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Multimodal Literacy Scale: A Study of Validity and Reliability[1]

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Abstract

Problem Statement: Most structures of the texts individuals encounter today are multimodal, in which written, visual, and auditory elements are used together. Students who spend most of their time on social networks or playing various computer games gain experience in multimodal environments. As a part of teacher training, it is important that teachers who prepare students for life and set an example have multimodal literacy skills by keeping up with advancing technology.

Purpose of Study: The study, carried out in Turkey, researches whether or not the multimodal literacy skills within the formal training prospective teachers receive are limited. A scale that aims to measure the multimodal literacy skills of teachers is developed.

Method: Designed in a survey model, the scale aimed to develop a multimodal literacy scale for prospective teachers. The validity and reliability studies of the scale were conducted on 392 prospective teachers.

Findings and Results: At the end of EFA, we identified that the scale had a 3 factored structure, which explains 52.63% of the total variance. As a result of the CFA conducted, consistency index values were identified and the 3

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factor structured scale, recognized as made up of 17 items, was verified as a model. In order to determine the reliability of the scale, we calculated the Cronbach Alpha internal consistency and test-retest reliability coefficients. In light of the values obtained, the scale was concluded as reliable and valid. During the studies of item analysis, corrected item-total correlation of the items within 3 factors was calculated and the t-test was used to determine if these items discriminate the 27 % of the upper groups and the 27 % the lower groups. These results can indicate that the items in the scale have a high validity rate, and it can discriminate between students with regard to their capabilities of multimodal literacy.

Conclusions and Recommendations: A scale designed to measure the multimodal literacy skills of teachers who will play a big part in the education of upcoming generations was developed. With this, we can identify multimodal literacy skills during their undergraduate education, whereby we can identify the prospective teachers who do not have such skills and they can then be trained in this respect.

Keywords: Multimodal literacy, scale development, validity, reliability

Introduction

In this century, the sources of literacy applications should be humans and materials: literacy skills should be advanced and meaning should be derived from texts (Wolfe & Flewitt, 2010). Within the scope of the 21st century concept of literacy, written words, oral communication, and visuals cannot stand out from each other in communication; rather, it is important to make people literate in multimodal text structures in which all three elements are used together (Tüzel, 2013). Multimodal texts involve the use of many components and sign sources in order to form a coherent message (Klein & Shinas, 2012). Multimodal literacy is reflected in the processes of interpreting texts, producing materials, and communicating in both our daily lives and on social networks. The changes in the perception of literacy with developing technology have changed the structure of the process of interpretation of texts.

Multimodal literacy refers to meaning-making that occurs through the reading, watching, understanding, interpreting, reacting, and interacting with digital texts and multimedia (Walsh, 2010). In this type of literacy, the text has to be interpreted separately in terms of sounds, writing, and visuals, and then has to be interpreted as a whole as a multimodal entity (Kress, 2003). The nature of literacy involves the analysis, review, and production of words and images as a whole rather than the separate interpretation of the words and images (Bearne & Wolstencroft, 2007). These elements (tables, words, and images) each have a distinct potential to form meaning, and making sense of them involves mobility among the elements in the chain of signs (McKee, 2013). Multimodal literacy is a strong access point for children to make interpretations (Pahl & Rowsell, 2006). The change in the structure of the

interpretation process in this kind of media involves a change in the structure of the production process of multimodal products, too.

The process includes reading, comprehending, and analyzing the texts shared in electronic media and then producing new texts through writing (Hocks, 2003, cited in Tüzel & Tok, 2013). This process involves multimodaled possibilities such as order, colors, images, tables, words, and sounds in order for individuals to produce their outputs (Jewitt, 2006). The interpretation of the experiences of users on social networks through sharing helps users form images and interpretations in multimodaled situations (Bowen & Whithous, 2013).

Multimodal literacy involves changing the mode of communication as a result of the social network (Rowsell & Walsh, 2011). Today, changing the perception of texts requires showing a deeper interest in every kind of sound, visual, writing, or multimodal structure; all are employed in making meaningful communication (Kurudayıoğlu & Tüzel, 2010). Multimodal literacy is interpreted as an extended form of social semiology dealing with how society interprets and manages signs and symbols (Jewitt & Kress, 2003, cited in Tüzel, 2013).

