriting, first literature on cursive handwriting teaching has been scanned (Akyol, 2005; Celenk, 2007; Gunes, 2006; Sahin, 2012; Turan, 2008) followed by scanning the literature on measuring attitude and attitudes (Tavsancil, 2010; Bindak, 2005; Yurdugul, 2005;

Tezbasaran, 1997; Koklu, 1995). To assist in writing items for attitude, 20 primary school pre-service teachers have been asked to write an essay narrating their feelings and opinions on cursive handwriting. These essays have been analyzed via content analysis method and negative and positive attitude items considered to be directly related to attitude have been compiled. Besides in writing the items for attitude scale, attitude scales of other researchers exploring attitude and attitude detection on different fields and topics have been reviewed (Turan and Demirel, 2009; Kan and Akbas, 2005; Gomleksiz, 2004).

In forming items for attitude, particular care has been paid to write the items in a simple and comprehensible manner and embedding no more than one judgment in one item. By making use of data obtained from content analysis and literature scan, a pool of 57 items has been created to identify attitudes of primary school pre-service teachers towards cursive handwriting. 29 of these attitude items are positive whilst 28 are negative. For the positive items used in scale, “I totally agree” and “I agree”; for negative items “I do not agree” and “I do not agree at all” statements have been used. For the items lacking a positive or negative judgment, “I am not sure” statement has been utilized.

Upon developing draft scale, the scale has been examined with respect to its content validity, narration, spelling and punctuation by one linguist and four pedagogues from Adıyaman University, Anadolu University, Firat University and Hatay University and two specialist of class teaching program. According to their views, 2 items have been removed and draft form of scale has been reduced to 55 items.

In testing draft scale on study group stage it has been aimed to designate comprehensibility of scale. Comprehensibility of the SACH was assessed by 20 pre-service teachers. The pre-service teachers were asked whether they understood the 57 items of the SACH. The levels of comprehensibility for each item were categorized on a 4-point scale (0: not comprehensible; 1: slightly comprehensible; 2: moderately comprehensible; and 3: highly comprehensible). Scores of 2 or more for each item were regarded as comprehensible. During this pretest stage pre-service teachers have reported that items used in this scale are comprehensible.

Pretest has proven that the scale is fit to be implemented on study group. This 55-item draft scale has been implemented on collectively 392 pre-service teachers from Universities of Adıyaman, Harran and Canakkale. Subsequent to leaving out the scales improperly completed by pre-service teachers, validity and reliability analyses have been performed on the scales of 379 prospective teachers. So as to test construct validity of Draft Scale for Attitude towards Cursive Handwriting Teaching performed on 379 pre-service teachers included in first study group of research, exploratory factor analysis has been executed. The sample which has been reduced to 41 items and two sub factors at the end of analysis has been performed on 254 3^{rd} and 4^{th} grade pre-service teachers studying at Department of Primary Education in Adiyaman University, Education Faculty, Primary School Education Program. To conduct EFA and CFA analyses two different sampling groups independent from one another and composed of respectively 379 and 254 students have been taken. It has been reported that acceptable size for sampling for EFA analysis is 4:1 per item or 5:1 per item (Floyd and Widaman, 1995). In present study however per item sampling size is 8:1 for EFA and 6:1 for CFA. It can thus be stated sampling size in research is, according to literature data, sufficient and universally general.

Data analysis

Towards the aim of identifying construct validity of scale for attitude towards cursive handwriting (SACH) first exploratory factor analysis then confirmatory factor analysis has been conducted. Exploratory factor analysis is an analysis technique aiming grouping items that measure the same construct or quality amidst several items designed by researchers (Buyukozturk, 2007). This analysis has been conducted to detect the number of factors required to explain the connections amidst observed variables (Raykov and Marcoulides, 2000). Confirmatory factor analysis has been used to test the accuracy of two-dimensional structure designated through exploratory factor analysis performed to detect the validity of scale. Confirmatory factor analysis is conducted to detect if there is a special factor structure (Raykov and Marcoulides, 2000). Therefore, in present study exploratory factor analysis and confirmatory factor analyses have been performed to test if factor structure of scale for attitude towards cursive handwriting is a valid model. The appropriateness of the sample size for factorising was examined with Kaiser-Meyer-Olkin (KMO) and Barlett Sphericty Tests before the application of exploratory factor analysis (EFA). Furthermore, common factor variance values of items, eigenvalue line graphic, main components analysis results and to obtain interpretable factors results of varimax (octagonal rotation) have been examined. Items with factor loadings below 40 and loading more than one factor –cyclical feature- have been exempted from analysis and factor analysis has been renewed. Construct validity findings have been verified after computing the correlation between sub-dimensions of scale. To detect item distinctiveness average scores of participants within top and bottom 27% group have been compared via independent t test and item subscale correlation, item total correlation and common factor variance (h^2) have been computed. To the ends of detecting reliability, each sub-factor in scale has been respectively measured via Cronbach Alpha Reliability coefficient. In exploratory factor analysis (EFA) and reliability test SPSS 15.0 program, in confirmatory factor analysis (CFA) Lisrel 8.80 program has been used.

