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ASSESSMENT OF UNIVERSITY STUDENTS' ONLINE SPECIFIC EPISTEMOLOGICAL BELIEFS

Üniversite Öğrencilerinin Çevrimiçi Epistemolojik İnançlarının Değerlendirilmesi

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ABSTRACT

The purpose of this study is to develop a domain-specific scale that would be used to determine epistemological beliefs of university students towards online learning media. In the developed scale epistemological beliefs are designed as multidimensional to reflect both belief system perspective and developmental perspectives as revised by Hofer and Pintrich (1997). 1058 volunteer students that attended remote classes during the Covid-19 pandemic participated in the study and answered scale items. In this scope as a result of exploratory factor analysis, factor structure of the 15-item scale came forward as 2-dimensional, namely Nature of Knowing and Nature of Knowledge dimensions. It was noted that load distribution factor of scale items varied between 0.40 and 0.74. Cronbach Alfa coefficient calculated for scale reliability was found to be 0.80 for each dimension. Also, it was established that this two-factor structure explained 39.44% of total variance. It is considered that the sample of the study has a rich cultural diversity and acts as a bridge between the Asian and European continents adding an intercultural structure to the scale. Thus, it is believed that deductions and comments made with the 2-dimensional, 15-item "Online-Specific Epistemological Beliefs" scale would be valid and reliable.

Anahtar Kelimeler
Epistemolojik inançlar ölçeği, İnternet-odaklı epistemolojik inançlar, Çevrimiçi öğrenme, Yükseköğretim

ÖZ

Bu araştırmanın amacı, üniversite öğrencilerinin çevrimiçi öğrenme ortamlarına yönelik epistemolojik inançlarını tespit etmede kullanılacak alan odaklı (domain spesific) bir ölçek geliştirmektir. Geliştirilen ölçekte epistemolojik inançlar Hofer ve Pintrich'in (1997) revize ettiği haliyle hem inanç sistemi perspektifini hem de gelişimsel perspektifleri yansıtacak şekilde çok boyutlu olarak tasarlanmıştır. Covid-19 pandemi döneminde uzaktan öğretim yoluyla ders alan 1058 gönüllü öğrenci araştırmaya katılarak ölçek maddelerini yanıtlamıştır. Bu bağlamda açımlayıcı faktör analizi sonucunda 15 maddeden oluşan ölçeğin faktör yapısı Nature of Knowing ve Nature of Knowledge olmak üzere 2 boyutlu olarak ortaya çıkmıştır. Ölçekteki maddelerin faktör yükü dağılımlarının .40 ile .74 arasında değiştiği görülmüştür. Ölçeğin güvenirliği için hesaplanan Cronbach alfa iç tutarlık katsayısı .80 olarak bulunmuştur. Ayrıca bu iki faktörlü yapının toplam varyansın 39.44% 'ünü açıkladığı görülmüştür. Ölçeğin hem doğu hem de batı kültürünün kesiştiği; kültürel çeşitliliği zengin; konumu gereği Asya ve Avrupa kıtaları arasında köprü görevi gören bir coğrafyada geliştirilmiş olmasının ölçeğe kültürler arası bir yapı kazandıracağı düşünülmektedir. Sonuç olarak, 15 maddeden oluşan 2 boyutlu "Online-Specific Epistemological Beliefs" ölçeği ile yapılacak çıkarım ve yorumların geçerli ve güvenilir olacağı düşünülmektedir.

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1. Introduction

Knowledge has always been valuable for human beings. Ever since they came to existence, humans undertook an intense and challenging process of search-examination in countless domains starting from its reason for being, developed with its acquirements in the process of accessing knowledge and arrived at its current state. Today, accessing knowledge is accepted as one of the development indicators of countries (United Nations Development Program-UNDP, 2020). This situation created a competitive medium in terms of digging up further/true information and knowledge.

In these days and age, obstacles to reaching further knowledge have been removed by means of developments in information and communication technologies which have also promoted contemporary themes and content. By means of these developments, individuals have accessed necessary knowledge sources quickly through online media tools. Also, individuals have contributed actively to development in knowledge with both of formal and informal ways (Szymkowiak et al., 2021; Zafarmand, 2010). This advantage of online technologies has created difficulties for individuals and learners in terms of taking decisions about the quality of knowledge. Therefore, epistemological development is vital not only for learners but also knowledge makers.

One of the most important factors in achieving such accumulated knowledge is epistemological beliefs (Hofer & Pintrich, 1997). Epistemological beliefs encompass orientations and tendencies of humans towards nature of knowledge and knowing, directly affecting knowledge acquisition methods (Hofer & Pintrich, 1997). Thus, epistemological beliefs are accepted among the most important variables that must be made more qualified and developed at every level of education (Kuhn, 1991).

