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Development and Factor Analysis of an Instrument to Measure Preservice Teachers' Perceptions of Learning Objects

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The purpose of this study was to develop a questionnaire to measure student teachers' perception of digital learning objects. The participants included 308 voluntary senior students attending courses in a college of education of a public university in Turkey. The items were extracted to their related factors by the principal axis factoring method. The results showed a 3 factor solution: Perceived Educational Merit, Perceived Use and Development in the Class, and Perceived Accessibility. Descriptive results revealed that preservice teachers think learning objects are easy to develop, use, and access; have an educational value; and are useful in teaching and learning. Replications with different samples are recommended to enhance and validate the questionnaire. Similar studies are also recommended to reveal innovative uses of learning objects in teacher education.

Keywords: Questionnaire Development, Learning Objects, Teacher Education

INTRODUCTION

Technology Integration

Although technology is everywhere, most schools lack far behind when it comes to integrating technology into classroom learning. Integrating technology into classroom instruction means more than teaching basic computer skills and software programs in a separate computer class. Effective technology integration must happen across the curriculum in ways that enhance the learning process. In particular, it must support 4 key factors of learning: active engagement, participation in groups, frequent interaction and feedback, and connection to real-world experts. Effective technology integration is achieved when the use of technology is routine and transparent and when technology supports curricular goals.

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For successful use of computers, educators must shift their focus from just providing more computers in schools to investing in faculty. Fabry and Higgs (1997) state: "If the integration of technology in the classroom in the next ten years is to look any different from the last ten, we must focus time, money, and resources in areas that can have the greatest impact for our students, our teachers" (p. 393).

According to Rogers (1995), one of the major factors affecting people's attitudes toward a new technology is related to the features of the technology itself. Rogers points out 5 basic features of technology that affect its acceptance and adoption: relative advantage, compatibility, complexity, observability, and triability. Thus, a new technology will be increasingly diffused if potential adopters perceive that the innovation:

- ✓ *has an advantage over previous innovations;*
- ✓ *is compatible with existing practices;*
- ✓ *is not too complex to understand, while its use shows observable results;*
- ✓ *and can be experimented with on a limited basis before adoption.*

Rogers and Shoemaker (1971) found that relative advantage, compatibility, and observability were positively related to adoption, whereas complexity was

State of the literature

- A large body of literature shows that teachers lack the competence of integrating technology into classroom learning.
- Especially in recent years, with the advent of distance learning, there is a growing interest on learning objects and the research body supports the idea that learning objects are beneficial in teaching and learning various content areas, and particularly in science and mathematics.
- Hence, there is a need for measuring student teachers' perception in the diffusion of innovation.

Contribution of this paper to the literature

- A questionnaire to measure student teachers' perception on learning objects is developed and validated.
- Perceived Educational Merit, Perceived Use and Development in the Class, and Perceived Accessibility are the factors of preservice teachers' perception of learning objects in the assessment of teacher education programs in terms of the effectiveness of the use and dissemination of technology.
- Evidence that teacher education courses use learning objects in integrating technology in teaching and learning.
- Recommendation that courses in teacher education integrate more innovative use of learning objects.

negatively correlated. Researchers have shown that the successful implementation of educational technologies depends largely on the perception of educators, who eventually determine how they are used in the classroom.

Reports indicate that faculty members are not integrating technology into instruction in ways that make a difference in student teachers' learning (Cuban, 2001; McCannon and Crews, 2000). Many critics have argued that successful use of technology in schools may depend on how well schools of education model technology, provide opportunities for practice and reflection, and prepare teacher candidates to use technology in their own classrooms (Kent and McNergney, 1999; Pellegrino and Altman, 1997). Bullock (2004) found that teachers' attitudes are a major enabling or disabling factor in the adoption of technology. Similarly, Kersaint, Horton, Stohl, and Garofalo (2003) found that teachers who have positive attitudes toward technology feel more comfortable using it and usually incorporate it into their teaching. Woodrow (1992) asserts that any successful transformation in educational practice requires the development of positive user attitudes toward the new technology. The development of teachers' positive attitudes toward ICT is a key factor not only for enhancing computer integration but also for avoiding teachers' resistance to computer use (Watson, 1998).