FINDINGS

Within the scope of validity analysis of Scale for Attitude towards Cursive Handwriting, construct validity and item-total correlations have been measured and obtained findings are presented as follows.

Findings regarding the validity of the scale

As part of the validity of the Scale for Attitude towards Cursive Handwriting (SACH), its structural validity and item-total correlation were examined and the related findings are presented.

STRUCTURAL VALIDITY

Findings relating to exploratory factor analysis

In order to detect whether data received from pre-application are fit for factor analysis and test the structural validity of the SACH Kaiser-Meyer-Olkin (KMO) sampling-fit test and Bartlett Sphericity test have been performed. In present study it has been detected through tests aiming to detect the compatibility of data with factor analysis that KMO values is .96; Bartlett Sphericity Test value as X^2=8214,404; sd=820 (p=<.001) (Table 2). Within the framework of these values, it is possible to argue that factor analysis can be conducted on scale.

Table 2. KMO and Bartlett test results of the scale for attitude towards cursive handwriting

Kaiser-Meyer-Olkin (KMO) sampling fitness value		.96
Bartlett sphericity test	Approximate Chi-square (X^2)	8214.40
	Degree of freedom (df)	820
	Degree of significance (Sig.)	.00

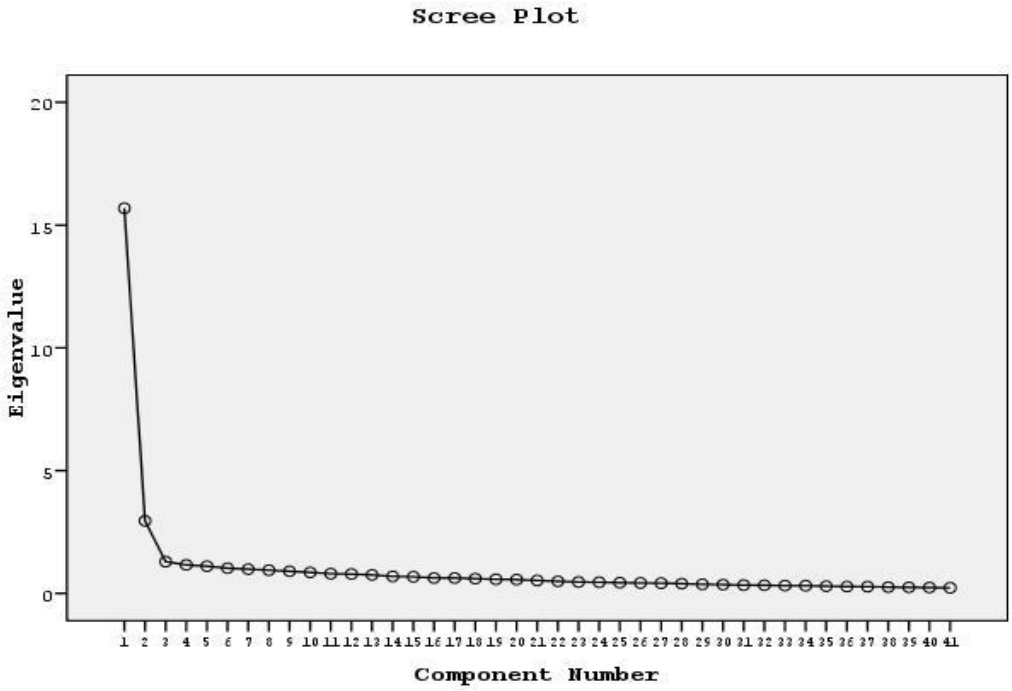

Figure 1. Scree plot of exploratory factor analysis.