Individuals are now more eager to be the producers and readers of multimodal texts (Unsworth, 2003, cited in Neville, 2006). In addition, one of the findings that have emerged from conducted studies is that multimodal texts used during classes are more appreciated by students than printed texts (Tüzel, 2012). Multimodal texts have both surrounded today's students and have become more preferable to them (Tüzel, 2013).

Students confirm that they use their cognitive skills more often and are more participative and productive during classes in which multimodal texts are used (Callow & Zammit, 2012, cited in Tüzel, 2013). Literacy involves developing individuals' skills in interpreting the meaning in multimodal elements (Narey, 2009). We need to integrate these kinds of texts into classroom environments to enhance students' skills and attract their attention. According to Bearne and Wolstencroft (2007), developments observed in students could be through education that combines speaking, dramatizing, writing, and visualizing, as well as training in reading and writing. As a response to the changes in the perception of literacy, teachers should resort to different methods and techniques.

Educators should help children establish relationships and reflect the aim of literacy in a critical manner for the language and literacy development of children in various fields (Wolfe & Flewitt, 2010). Using various methods during classes based on multimodal qualities means having various skills on the part of teachers. Including multimodal qualities in educational environments is of importance when it comes to education based on the individual characteristics and dominant types of intelligence of the students. According to Neville (2006), teachers should produce projects in order to underline the basic point of view of multimodal literacy rather than the analysis of the fundamental importance of the design of multimodal texts.

Education in computers, information, communication, and multimedia technologies, which are indications of the fact that society is now an information society, plays a central role in every field of life. This incredible transformation causes educators to rethink their own basic principles and plan new technologies in ingenious and productive ways (Kellner, 2000). Studies carried out in Turkey about the multimodal literacy skills within the formal training received by prospective teachers receive have been quite limited. In this study, we formulate a scale that aims to identify the views of prospective teachers on multimodal literacy. During the scale development, we identified the definition of multimodal literacy by resorting to a literature review. Indicators of these items were determined with the help of literature. Indicators in the factors concerned with the items of the multimodal literacy scale and the literature review for the indicators are presented in Table 1.

Table 1.

Factors and their Indicators of Concern in the Multimodal Literacy Scale and a Literature Review of the Indicators

Factors	Indicators	References	Item no.
Expressing Oneself Using Multimodal Structure	Referring to Communication	(Kurudayıoğlu & Tüzel, 2010). (Rowsell & Walsh, 2011).	3
	Production	(Bearne & Wolstencroft, 2009).	1, 2, 5
	Arranging Contents	(Hocks, 2003, cited in Tüzel, 2013). (Jewitt, 2006).	4
Interpretation of the Contents Presented in Multimodal Structure	Synthesizing Contents Presented in Various Media	(Walsh, 2010). (Bowen & Whithous, 2013).	6, 9
	Recognizing Body Language	(Jewitt & Kress, 2003, cited in Tüzel, 2013). (McKee, 2013).	7, 8 12
	Using Various Resources in Interpretation	(Pahl & Rowsell, 2006) (Narey, 2009).	10, 11
Preferring Multimodal Structures	Showing Interest	(Unsworth, 2003, cited in Neville, 2006). (Kress, 2003). (Tüzel, 2012). (Tüzel, 2013).	13,14 15,16 17

Method

Research Design

Designed in a survey model, the scale aimed to develop a multimodal literacy scale for prospective teachers. In survey models, the individual or subject of the study is defined as is under its own circumstances (Karasar, 2013).

Research Sample

Convenience sampling was used in the research. The study group was comprised of 392 undergraduate students who attend several departments in the Faculty of Education of Adnan Menderes University. Comrey and Lee (1992) highlight the fact that 300 and above as the number of specimens suitable for data analysis in survey development. A test-retest reliability study was conducted on 61 prospective teachers.