Most teacher candidates seeking teacher certification have little experience integrating technology into the students' learning process and typically do not have experience using models on which to build their own visions of an integrated classroom (Beichner, 1993; Cifuentes, 1997; Kerr, 1996; Morehead and LaBeau, 2005, Schrum, 1999; Strudler and Wetzel, 1999). Teacher candidates currently receive little technical, pedagogical, or administrative support for these fundamental changes, and few teacher preparation programs prepare their graduates adequately to use technology to enhance student learning. As a result, most teacher candidates have very little insight into how to integrate technology into their curriculum (Recesso, Wiles, Venn, Campbell, and Padilla, 2002).

Integrating Digital Learning Objects into Teaching and Learning

Learning materials (audio, video, animation, etc.) used in learning environments created with the use of Internet technologies in teaching, in general, are called learning objects (Merrill, 2000; Wiley, 2000). Digital learning objects, similar to written and visual materials, are assets that have learning goals and features in their own properties. In contrast to the written and visual materials known by the classical meaning, digital learning objects are designed as desired and updated and reused easily, which are important features. Reuse at the same time is shown as the most significant difference, and everyone reaches the digital learning objects simultaneously. However, it is quite difficult, even impossible, to provide this feature by using other materials (video tapes, audio tapes, etc.). Since learning objects are small pieces and each piece is designed as a means to express itself, more than one learning object can be brought together and used as appropriate according to the learning goal.

According to Weller (2004), learning objects can address the dilemma of high fixed costs of production in e-learning in 4 ways: reuse, rapid production, ease of updating, and cost effective pedagogy. Similarly, Chrysostomou and Papadopoulos (2008) recommend that learning objects can easily be aggregated to form larger learning contents, which can also be reused when necessary, and that learning objects have the ability to be used in a variety of contexts. Instructors will be able to use the learning objects in a variety of teaching styles or apply to them their own preferred style; learning objects will become more appealing to instructors and consequently to learners.

Maniar, Garrison, Simms, and Bennett (2007) conducted a survey to measure the success of a learning object broker service aiming to facilitate the easy purchasing and selling of learning objects, thus enabling the efficient creation of course content. They interviewed 173 educators from a cross-section of subject areas in UK higher and further education institutions. After being presented with a short description of an 'ideal' learning object broker service, approximately two-thirds of the interviewees reported that they would consider using the service to support their teaching. However, the most striking finding of the survey was the limited current usage of e-learning resources and digital media. Although the use of video, either recorded from the television or purchased, was widespread, none of the interviewees used any kind of computer-based learning resource.

Lau and Woods (2008) carried out a study to investigate how user beliefs and attitudes influence learning object use among higher education learners by evaluating the relationships between perceived usefulness, perceived ease of use, attitude, behavioral intentions, and actual use. Their study included 481 users. Lau and Peter found that both the user beliefs and attitudes had significant positive relationships with behavioral intention and that behavioral intention accurately predicted the actual use of learning objects.

Kay and Knaack (2008) aimed to develop and assess a multicomponent model for evaluating learning objects. A sample of 1113 middle and secondary students, 33 teachers, and 44 learning objects was used to test this model. Their principal axis factoring revealed 4 distinct constructs: interactivity, design, engagement, and usability. The constructs also correlated significantly with student and teacher perceptions of learning, quality, and engagement. Kay and Knaack found that all 4 constructs were significantly and positively correlated with student learning performance.

Kay, Knaack, and Petrarca (2009) analyzed teacher perceptions of the use of web-based learning objects in middle and secondary school classrooms. Data were collected from a learning object scale for teachers. They found that most teachers rated learning objects as easy-to-use and engaging for students. They also reported that learning objects promoted successful learning. A number of teachers noted that significant time was spent searching for appropriate learning objects and preparing lessons. They found that the main suggestion offered by teachers was to be prepared to spend time selecting, testing, and preparing the materials in order to ensure successful use of learning objects.

Manea and Rutledge (2008) examined teachers' attitudes and perceptions toward the use of learning objects-based instruction and a project-based format as an instructional strategy in an advanced multimedia classroom. They found that both the teachers' current views about the courseware and the perceived importance of similar environment were positive toward the use of the learning objects in e-learning, while teachers with strong technical skills and experiences appeared to have a more positive attitude toward the learning objects-based instruction than traditional web-based instruction.