In this study if KMO sampling fitness value is .96, sampling size is quite sufficient if Bartlett's Sphericity test significance level is p<.001. It indicates that distribution is normal and data are fit for exploratory factor analysis.

Upon detecting that data are applicable for factor analysis, Exploratory Factor Analysis has been conducted to analyze construct validity and factor structure of attitude scale.

In order to demonstrate factor pattern of developed scale, main components analysis has been used as factorization method; as rotation method, varimax -an octagonal rotation method- has been selected as the best method. Factor loadings represent the connections between indicators and latent factors (Brown, 2006). It has been detected at the end of analysis that two components with eigenvalue higher than 1 for 55 items analyzed have been formed. 14 items (m2, m6, m8, m9, m18, m22, m34, m35, m36, m37, m41, m44, m45, m47) out of 55 items have been removed from scale since their factor loadings are cyclical; a scale with two dimensions and 41 items has been obtained. Main components analysis has been performed to ensure that in factor analysis eigenvalue of 41 items is 1 and EFA analysis has verified that the scale has a two-factor structure. In Figure 1, scatter graphic of exploratory factor analysis has been demonstrated.

As scatter graphic in Figure 1 is analyzed it surfaces that components with four and above four have values quite close to each other. In the graphic, each space between two points corresponds to one factor. It is seen that in the first factor the fall is high speed. With this aspect, the scale manifests a two-factor structure. Items computed in the first factor are 22 and 19 in the second factor.

At the end of rotation procedure aimed at analyzing main components of factors, factor variance, eigenvalues of factors and the level they explain variance have been detected and obtained values are as given in Table 3.

Table 3 manifests that at the end of analysis eigenvalue of items have been grouped under two factors

Table 3. Factor loadings of the items in rotated main components analysis method of scale for attitude towards cursive handwriting with respect to principal axis.