Survey Development Process

While developing a multimodal literacy scale, researchers reviewed relevant literature and contacted domestic and foreign academicians who work on the subject. A repository of 45 items was produced in accordance with the opinions received. Thirteen articles found to be unclear, incomprehensible, ambiguous, or included more than one statement were omitted from the repository in accordance with the opinions, assessments, and evaluations of linguistics experts and specialists in this field. A 32-item form was formulated for trial. Nineteen of the items on the form are affirmative statements and 13 are negative. Before the analyses, negative statements were scored by reversing the scoring system. The statements in the scale items were graded with a 5 point Likert scale (1: Not valid for me at all – 5: Absolutely valid for me).

Data Analysis

We resorted to the views of academicians who are experts in this subject for content validity. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were applied for structure validity. Using EFA proved that the scale has a meaningful structure, and how many factors comprise the items in the scale was determined. CFA was applied to test the compatibility of the model formulated in EFA. The efficiency of the model was evaluated by examining the compatibility and error indexes obtained with the help of CFA. Internal consistency and test-retest methods were applied to determine the reliability of the scale. Cronbach Alpha values for the whole test and for each of the factors that comprise it were calculated for internal consistency, and the Pearson correlation coefficient was calculated for the reliability of the test-retest, which was used to determine the consistency of the scale. Corrected item total correlation was calculated for each item and t-test was applied to test whether or not the items can discriminate upper and lower groups of 27% for items analysis. SPSS 17.0 and LISREL 8.80 package software was used for the validity and reliability analyses of the Multimodal Literacy Scale.

Results

Exploratory Factor Analysis

First, Exploratory Factor Analysis (EFA) was applied to prove the structure validity of the developed scale. To this end, we tested if the data are appropriate for factor analysis; the test results of Kaiser Meyer-Olkin (KMO) and the Barlett Test of Sphericity were examined. A KMO value of .80 or over means that the size of the sample is perfect and a significant chi-square test means that it displays a multivariate normal distribution (Tavşancıl, 2010). The KMO value of the scale was calculated as .897, and the statistical result of the Chi-square test, as a result of the Barlett Test, proved to be significant in the analyses carried out (χ^2 = 232.004, sd: 136, p<.001). In light of these findings, the data used in the study are suitable for the factor analysis.

According to the results of the primary EFA applied on the study data, the scale is comprised of 7 factors. Some of the factors obtained through the varimax axis rotation technique were omitted from the scale because they had fewer than 3 items (Comrey & Lee, 1992). The remaining 17 items were found to be comprised of 3 factors as a result of the analyses conducted. The eigenvalues of these factors are shown below:

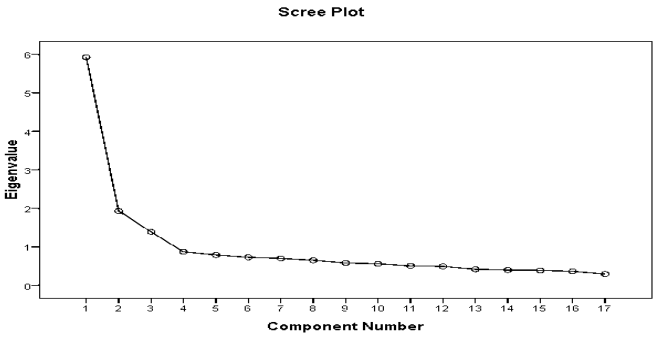

Figure 1. Scree-plot Graphic of Multimodal Literacy Scale

Figure 1 shows there are 3 factors whose eigenvalues are more than 1 (Kaiser, 1960). After the variance explanation rates and varimax axis rotation techniques were applied, the factor loads of the items found in those items are presented in Table 2.

Table 2.