Francis and Murphy (2008) investigated how instructional designers conceptualize learning objects and their attributes. They aimed to identify the range and types of conceptualizations of learning object attributes held by a group of designers. Data were collected during 2 phases of semistructured phone interviews with 10 instructional designers working in Canadian colleges and universities. Designers identified the following attributes of learning objects: digital, interactive, pedagogically purposeful, pedagogically worthwhile, pedagogically assessable, usable, reusable, peer reviewable, and granular. Designers conceptualized learning objects and their attributes with more of a focus on pedagogical best practices rather than a focus on technical definitions of learning objects.

Elliott and Sweeney (2008) conducted a case study to examine the efficiencies gained through the use of existing learning objects to support a healthcare course rather than having to develop new learning objects. They found that the approach whereby they focused on using existing materials promoted a threefold advantage in development time and a reduced cost. Additionally, they reported that gaining permission to use materials was not found to be a significant problem, and some difficulties were noted in ensuring that existing learning objects suitably matched the context of instruction.

In summary, recent research results explain that learning objects are useful tools in teaching and learning. There are repositories that teachers can access for learning objects. There are environments in which teachers use learning objects and there are methods by which teachers integrate learning objects. However, there is a lack in measuring the effects of learning objects in teaching and learning on pedagogical, behavioral, and emotional outcomes. This current study aimed to provide the research literature with a questionnaire to measure student teachers' perception of digital learning objects.

THEORETICAL BACKGROUND

Over the past 8 to 10 years, learning objects have been evaluated and received positively by higher education students. However, little research has been done examining teachers' perceptions of these tools, particularly in middle and secondary school environments (Kay, Knaack, and Petrarca, 2009). This study focuses on digital learning objects, which provide students ways to observe and experiment any

phenomenon and to view results in graphic ways that aid in understanding. The online learning object repositories provide learners with more interesting, diverse, and up-to-date learning materials. The repositories support teachers and students with numerous opportunities for understanding through images, sound, and text. Learning objects are described as any entity, digital or nondigital, that can be used, reused, or referenced during technology-supported learning. According to Wiley (2000), the reusable learning objects approach currently leads other candidates in becoming the technology of choice for the next generation of instructional design, development, and delivery methods due to its potential for reusability, generic character, adaptability, and scalability.

The issues behind the use of learning objects as stated by the literature are use, reuse, development, access, educational merit of learning objects, and learning object repositories. This study has focused on developing a questionnaire to measure preservice teachers' perceptions of these aspects of learning objects.

METHOD

Questionnaires are seen as an inexpensive way to gather data from a potentially large number of respondents. For many good reasons, the questionnaire is the most widely used technique for obtaining information from subjects. Often they are the only feasible way to reach a number of respondents large enough to allow for statistical analysis of the results (McMillan and Schumacher, 2001).

The Purpose of the Study

The purpose of this study was to develop a scale to measure student teachers' perception of learning objects.

Item Generation

The scale items were written in terms of the literature and expert views. The related literature was examined to understand preliminary issues and previous questionnaires. The content of academic studies published in the journals indexed by the Educational Research Information Center (ERIC), Academic Search Complete, Professional Development Collection, and Psychology and Behavioral Sciences Collection was examined in this study. These are core educational indexes citing peer-reviewed or refereed journals, available in full-text for the researcher. The keywords used in the search included "learning objects" and "teacher education" or "higher education." Out of the 126 returns from the searches, 36 found to be directly related to the study were examined to determine the issues and research results. Six themes arose after the review, which were use, reuse, design, development, access, and benefit of learning objects. Twenty-four initial items were generated under these themes. The expert group comprised 2 faculty members teaching instructional design and 2 faculty members teaching educational psychology. The unstructured interview technique was used to carry out the interviews with the experts. Instructional design experts were asked to determine technological aspects related to the learning objects. The answers were collected under the themes of design, development, and reuse. Educational psychology experts were asked to determine aspects related to the learning objects and teaching and learning. The aspects were collected under the themes of educational merit and benefit in teaching and learning. Accordingly, 26 initial items were produced from the interviews. Finally, comparing items produced by both of the data sources, the initial survey consisted of 15 items to be validated as the result of this study.

Participants

The original Turkish version of the scale (see appendix) was administered over the Internet. The participants were 308 voluntary senior pre-service teachers attending courses in a faculty of education of a large metropolitan public university in Turkey. The participants were enrolled in various subject areas in different class levels and the group was composed of 106 males and 202 females.