Items	Factor designanditemloadings			Item analysis								
				Correlation		Item discrimination feature					Reliability (α)	
			Commonfactor	Item fcator	Item total	Sub %27 (n=102)		Top %27 (n= 102)		t * *	Item (α) s	Sub scale (α=.96)
	F1	F2	(h^2)	r**	r**	$\overline{X}$	Sd	$\overline{X}$	Sd			
m51	.70	.15	.51	.69	.48	4.16	1.00	2.32	1.30	11.28	.96	
m14	.70	.24	.54	.72	.43	3.96	1.02	2.52	1.22	9.12	.96	
m17	.69	.31	.57	.75	.39	4.01	.98	2.69	1.33	8.07	.96	
m28	.69	.33	.58	.76	.40	3.75	1.12	2.23	1.22	9.33	.96	
m19	.65	.32	.53	.73	.38	3.60	1.28	2.20	1.24	7.92	.96	
m49	.65	.23	.48	.69	.42	3.89	1.15	2.34	1.37	8.72	.96	
m24	.65	.34	.54	.73	.37	3.57	1.21	2.16	1.21	8.32	.96	
m55	.63	.29	.49	.70	.38	3.89	1.30	2.14	1.31	9.60	.96	
m30	.63	.09	.41	.61	.45	3.75	1.06	2.24	1.18	9.69	.96	
m7	.61	.34	.49	.67	.34	3.63	1.14	2.38	1.27	7.41	.96	
m23	.61	.28	.46	.68	.36	3.69	1.19	2.36	1.33	7.47	.96	
m3	.61	.33	.48	.69	.35	3.49	1.17	2.23	1.25	7.45	.96	.94
m4	.61	.42	.54	.73	.31	3.50	1.23	2.35	1.35	6.33	.96	
m5	.61	.39	.53	.72	.32	3.56	1.16	2.46	1.30	6.35	.96	
m13	.61	.28	.45	.67	.36	3.63	1.21	2.33	1.33	7.25	.96	
m12	.59	.01	.35	.57	.42	3.69	.99	2.33	1.26	8.51	.96	
m33	.55	.19	.34	.58	.35	3.68	1.12	2.38	1.36	7.41	.96	
m10	.54	.16	.32	.56	.36	3.75	1.03	2.57	1.24	7.44	.96	
m46	.54	.01	.31	.54	.39	3.96	.98	2.60	1.31	8.41	.96	
m50	.53	.16	.31	.56	.36	3.55	1.13	2.31	1.30	7.22	.96	
m27	.51	.28	.34	.59	.30	3.15	1.33	2.18	1.17	5.53	.96	
m48	.49	.27	.32	.57	.29	3.16	1.40	2.13	1.23	5.58	.96	
m38	.22	.75	.61	.77	.21	2.61	1.19	3.00	1.36	-2.19	.96	
m29	23	.75	.62	.78	.21	2.71	1.11	3.03	1.42	-1.81	.96	
m21	27	.71	.58	.77	.15	2.62	1.13	2.88	1.44	-1.46	.96	
m20	.36	.69	.61	.75	.07	2.88	1.11	2.89	1.43	-0.05	.96	
m39	.18	.69	.50	.70	.21	2.51	1.17	2.91	1.49	-2.14	.96	
m25	.27	.64	.48	.69	.12	3.26	1.18	3.31	1.33	-0.28	.96	
m15	.26	.63	.46	.68	.13	2.52	1.08	2.77	1.35	-1.49	.96	
m31	13	.61	.39	.62	.21	2.45	1.15	2.95	1.46	-2.71	.96	
m32	.26	.61	.44	.66	.11	2.88	1.25	3.13	1.41	-1.37	.96	
m54	.26	.61	.44	.66	.12	2.82	1.21	2.94	1.39	-0.64	.96	.93
m42	22	.61	.42	.65	.15	2.61	1.14	2.89	1.39	-1.60	.96	
m52	28	.61	.45	.67	.11	3.01	1.24	3.15	1.40	-0.74	.96	
m40	.21	.56	.40	.64	.15	2.60	1.24	2.88	1.52	-1.47	.96	
m26	19	.59	.39	.62	.16	2.74	1.22	3.14	1.39	-2.13	.96	
m53	.08	.59	.36	.58	.24	2.77	1.08	3.29	1.38	-3.00	.96	
m43	.33	.59	.45	.68	.07	3.03	1.24	2.96	1.49	0.41	.96	
m16	35	.56	.44	.66	.04	2.78	1.19	2.74	1.43	0.21	.96	
m1	.34	.56	.43	.65	.04	2.84	1.31	2.70	1.49	0.75	.96	
m11	.21	.52	.31	.57	.12	2.74	1.15	2.94	1.44	-1.07	.96	

above 1. Loadings of first sub-factor consists of 22 items (m51, m14, m17, m28, m19, m49, m24, m55, m30, m7, m23, m3, m4, m5, m13, m12, m33, m10, m46, m50, m27, m48) of which loads vary between .70 and .49.

Second sub-factor consists of 19 items (m38, m29, m21, m20, m39, m25, m15, m31, m32, m54,m42, m52,m40, m26, m53, m43, m16, m1, m11) of which factor loadings vary between .75 and .52. Factor loadings of items have

Table 4. Correlation and explained variance ratios between sub-dimensions of SACH

Attitudes towards cursive handwriting	Negative	Positive	Total
Negative	1	-,70**	.57**
Positive		1	.203**
Total			1
Eigenvalue	9.48	9.16	18.64
Explained variance (%)	23.14	22.34	45.48

**p<.001

been accepted minimum 0.49. Factor loadings need to be minimum 0.30 (Barnes et al., 2001). These findings prove that this scale developed for cursive handwriting has satisfactory construct validity.

Items in detected factors have been named according to specialist views and content of items. Items in the first dimensions focus on negative attitudes of pre-service teachers towards cursive handwriting. Items under first sub-factor are negative: "I believed cursive handwriting is hard", "I do not like using cursive handwriting", "I believe cursive handwriting is boring", "I feel anxious about teaching cursive handwriting", "In professional life cursive handwriting will not mean anything to me" since they all refer to negative dimension this structure has been termed as "*negative attitudes towards cursive hand-writing"*. In the second sub-factor the statements are "Cursive handwriting makes me passionate", "Cursive handwriting makes me more self-confident while writing", "Cursive handwriting makes me more passionate and eager to write", "Cursive handwriting practices are great fun for me." which are listed under "*positive attitudes towards cursive handwriting*".