EFA Results of the Multimodal Literacy Scale

Items	Factor 1	Factor 2	Factor 3
28. I organize my thoughts systematically in my presentations thanks to various visual elements (such as tables and graphics).	.790		
18. I prepare an interactive presentation making use of music, visuals, and animations.	.751		
29. Using various elements (such as music and images) in my presentations makes it easier to make my point.	.734		
22. I use visuals such as graphics, tables, pictures, and photographs in my writings.	.720		
26. I express myself more explicitly in environments in which writing, sound, and images exist together.	.650		
10. I relate various visual and verbal information on various media tools to each other.		.732	
11. I interpret the information that I gather from numerous resources.		.690	
5. I can decide whether or not content presented on various media (newspaper, TV, social media, etc.) is true.		.676	
15 I relate the information to which I have access using visual and auditory elements.		.661	
7. I pay attention to the body language of the individuals I am listening to.		.605	
24. I use body language that is in harmony with the words I choose when speaking.		.551	
8. I can realize how visual, auditory, and written elements influence individuals.		.433	
12. I get bored in communication in which written, auditory, and visual elements are used together.			.753
14. I get distracted in electronic environments in which visual, auditory, and written elements are used together.			.752
16. The use of visual, auditory, and written elements together leads to laziness of the mind.			.713
9. I do not like trying to interpret images, sounds, graphics, and writings simultaneously.			.651
19. I only believe in the power of verbal expression when sharing my thoughts.			.596

According to the EFA results in Table 2, the scale of 17 items is made up of 3 factors and can explain 52.63% of the total variance. The variance explained by the factors should be 50% or over in Exploratory Factor Analysis (Erkuş, 2012). The first factor, comprised of 5 items, explains 33.71% of the total variance, and factor load

value ranges between .650 and .790. The second factor, whose factor load values range between .433 and .732, explains 11.17% of the total variance and is comprised of 7 items. The third factor, which explains 7.74% of the total variance, is comprised of 5 items and has factor loads ranging between .596 and .753. After the items that make up the factors have been examined, the first, second, and the third factors were named "Expressing Oneself Using Multimodal Structures", "Interpretation of the Contents Presented in Multimodal Structure", and "Preferring Multimodal Structure", respectively.

Confirmatory Factor Analysis

CFA was applied to verify the 3 factored structure of the Multimodal Literacy Scale obtained through EFA. Factor distributions and values obtained through CFA are presented.

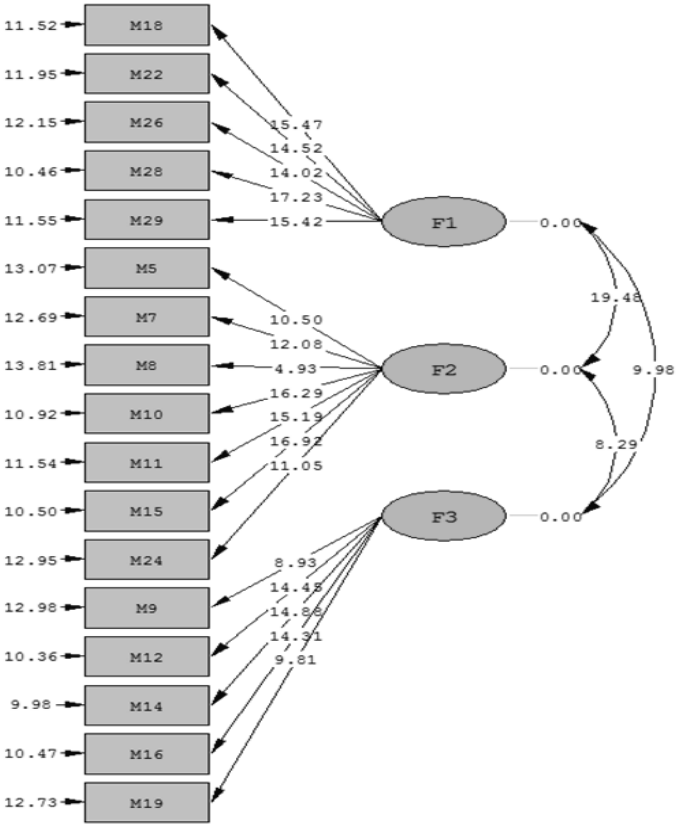

Figure 2. Path Diagram of the Multimodal Literacy Scale

As can be seen in Figure 2, t values concerned with the ability of latent variables to explain observed variables are displayed on arrows. Parameter predictions are .05, significant if t values exceed 1.96 and .01 significant if t values exceed 2.56 (Raykov & Marcoulides, 2008). Within this scope, all of the items have a .01 significance level, as can be seen in Figure 2.