Data Collection

The data were collected from the participants either in writing or online. The participants were informed about the purpose and the importance of the survey and the required time in which to complete it. The emails of the participants were collected by the instructors of the courses. Two postings were made; the first posting was a request for participation in the survey and the second was a reminder posted one week later. The returns were collected in an Excel file automatically so that no data were lost. The written surveys were completed by the participants before one of their college courses under the supervision of the researcher. Before providing the data, the participants were informed about the survey, including the purpose, the procedure, and the estimated time required, and the informed consent was collected. The participants were informed about what "learning objects" were before the survey. Information included narrative explanations with accompanying graphics. For this study, learning objects included all digital media formats for teaching and learning by which a predefined learning goal is achieved. The explained formats

included digital video, audio, graphics, pictures, texts, animations, simulations, applets, spreadsheets, etc.

Data Analysis

The data were analyzed to explore the underlying structure of the questionnaire items. The statistical method used in the data analysis was exploratory factor analysis. In exploratory factor analysis, the goal is to describe and summarize data by grouping together variables that are correlated. The variables may or may not have been chosen with these underlying structures in mind (Tabachnick and Fidell, 1996). The statistical technique used in the factor analysis was principal axis factoring. The underlying mathematical objective in principal axis factoring is to obtain the least number of factors that can account for the common variance (correlation) of a set of variables (Johnson and Wichern, 1998).

FINDINGS AND DISCUSSION

The data were evaluated to screen for outliers and assessed for normality and linearity. Using Mahalanobis distance, 10 outliers were eliminated. A scatter plot matrix revealed a fairly normal distribution and a linear relationship among the variables.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were also performed to screen the data. The KMO measure was found to be 0.856, which suggests that the sample is adequate for carrying out a factor analysis. Bartlett's test of sphericity was found to be significant, which suggests that the strength of the relationship among the variables is strong, such that the data are suitable for conducting a factor analysis (approximately $\chi^2(df = 105) = 3451$; $P < 0.000$).

A parallel analysis was executed to decide the number of factors. Looking at Table 1, 3 of the eigenvalues in the principal axis factoring column are greater than the eigenvalues in the parallel analysis and percentile columns. This result indicates that 3 factors should be retained.

Looking at the scree plot (Figure 1), the line for parallel analysis in the scree plot graph crosses the principal axis line before reaching the fourth component. This result also supports a solution with 3 components.

Table 2 presents the factor loadings for the rotated factors. The first factor consists of 6 of the 15 variables. These variables have positive loadings and address *Perceived Educational Merit*. The second factor consists of 5 variables and is named as *Perceived Current Use and Development in the Class*. The third factor consists of 4 variables and is named as *Perceived Accessibility*.

Cronbach's alpha reliability coefficients of the subscales and the total scale were satisfactory: 0.92 for Perceived Educational Merit, 0.87 for Perceived Current Use and Development in the Class, 0.86 for Perceived Accessibility, and 0.89 on the global scale. These results indicate that the questionnaire has a good inter-item reliability.

Inter-item correlations (Table 3) ranged from 0.52 to 0.86 for Perceived Educational Merit, from 0.42 to 0.86 for Perceived Current Use and Development in the Class, and from 0.48 to 0.72 for Perceived Accessibility. Item-total correlations are therefore generally reasonably strong in demonstrating reliability and support that items on the same factor (and the global scale) are measuring the same construct, while items on a different factor are measuring a different construct.

Mean and standard deviations for questionnaire items are presented in Table 4. The overall mean for Perceived Educational Merit of learning objects is 4.39, and for Perceived Current Use and Development in the Class, the mean is 3.92. These results suggest the participants' agreement on both dimensions. The overall mean for Perceived Accessibility of learning objects is 3.88. This result also indicates the participants' agreement on the accessibility of learning objects. These results suggest that preservice teachers think learning objects are easy to develop, use, and access, and have an educational value and use in teaching and learning.