In order to detect item distinctiveness, item-total correlations have been examined. As manifested in Table 4 items - scale correlations vary between .78 and .54. Considering that items of which item-total correlation is above .30 are good at distinguishing people it is feasible to argue that distinctiveness of the items in this scale is high (Buyukozturk, 2007). In order to gather more evidences on item distinctiveness, total scores received by participants have been computed. Scores obtained from the responses of participants from the top and bottom 27% groups with respect to scale total scores have been compared via independent group's t test and measured t values are provided in Table 3. It has been noted that in the scores of groups, the difference in favor of top group is significantly meaningful. Accordingly, it can be argued that the distinctiveness of these items is high.

Eigenvalues of sub-dimensions obtained from factor analysis in Scale for Attitude towards Cursive Handwriting and variance ratios they explain are indicated in Table 4.

In SACH eigenvalue of the first factor has been detected as 9.48. This sub-factor alone explains 23.14% of attitude variable. Eigenvalue of the second factor has been detected as 9.16 and this sub-factor alone explains 22.34% of attitude variable. These two sub-factors explain 45.48% of variance about relevant attitude variable. In social sciences, acceptable variance ratios are 60% or less (Vieira, 2011), even the ratios between 40% and 60% (Tavsancil and Keser, 2002). Accordingly, it can be asserted that the variance ratio obtained from this research is adequate.

Findings relating to confirmatory factor analysis (CFA)

To conduct confirmatory factor analysis the scale with 41 items have been applied on 254 pre-service teachers studying at Adiyaman University, Faculty of Education Primary School Education Program and who have received writing techniques course. In order to detect if obtained data are distributed normally, One-Sample Kolmogorov-Smirnov Test has been performed. In positive attitudes towards cursive handwriting sub-dimension distribution is p>.37, in negative attitudes towards cursive handwriting sub-dimension, the distribution is p>.33 and in overall scale the distribution it is p>.44 which all indicate that the distribution is normal.

Within the scope of confirmatory factor analysis, fitness and error indexes have been explored. In researches based on structural equation model goodness-of-fit index, standard fit index (NFI), standard model complexity index (PNFI), non-standard fit index (NNFI), comparative fit index (CFI) and Critic statistics are widely used (Buyuker-Isler, 2008). Goodness of fit index of items with respect to Confirmatory factor analysis results are presented in Table 5.

In Table 5, error and goodness-of-fit indexes obtained through testing via confirmatory factor analysis the scale consisting of two sub-dimensions and 41 items are demonstrated. The most frequently used statistics model-data fitness by using confirmatory factor analysis are chi-square ($\chi 2$), RMSEA, NFI, NNFI, CFI, GFI, and AGFI. At the end of confirmatory factor analysis if chi-square ($\chi 2$) fit ($\chi 2 = 1700.00$, df = 254 ve $\chi 2/df = 3.0<52$, p=.00),

Table 5. Confirmatory factor analysis error and goodness-of-fit indexes of scale for attitude towards cursive handwriting.

Fitness criteria	Acceptable fitness	New proposed model (n=254)
χ2 /df	0< χ2 /sd <3	1700.00 /778= 2.19
RMSEA	.05 ≤ RMSEA ≤ .10	.07
RMR	.00 ≤ RMR ≤ .10	.08
SRMR	.00 ≤ SMR ≤ .10	.05
NFI	.90 ≤ NFI≤ .95	.97
NNFI	.95 ≤ NNFI ≤ .97	.98
CFI	.90 ≤ CFI ≤ .95	.99
GFI	.90 ≤ GFI ≤ .95	.75
AGFI	.80≤ AGFI ≤ .90	.73
PGFI	.00 ≤ PGFI ≤ .95	.68

Goodness-of-fit Index (GFI=.75), Regulated Goodness-of-fit Index (AGFI=.73), Standardized Fit Index (NFI=.97), Non-Standardized Fit Index (NNFI=.98), Compared Fit Index (CFI=.99), Square root of Residual Means (RMR=.08), Square root of Standardized Common Means (SRMR=.05) and Average Square root of Approximate Errors (RMSEA=.07) and Simplicity Fit Index (PGFI=.68) indicate good fitness (Vieira, 2011; Hooper et al., 2008; Schreiber et al., 2006; Hu and Bentler, 1999). Fit index values formed at the end of confirmatory factor analysis have exhibited that this model fits well. Road map for the new structure of the attitude scale for cursive handwriting has been provided in Figure 2.