Another value that needs to be examined is p value. This value gives clues about the significance level of the difference between expected the covariance matrix and the observed covariance matrix (χ^2 value). Naturally, it is more favorable when the p value is significant (Raykov & Marcoulides, 2008). As can be seen in Figure 2, p value has a significance of .01. In addition, model fit and error indexes are presented in the table below.

Table 3.

CFA Results of the Multimodal Literacy Scale

χ^2	df	p	χ^2 /df	RMSEA	GFI	AGFI	RMR	SRMR	NFI	NNFI	CFI	IFI
175.77	116	.00	1.51	.036	.95	.93	.042	.038	.97	.99	.99	.99

An important variable that needs to be examined in CFA is χ^2 model fit statistics. This value is assessed in relation to the degree of freedom. Perfect model fit is reached if $\chi^2/sd \leq 2$ (Tabachnick & Fidell, 2007). Table 3 shows that this value is 1.51 in the developed scale. This value is proof of the perfect model fit of the scale.

The fact that the RMSEA value, which is less sensitive to sample size and more sensitive to the relationship between errors, is less than .05 is an indication of perfect model fit (Jöreskog & Sörbom, 1993). When the RMSEA value obtained from the scale (.036) is examined with the help of the analyses conducted within this framework, we can see that a perfect model fit index was obtained.

When the other model fit indexes in Table 3 are examined, GFI=.95 and AGFI=.93 are calculated. GFI and AGFI indexes above .95 correspond to perfect model fit, while values above .90 means a good enough model fit (Sümer, 2000). In this respect, GFI can be said to have perfect model fit and AGFI has a good enough model fit. Standardized RMR and RMR values below .05 mean perfect model fit(Brown, 2006). When Table 3 is examined, RMR=.042 and SRMR=.038 equations can be seen. In this respect, RMR and SRMR can be said to have perfect model fit.

Last, when NFI, NNFI, CFI, and IFI model fit indexes are examined, we see that NFI is .97 and NNFI, CFI, and IFT are .99. NFI, NNFI, CFI, and IFT values above .95 mean perfect model fit (Sümer, 2000). Within this scope, we can say that NFI, NNFI, CFI, and IFT model fit indexes have perfect model fit. Overall, we can say that the 3 factor structure of the Multimodal Literacy Scale comprised of 17 items as a model is confirmed.

Reliability Analysis

Cronbach Alpha coefficients belonging to each factor are presented in Table 4.

Table 4.

Reliability Results of the Sub-Factors of the Multimodal Literacy Scale

Factors	Cronbach-Alfa Internal Consistency Coefficient (α)
Expressing Oneself Using Multimodal Structure	.837
Interpretation of the Contents Presented in Multimodal Structure	.746
Preferring Multimodal Structure	.762

According to the table, the reliability coefficient of each sub-factor is higher than .70, which is the critical value (Kline, 1986; DeVellis, 2003). As a result of the reliability studies conducted, the overall Cronbach-Alpha internal consistency coefficient is identified as .875.

In order to calculate the test-retest reliability coefficient of the scale, it was applied again to 61 prospective teachers 4 weeks after it was first applied. The Pearson correlation coefficient between the points on both occasions was calculated as .880. This outcome demonstrates that the scale produces consistent results on each occasion.

Item Analysis

The findings of the item analysis of the test are presented in Table 5.

Table 5.

Item Analysis Results of the Multimodal Literacy Scale

Factors	Items	Corrected Item-Total Correlation[1]	t (Lower %27-Upper %27)[2]
Expressing Oneself Using Multimodal Structure	18	.64	12.62***
	22	.62	13.86***
	26	.59	13.47***
	28	.70	13.82***
	29	.63	12.72***

Table 5. Continued

Interpretation of the Contents Presented in Multimodal Structure	5	.47	8.00***
	7	.52	9.39***
	8	.25	8.68***
	10	.61	11.86***
	11	.59	10.57***
	15	.60	14.39***
	24	.47	11.08***
Preferring Multimodal Structure	9	.43	7.90***
	12	.59	13.32***
	14	.59	14.05***
	16	.59	14.88***
	19	.45	11.18***