CONCLUSION AND RECOMMENDATIONS

As presented in the review of the literature, research has revealed that learning objects are useful tools to support teaching and learning (Elliott and Sweeney, 2008; Francis and Murphy, 2008; Kay and Knaack, 2008; Lau and Woods, 2008; Manea and Rutledge, 2008; Maniar, Garrison, Simms, and Bennett, 2007). This current study resulted in an internally consistent questionnaire by which teacher educators measure their students' perception of the use and merit of learning objects. This measure will inform teacher educators about whether they appropriately adopt and use learning objects. This is important since student teachers see their instructors as role models.

The factors proven by the principal axis factoring are named as Perceived Educational Merit, Perceived Current Use and Development in the Class, and Perceived Accessibility. A similar study has been carried out by Kay and Knaack (2008), and their principal axis factoring revealed 4 constructs: interactivity, design, engagement, and usability. Francis and Murphy (2008) have carried out a similar study, in which they investigated how instructional designers conceptualize learning objects and their attributes. The attributes identified were digital, interactive, pedagogically

Table 1. Parallel Analysis.

	Eigenvalues		
Root	Principal Axis Factoring(raw data)	Parallel Analysis(mean)	Percentile
1.000000	**5.994147**	**1.397234**	**1.481313**
2.000000	**3.029046**	**1.301796**	**1.366514**
3.000000	**1.582010**	**1.236869**	**1.286051**
4.000000	0.964592	1.178530	1.225286
5.000000	0.772087	1.129637	1.167314
6.000000	0.537314	1.078683	1.110224
7.000000	0.410707	1.031571	1.067222
8.000000	0.370402	0.986501	1.019374
9.000000	0.294493	0.942604	0.978439
10.000000	0.243004	0.899110	0.929246
11.000000	0.211979	0.855267	0.890691
12.000000	0.178258	0.812851	0.848435
13.000000	0.155637	0.770582	0.801720
14.000000	0.134444	0.717780	0.759686
15.000000	0.121883	0.660984	0.707719

Table 2. Factor Loadings.

	Component		
	Educational Merit	Use and Development in Class	Accessibility
Learning objects (LOs) will appeal to my students' interest.	**0.867**	0.096	0.074
LOs will help my students' learning.	**0.866**	0.046	0.103
LOs will help my teaching.	**0.843**	0.016	0.074
Using LOs in teaching and learning is a very good idea.	**0.707**	0.072	0.383
LOs are very good innovations in teaching and learning.	**0.697**	0.070	0.364
LOs are very good tools for teaching and learning.	**0.687**	0.084	0.350
I use LOs in the class frequently.	0.088	**0.896**	0.072
I use LOs in the class properly.	0.046	**0.876**	0.049
I use LOs in the class effectively.	0.037	**0.742**	0.114
I have enough knowledge to develop LOs.	-0.027	**0.636**	0.331
It is very easy to develop LOs.	0.124	**0.512**	0.260
I know how to access LO repositories.	0.125	0.179	**0.893**
I know what an LO repository is.	0.303	0.103	**0.717**
I know how to benefit from LO repositories.	0.253	0.198	**0.666**
I know how to access LOs.	0.207	0.336	**0.569**

Table 3. Inter-Item Correlation Matrix.