According to the views of pre-service teachers on the scale for attitudes towards cursive handwriting correlations between two sub-dimensions have been examined. Accordingly, correlation between negative subscale and positive subscale is -0.84. It indicates that in this correlation structure which is negative, each single sub-dimension can exist on its own (Peter, 1981).

Findings relating to the reliability of the scale

In measuring reliability which was performed subsequent to confirmatory factor analysis, reliability coefficient of "negative attitudes towards cursive handwriting" sub-dimension has been detected as Cronbach α=.94, reliability coefficient of "positive attitudes towards cursive handwriting" sub-dimension as Cronbach α=.93 and total reliability coefficient of scale has been detected as Cronbach α=.96. In EFA and CFA performances, the close value of Cronbach Alfa reliability coefficient implies that reliability of scale is good. On a general base, reliability coefficient around 0.90 is categorized as "perfect". 0.80 is categorized as "very good" and 0.70 as "sufficient" (Kline, 2011). This value supports the idea that questions used to detect attitude of pre-service teachers towards cursive handwriting are consistent. Obtained reliability coefficient is accepted as a scale of which reliability is high in educational and social sciences (Kline, 2011). Hence it can reasonably be argued that reliability coefficient of scale is perfect.

CONCLUSION AND SUGGESTIONS

Constructing an attitude scale which should be used in determining the attitudes of primary school pre-service teachers toward cursive handwriting is aimed in this study. Pre-service teachers' attitude towards cursive handwriting has great important for effective writing teaching in primary school. Having awareness on pre-service teachers' attitudes towards cursive handwriting is vital in training pre-service teachers endowed with professional competency. Because there was no scale development study similar to this one in Turkey, it was considered as an urgent need to develop such a scale in the study. It is believed that this scale developed to detect the attitudes of prospective teachers shall assist in identifying attitudes of pre-service teachers, and further researches shall contribute to making it more meaningful and attractive for pre-service teachers. Therefore, it was thought that developing a scale was necessary to determine the attitudes of primary school pre-service teachers toward cursive handwriting. To this end a scale has been developed to detect attitudes of pre-service teachers towards cursive handwriting.

To ensure the structural validity of the scale, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analyses (CFA) have been performed. The appropriateness of the sample size for factorising was examined with Kaiser-Meyer-Olkin (KMO) and Barlett Sphericty Tests before the application of exploratory factor analysis (EFA). Besides, common factor variance values of items, eigenvalue line graphic, main components analysis results and to obtain interpretable factors results of varimax (octagonal rotation) have been examined. Items with factor loadings below 40 and loading more than one factor -cyclical feature- have been exempted from analysis and factor analysis has been