[1] n=392, [2] $n_1=n_2=106$
*** $p<.001$

The table shows that all items (except for item no. 8) have a corrected item-total correlation above .30, which is the threshold value. Although the corrected item-total correlation of item 8 was computed as .25, it was not omitted from the scale as the other values computed were positive and the item is eligible for this scale. Furthermore, Özçelik (2010) states that items with corrected item-total correlation values between .20 and .30 are employable in such scales. In addition, one can see that t values computed for lower and upper groups of 27% are significant ($p<.001$). These results can be interpreted to indicate that the items in the scale have a high validity rate and can discriminate between students with regard to their capabilities of multimodal literacy.

Discussion and Conclusion

Most texts individuals encounter today are multimodal in structure; written, visual, and auditory elements are used together. Students who spend most of their time on social networks (such as YouTube, Facebook, and Twitter) or playing various computer games gain experience in dynamic, non-linear, and interactive multimodal environments. Alternatively, the dominance of paper-based verbal education at schools results in a digital divide between school and daily life in this respect (Kellner, 2000). Teachers, who prepare individuals for their future lives and who should act as models, have to overcome this division by keeping pace with advancing technology. Therefore, it is important that teachers possess multimodal literacy skills. Many researchers argue that teachers should be able to: access various texts, either paper-based or electronic-based (newspapers, brochures, websites, books, Kindles, etc.); read and write such texts; produce texts that will be a part of the virtual world for various media (such as social media, blogs); and design interactive and dynamic media using Web 2.0 tools (Cuming, Kimber & Wyatt-Smith, 2012; Doering, Beach & O'Brien, 2007; Turner, 2012, cited in Tüzel, 2013).

Tüzel (2013) conducted a quantitative study on the opinions of 61 prospective teachers and concluded that prospective teachers have a low awareness level of

multimodal text structures and multimodal literacy education. In this study, a scale designed to measure the multimodal literacy skills of future teacher was developed. In this way, we can identify the multimodal literacy skills during their undergraduate education, whereby we can identify the prospective teachers without such skills and they can be trained in this respect.

During the development process of the Multimodal Literacy Scale, validity and reliability studies were conducted on the 32-item test form after the expert evaluations. Content and construct validity were examined for validity studies. We referred to academicians who are experts in their respective fields for content validity. We applied EFA and CFA for construct validity. At the end of EFA, we identified that the scale has a 3 factored structure that explains 52.63% of the total variance. As a result of CFA, consistency index values were identified and it was recognized that the 3 factor structured scale, made up of 17 items, was verified as a model. EFA and CFA results demonstrated that the scale has a valid 3 factorial structure. In order to determine the reliability of the scale, we calculated the Cronbach Alpha internal consistency and test-retest reliability coefficients. In light of the values obtained, the scale was concluded as reliable. During the studies of item analysis, corrected item-total correlation of the items within 3 factors was calculated and the t-test was used to determine if these items discriminate the 27% of the upper and the 27% of the lower groups. These results can be interpreted to indicate that the items in the scale have a high validity rate and can discriminate between students with regard to their capabilities of multimodal literacy.

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Çok Katmanlı Okuryazarlık Ölçeği: Geçerlik ve Güvenirlik Çalışması

Atıf:

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Özet

Problem Durumu: Çağımızda bireylerin günlük hayatta karşılaştıkları metin yapılarının birçoğu yazı, ses ve görsel unsurların bir arada kullanıldığı çok katmanlı yapıdadır. Zamanlarının büyük bir bölümünü youtube, facebook, twitter gibi sosyal ağlarda ve çeşitli bilgisayar oyunlarında geçiren öğrenciler dinamik, doğrusal