	Educational Merit						Current Use And Development in the Class					Accessibility			
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**1.00**	**0.86**	**0.80**	**0.56**	**0.58**	**0.54**	0.18	0.13	0.07	0.06	0.19	0.21	0.33	0.33	0.29
2	**0.86**	**1.00**	**0.82**	**0.56**	**0.57**	**0.55**	0.13	0.08	0.02	0.06	0.17	0.22	0.35	0.35	0.29
3	**0.80**	**0.82**	**1.00**	**0.57**	**0.53**	**0.52**	0.10	0.05	0.04	0.00	0.13	0.19	0.32	0.33	0.23
4	**0.56**	**0.56**	**0.57**	**1.00**	**0.77**	**0.84**	0.13	0.09	0.18	0.17	0.23	0.40	0.48	0.36	0.38
5	**0.58**	**0.57**	**0.53**	**0.77**	**1.00**	**0.79**	0.15	0.12	0.18	0.11	0.21	0.41	0.51	0.34	0.31
6	**0.54**	**0.55**	**0.52**	**0.84**	**0.79**	**1.00**	0.14	0.13	0.17	0.15	0.23	0.38	0.42	0.36	0.34
7	0.18	0.13	0.10	0.13	0.15	0.14	**1.00**	**0.86**	**0.66**	**0.56**	**0.44**	0.26	0.17	0.30	0.32
8	0.13	0.08	0.05	0.09	0.12	0.13	**0.86**	**1.00**	**0.69**	**0.50**	**0.39**	0.22	0.17	0.26	0.29
9	0.07	0.02	0.04	0.18	0.18	0.17	**0.66**	**0.69**	**1.00**	**0.49**	**0.42**	0.23	0.17	0.16	0.35
10	0.06	0.06	0.00	0.17	0.11	0.15	**0.56**	**0.50**	**0.49**	**1.00**	**0.59**	0.38	0.27	0.30	0.46
11	0.19	0.17	0.13	0.23	0.21	0.23	**0.44**	**0.39**	**0.42**	**0.59**	**1.00**	0.30	0.27	0.27	0.36
12	0.21	0.22	0.19	0.40	0.41	0.38	0.26	0.22	0.23	0.38	0.30	**1.00**	**0.71**	**0.72**	**0.60**
13	0.33	0.35	0.32	0.48	0.51	0.42	0.17	0.17	0.17	0.27	0.27	**0.71**	**1.00**	**0.62**	**0.48**
14	0.33	0.35	0.33	0.36	0.34	0.36	0.30	0.26	0.16	0.30	0.27	**0.72**	**0.62**	**1.00**	**0.53**
15	0.29	0.29	0.23	0.38	0.31	0.34	0.32	0.29	0.35	0.46	0.36	**0.60**	**0.48**	**0.53**	**1.00**

Table 4. Mean and Standard Deviations.

	Mean	Std. D.
Perceived Educational Merit	**4.39**	**0.88**
LOs will appeal to my students' interest.	4.39	0.88
LOs will help my students' learning.	4.41	0.86
LOs will help my teaching.	4.33	0.89
Using LOs in teaching and learning is a very good idea.	4.48	0.79
LOs are very good innovations in teaching and learning.	4.38	0.81
LOs are very good tools for teaching and learning.	4.41	0.79
Perceived Current Use and Development in the Class	**3.92**	**0.92**
I use LOs in the class frequently.	3.15	1.06
I use LOs in the class properly.	3.14	1.07
I use LOs in the class effectively.	3.34	1.03
I have enough knowledge to develop LOs.	3.28	1.04
It is very easy to develop LOs.	3.37	1.01
Perceived Accessibility	**3.88**	**0.93**
I know how to access LO repositories.	3.77	0.98
I know what an LO repository is.	3.80	1.02
I know how to benefit from LO repositories.	3.58	0.99
I know how to access LOs.	3.78	0.90