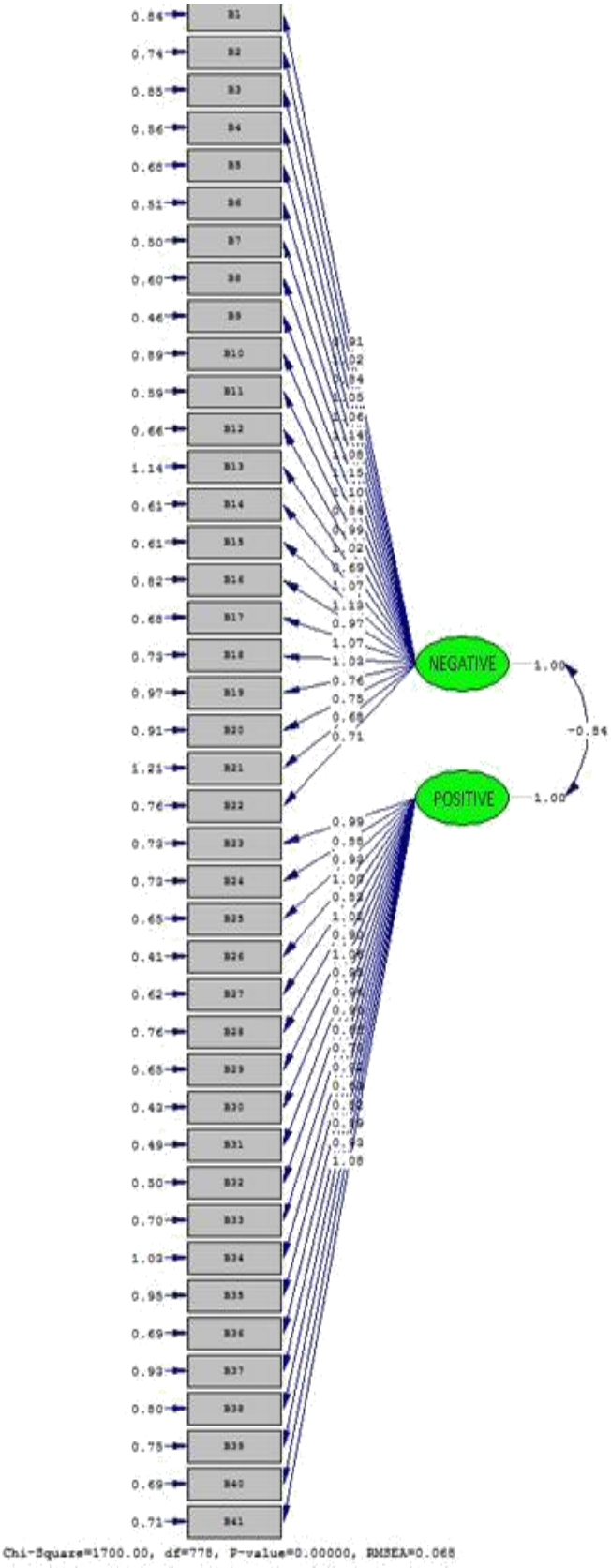

Figure 2. Significance level of the rates latent variables explain observed variables for two-dimensional model of scale for attitude towards cursive handwriting.

renewed. Construct validity findings have been verified after computing the correlation between sub-dimensions of scale. To detect item distinctiveness average scores of participants within top and bottom 27% group have been compared via independent t test and item subscale correlation, item total correlation and common factor variance (h^2) have been computed. To the ends of detecting reliability, each sub-factor in scale has been respectively measured via Cronbach Alpha Reliability coefficient. In exploratory factor analysis (EFA) and reliability test SPSS 15.0 program, confirmatory factor analysis (CFA) Lisrel 8.80 program has been used.

By making use of data obtained from students' views and literature scan, first a pool of 57 items has been created to detect attitudes of pre-service teachers towards cursive handwriting. 29 of these attitude items are positive whilst 28 are negative. Upon receiving views of specialists 2 items have been removed and draft form of scale has been reduced to 55 items. Construct validity of scale has been conducted via Exploratory Factor Analysis (EFA) and tested via Confirmatory Factor Analysis (CFA). For EFA 379 and for DAF 254 different students have been included in research sampling. Factor analysis has been performed on this 55-item scale; items with factor loadings below 30 and loading more than one factor have been exempted one by one from analysis and factor analysis has been renewed. At the end of exploratory factor analysis, it has been decided to remove 14 items due to the cyclical feature of their factor loadings. In the end there have been 41 operational items in the scale. At the end of rotated main components analysis, a structure with 41 items and 2 subdimensions has been reached. In line with the views of specialists, these factors have been classified as positive attitudes towards cursive handwriting and negative attitudes towards cursive handwriting. In the new structure of scale, size of factor loadings (Barnes et. al., 2001), explained total variance (Vieira, 2011), internal consistency coefficient (Kline, 2011), correlation between subscales (Brown, 2006) and error and goodness-of-fit indexes (Cote et al., 2001; Vieira, 2011; Hooper et al., 2008) are all amongst acceptable criteria. Internal consistency coefficients of sub-factors of scale are respectively 0.93 for the first sub-factor, 0.94 for the second sub-factor and total Cronbach-Alfa internal consistency coefficient of scale has been detected as 0.96. Findings related to the validity and reliability of scale confirms that this scale is fit to be used to detect attitudes of primary school pre-service teachers towards cursive handwriting.