olmayan ve etkileşimli çok katmanlı ortamlarda deneyim kazanmaktadırlar. Bununla birlikte okullarda kâğıt tabanlı söze dayalı eğitimin hâkim olması, okul ve günlük yaşam arasında bu bağlamda bölünmüşlük yaşanmasına neden olmaktadır. Bireyi hayata hazırlayan ve onlara iyi bir model olması gereken öğretmenler gelişen teknolojiye ayak uydurarak bu bölünmüşlüğün önüne geçmeleri gerekmektedir. Birçok araştırmacı da öğretmenlerin, kağıt tabanlı ve elektronik türden çeşitli metinlere ulaşabilmesi, okuyup yazabilmesi; sanal dünyanın bir parçası olacak iletileri çeşitli ortamlara yönelik üretebilmesi; Web 2.0 araçlarını kullanarak etkileşimli ve dinamik multimedya ortamlar tasarlayabilmesi gerektiğini savunmaktadırlar. Derste çok katmanlı metinlerin kullanımıyla birlikte, öğrencilerin ders işleme sürecinde bilişsel becerilerini daha yoğun kullandıkları, daha katılımcı ve üretken olduklarını belirttikleri görülmüştür. Eğitim ortamlarında çok katmanlılığa yer verilmesi öğrencilerin bireysel özelliklerine göre ya da baskın zekâ alanlarına göre öğretim yapılması açısından önem taşımaktadır.

Araştırmanın Amacı: Öğretmenlerin çok katmanlı okuryazarlık becerilerine sahip olması öğretmen eğitimi açısından önemli bir unsur olarak görülmektedir. Bu çalışmada öğretmen adaylarının çok katmanlı okuryazarlık becerilerini ölçmeyi amaçlayan bir ölçek geliştirilmiştir.

Araştırmanın Yöntemi: Bu araştırmada öğretmen adaylarına yönelik çok katmanlı okuryazarlık ölçeğini geliştirmek amaçlandığı için araştırma tarama modeline göre desenlemiştir. Araştırmanın çalışma grubunu Adnan Menderes Üniversitesi Eğitim Fakültesi'nin çeşitli bölümlerinde öğrenim gören 392 lisans öğrencisi oluşturmaktadır.

Çalışmaya temel teşkil eden veriler, öğretmen adaylarının çok katmanlı okuryazarlık becerilerini belirlemek amacıyla hazırlanmış bir ölçekle toplanmıştır. Madde havuzu alanla ilgili literatür taramasına ve uzman görüşlerine başvurularak belirlenmiştir. Alınan görüşler doğrultusunda 45 maddelik bir madde havuzu oluşturulmuştur. Alandaki uzmanların yanı sıra, dil ve ölçme değerlendirme uzmanlarının görüşleri doğrultusunda açık ve anlaşılır olmayan, muğlak olan ve birden fazla yargı içeren madde havuzundaki 13 madde çıkarılmış ve 32 maddelik denemelik form oluşturulmuştur. Ölçeğin geçerliğini belirlemek için kapsam ve yapı geçerlikleri incelenmiştir. Kapsam geçerliği için konu ile ilgili uzman akademisyenlerin görüşlerine başvurulmuştur. Yapı geçerliği için Açımlayıcı Faktör Analizi (AFA) ve Doğrulayıcı Faktör Analizi (DFA) uygulanmıştır. AFA'da ortaya konulan modelin uygunluğunu test etmek için DFA yapılmıştır. Ölçeğin güvenirliğini belirlemek için iç tutarlık ve test-tekrar test yöntemleri uygulanmıştır. Güvenilirlik çalışmaları sonucunda, tüm ölçeğin Cronbach-Alfa iç tutarlılık katsayısınında .875 olduğu belirlenmiştir. Test-tekrar test güvenirlik katsayısını hesaplamak amacıyla ilk uygulamadan 4 hafta sonra ölçek, 61 öğretmen adayına tekrar uygulanmıştır. Ölçeğin her iki uygulamasından elde edilen puanlar arasındaki Pearson korelasyon katsayısı .880 olarak hesaplanmıştır.