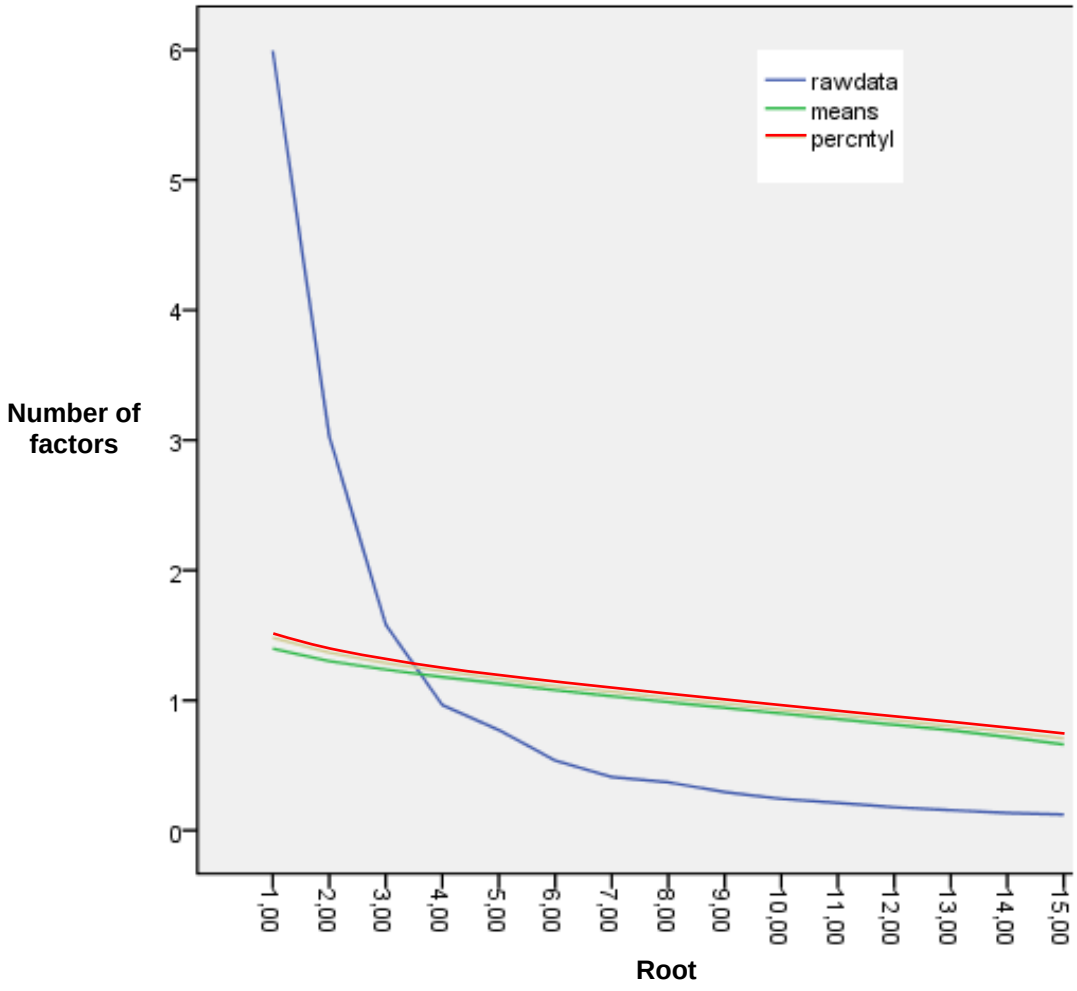

Figure 1. Scree Plot Graph.

purposeful, pedagogically worthwhile, pedagogically assessable, usable, reusable, peer reviewable, and granular.

Descriptive results revealed that preservice teachers think that learning objects are easy to develop, use, and access, and have an educational value and use in teaching and learning. Lau and Woods (2008) found that teachers' beliefs and attitudes have significant positive relationships with behavioral intention and the actual use of learning objects. Manea and Rutledge (2008) examined teachers' attitudes toward and perceptions of the use of learning objects-based instruction and found that teachers have a more positive attitude toward the learning objects-based instruction than traditional web-based instruction. Although the result of this study indicates that teacher educators use learning objects in the class so that teacher candidates see learning objects are easy to access, have an educational value, and are useful in teaching and learning, they still need to find innovative ways to integrate learning objects in teacher education.

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Appendix: The Original form of the Scale of Preservice Teachers' Perceptions of Learning Objects in Turkish

Hizmet-Öncesi Öğretmen Öğrenme Nesnesi Algı Ölçeği

Eğitsel Değer Algısı

1. Öğrenme nesneleri öğrencilerimin ilgisini çekecektir.
2. Öğrenme nesneleri öğrencilerimin öğrenmesine yardım edecektir.
3. Öğrenme nesneleri öğretmeme yardım edecektir.
4. Öğrenme ve öğretmede Öğrenme nesnelerinin kullanılması iyi bir düşüncedir.
5. Öğrenme nesneleri öğrenme ve öğretmede çok iyi bir yeniliktir.
6. Öğrenme nesneleri öğrenme ve öğretmede çok iyi araçlardır.

Sınıfta Kullanma ve Geliştirme Algısı

7. Öğrenme nesnelerini sınıfta çok sıklıkla kullanıyoruz.
8. Öğrenme nesnelerini sınıfta doğru kullanıyoruz.
9. Öğrenme nesnelerini sınıfta etkili kullanıyoruz.
10. Öğrenme nesnelerini kullanmak için yeterli bilgiye sahibim.
11. Öğrenme nesnelerini geliştirmek çok kolaydır.

Erişim Algısı

12. Öğrenme nesnesi ambarlarına nasıl erişebileceğimi biliyorum.
13. Öğrenme nesnesi ambarının ne demek olduğunu biliyorum.
14. Öğrenme nesnesi ambarlarından nasıl yararlanabileceğimi biliyorum.
15. Öğrenme nesnesi ambarlarına nasıl erişebileceğimi biliyorum.