In conclusion, it can be said that the scale had an appropriate quality to determine primary school pre-service teachers' attitude toward cursive handwriting. In conclusion, it can be said that in this study, a valid and reliable scale was developed. It is thought that this scale will be useful for teacher educators who want to study about factors affecting pre-service teachers' attitudes towards cursive handwriting. However, further studies will

contribute to the development of the scale can be made.

Following suggestions can be made based on the study results:

(i) This scale can be used to determine pre-service teachers' attitude toward cursive handwriting.

(ii) If students indicate a negative attitude toward cursive handwriting on this scale, then more various strategies might be provided for effective cursive handwriting in calligraphy (handwriting) techniques course.

(iii) It is suggested that in studies aiming to detect attitudes of pre-service teachers towards cursive handwriting, validity and reliability tests of this scale should be repeated on different samplings.

(iv) The sampling of the study was comparatively small using pre-service teachers from three universities in Turkey. This population does not represent the total number of pre-service teachers in Turkey. Therefore, it is suggested that further studies should be carried out in large sample groups.

(v) The sampling of universities of the study was also comparatively small. Only three different universities were used, with a total of three different classes. Hence, it is recommended that further studies should be carried out in different universities.

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Appendix 1. Scale for Attitude towards Cursive Handwriting (SACH).

Items		*I totally agree*	*I agree partially agree*	*do not agree do not agree at all*
Negative attitudes towards cursive handwriting				
m51	I believe using handwriting is a futile act.			
m14	I do not like using cursive handwriting.			
m17	I feel bored while reading texts with cursive handwriting.			
m28	I believe cursive handwriting is boring.			
m19	If it were not compulsory I would not attend calligraphy techniques course.			
m49	Cursive handwriting is almost a torture for me.			
m24	In professional teaching I will not demand my students to use cursive handwriting.			
m55	I would not schedule cursive handwriting courses in primary education if only I could.			
m30	I find cursive handwriting courses in primary education totally useless.			
m7	It is quite complicated to learn how to use cursive handwriting.			
m23	I believe all the efforts exerted to learn cursive handwriting are good for nothing.			
m3	Using cursive handwriting is a waste of time in my opinion.			
m4	I would have to spare half of the day to write in cursive handwriting the things I easily write in block writing.			
m5	I believe the motives to teach cursive handwriting in primary schools is meaningless.			
m13	I hate cursive handwriting.			
m12	I do not plan to use cursive handwriting outside school.			
m33	I get mad when I think about the fact that in my professional life I will be forced to use cursive handwriting.			
m10	The most meaningless and useless course I have ever taken in my academic life is cursive handwriting.			
m46	I feel anxious about teaching cursive handwriting.			
m50	Cursive handwriting will mean not much to me while I teach.			
m27	In my professional life I shall advise my students to use block writing.			
m48	Since I will not be using cursive handwriting while teaching professionally I do not pay much attention to this course.			
Positive attitudes towards cursive handwriting				
m38	I prefer to use cursive handwriting while I write.			
m29	I feel happy when I think about the fact that I shall use cursive handwriting in my professional life.			
m21	I believe cursive handwriting practices should be spread to other stages of education.			
m20	I feel myself comfortable while using cursive handwriting.			
m39	I believe I shall use cursive handwriting a lot in my life.			
m25	I want to develop my cursive handwriting skills.			
m15	Cursive handwriting makes me passionate.			
m31	Cursive handwriting makes me more self confident while writing.			
m32	Cursive handwriting makes me more passionate and eager to write.			
m54	Cursive handwriting practices are great fun for me.			
m42	I believe cursive handwriting improves my aesthetic taste.			
m52	Cursive handwriting has so may interesting aspects in my opinion.			
m40	Weekly cursive handwriting classes should be more in number.			
m26	I believe primary education cursive handwriting classes are quite effective.			
m53	The attention I pay while using cursive handwriting is reflected in the same manner to different events in my daily life.			

Appendix 1. Contd.

m43	I believe I write more aesthetically and faster in cursive handwriting.
m16	Compared to the former type of writing I believe I provide faster and more readable products in cursive handwriting.
m1	I feel like I am performing a work of art while using cursive handwriting.
m11	I become happy since I produce an appraisable piece of work with cursive handwriting.