Araştırmanın Bulguları: Geliştirilen ölçeğin yapı geçerliğini kanıtlamak amacıyla ilk olarak Açımlayıcı Faktör Analizi (AFA) uygulanmıştır. Bunun için öncelikle verilerin

faktör analizine uygun olup olmadığı test edilmiş ve Kaiser-Meyer-Olkin (KMO) ile Barlett Küresellik testleri sonuçları incelenmiştir. Yapılan analizler sonucunda geliştirilen ölçeğin KMO değeri .897 olarak hesaplanmış ve Barlett testi sonucu elde edilen Ki-Kare test istatistiği sonucunun anlamlı olduğu görülmüştür (χ^2 = 2232.004, sd: 136, p<.001). Bu bulgular doğrultusunda araştırma verilerinin faktör analizi için uygun olduğu söylenebilir. Yapılan analizler sonucunda ölçekte geriye kalan 17 maddenin 3 faktörde toplandığı ve toplam varyansın %52.63'nün açıklandığı görülmektedir. Faktörleri oluşturan maddeler incelenerek, birinci faktör "Çok Katmanlı Yapıyı Kullanarak Kendini İfade Etme", ikinci faktör "Çok Katmanlı Yapıda Sunulan İçeriği Anlamlandırma" ve üçüncü faktör "Çok Katmanlı Yapıyı Tercih Etme" şeklinde isimlendirilmiştir. Geliştirilen Çok Katmanlı Okuryazarlık Ölçeğinin AFA sonucunda elde edilen 3 faktörlü yapısını doğrulamak amacıyla DFA uygulanmıştır. İncelenmesi gereken değerlerden biri p değeridir. Bu değer beklenen kovaryans matrisi ile gözlenen kovaryans matrisi arasındaki farkın (χ^2 değerinin) manidarlığı hakkında bilgi verir. Doğal olarak p değerinin anlamlı olması arzu edilen bir durumdur. P değeri .01 düzeyinde anlamlıdır. Eğer $\chi^2/\text{sd} \leq 2$ ise mükemmel uyum anlamına gelir. Geliştirilen ölçekte bu değerin 1.51 olduğu görülmektedir. Bu değer modelin mükemmel uyum gösterdiğinin kanıtıdır. Ayrıca tablo incelendiğinde uyum ve hata indekslerinin mükemmel uyuma sahip olduğu görülmektedir. Bu çerçevede, ölçeğin 17 maddeden oluşan 3 faktörlü yapısının bir model olarak doğrulandığı söylenebilir.

Araştırmanın Sonuçları ve Önerileri: Bireyleri çok katmanlı okuryazar kılabilmek için en önemli görev öğretmenlere düşmektedir. Bunun için öncelikle öğretmenlerin bu yeni okuryazarlık anlayışını derslerine entegre edebilmeleri için konu ile ilgili yeterli olmaları gerekmektedir. Çok katmanlı okuryazarlık öğretimi ile ilgili yapılan çalışmalarda öğretmen adaylarının çok katmanlı okuryazarlık öğretimine ilişkin farkındalık düzeylerinin düşük olduğu sonucuna ulaşmıştır. Bu çalışmada da gelecek nesillerin eğitiminde önemli rol oynayacak olan öğretmen adaylarının çok katmanlı okuryazarlık becerilerini ölçmeyi amaçlayan bir ölçek geliştirilmiştir. Yapı geçerliği için uygulanan AFA sonucunda ölçeğin 3 faktörlü bir yapıda olduğu bulunmuş ve DFA sonucunda da ölçeğin bu yapısının bir model olarak doğrulandığı görülmüştür. Ölçeğin güvenirliğini belirlemek için Cronbach-Alfa iç tutarlık ve test-tekrar test güvenirlik katsayıları hesaplanmıştır. Bulunulan değerlere göre ölçeğin güvenilir olduğu sonucuna varılmıştır. Yapılan analizler sonucunda geçerli ve güvenilir olduğu saptanan ölçek ile öğretmen adaylarının çok katmanlı okuryazarlık becerilerinin lisans eğitimlerinde belirlenebileceği düşünülmektedir. Dolayısıyla bu beceriye sahip olmayan öğretmen adaylarının tespit edilerek bu yönde çalışmalar yapılması beklenmektedir.

Anahtar Sözcükler: Çok katmanlı okuryazarlık, ölçek geliştirme, geçerlik, güvenirlik