Nowadays, with the COVID-19 pandemic we entered into a new era of knowledge age. In this period, with measures taken and prohibitions introduced to fight against the Corona virus pandemic that is effective all around the world, socialization of persons is considerably restricted. In this extraordinary situation with various uncertainties, many individuals have had to cope with psychological problems such as fear, anxiety, stress, and depression (The Psychiatric Association of Turkey-PAT, 2020; World Health Organization, 2020) and people were directed towards online media to avoid such problem situations and meet physiological and psychological needs they could not in social life (Brooks et al., 2020; Nimrod, 2020). Similarly, education and business lives were substantially affected from this situation and were carried to online media from physical, thus popularizing Internet use even more. Consequently, individuals started to actively use online media for informal learning activities as well as for formal learning activities (Heidari, Mehrvarz, Marzooghi & Stoyanov, 2021; Watkins & Marsick, 2021). All such developments increased demand for online learning media much more compared to pre-pandemic period. So much so that, according to Survey on Knowledge and Communication Technology Use in Households (Turkish Statistical Institute-TUIK, 2020), rate of Internet use increased by 6.1% among 16-74 year-old individuals compared to 2018 and reached 79%. According to WeAreSocial (2021) Turkey report, among purposes of use of online media by Internet users, knowledge search comes at the top with 63%. Similar to this data, studies in the literature demonstrate that students use the online environments largely as knowledge source (Akkoyunlu & Yilmaz, 2005; Kurbanoğlu, 2002; Oliver & Goerke, 2007; Tsai, 2008).

Internet enriches education-learning process and presents instructors and learners with rich experiences in both formal and informal learning media (Akkoyunlu & Yilmaz, 2005). However, the internet users that participated in online learning media only in "reader" role in the past became able to contribute to existing content swiftly with development of WEB 2.0 technologies (Zafarmand, 2010). Among methods employed by users to share content they created, the most frequently used is shares on social media platforms. Today, 53.6% of world population and 70.8% of Turkey actively uses various social media applications (WeAreSocial, 2021). When average time spent on the Internet is studied, it could be noted that users spare about one-third of the time they spend on the internet to social media applications (WeAreSocial, 2021). On such platforms individuals can share content open to other internet users and share knowledge. However, the knowledge published on the internet and through the social media are open to all kinds of knowledge manipulations (Ay, 2016) and these information sources mostly need confirmation (Aydin, 2020; Gecgel, Kana, Ozturk & Akkas, 2020; Tsai, 2001).

Consequently, accumulated knowledge in online media ease access to knowledge while also making it difficult to decide on the quality of accessed knowledge (Nazim, 2008; Tsai, 2001). Studies demonstrate that users of online learning media run into various problems while searching knowledge on the internet in terms of using search motors, determining relevant keywords, and assessing search results (Lee & Tsai, 2011; Lorenzen, 2002; Walraven, Brand-Gruwel, & Boshuizen, 2008). The knowledge that accumulates at online learning media in time might result in users getting lost in search process (Askar & Mazman, 2013; Debowski, 2001). In this case, users must be qualified to assess suitability, reliability, and quality of knowledge at online learning media in the process of searching knowledge on the internet (Brand-Gruwel, Wopereis, & Vermetten, 2005;

Kammerer, Bråten, Gerjets & Strømsø, 2013; Tsai, Tsai & Hwang, 2011). Thus, it is important that knowledge search strategies regarding online learning media together with epistemological beliefs on online learning media that reportedly guide such strategies must be determined and developed (Bråten, 2008; Chiu, Liang, & Tsai, 2013; Hofer, 2004; Tsai, 2004). In line with the mentioned necessity, the purpose of this study is to develop a scale to measure epistemological beliefs of university students towards online media.

1.1. Theoretical Framework

1.1.1. Epistemological beliefs

Epistemology is a branch of philosophy related to nature and requirements of knowledge (Hofer & Pintrich, 1997). Employed for the first time in 1950 by Piaget while defining cognitive development theory, the concept of epistemology defines the domain of study on definition, source, and methods of knowing (Deryakulu, 2004a; Hofer & Pintrich, 1997). Epistemology has been collecting increasing attention for a long time from various circles including, before all, philosophers, psychologists, neuropsychologists, management scientists, and pedagogues in order to discover how individuals create, interpret, and verify knowledge and knowing (Eren, 2006). Because understanding the nature of epistemological beliefs might help us to understand how humans approach knowledge, knowing, and learning (Schommer, 1990).

According to Schreiber and Shinn (2003), epistemological beliefs resemble a filter system where all cognitive processes of humans go through in learning process. Thus, persons conditionally inquire content of knowledge packages in the framework of their epistemological beliefs and introduce their decision-making mechanisms accordingly. Similarly, Lodewyk (2007) mentioned that while working on an academic duty, students with different epistemological beliefs have different ways of thinking, justifications, motivation sources and different strategies affecting their learning. As epistemological beliefs of individuals develop, so do their critical thinking skills (Valanides & Angeli, 2005) and they manage knowledge learning process more successfully (Deryakulu, 2004b; Basbay, 2013). In this sense, it could be argued that epistemological beliefs guide cognitive strategies during knowledge searching processes of persons on online media (Bråten & Strømsø, 2006; Hofer, 2004; Tsai, 2004; Whitmire, 2003) and they are a predicting variable in assessment of knowledge learned on such media (Wu & Tsai, 2007).

When studies in this domain are considered, it could be noted that scholars have one of three perspectives. The first one is developmental perspective pioneered by Perry (1968; 1970). Perry (1968; 1970) worked with a group of university students at Harvard University most of whom were white, elite men and assessed the change in their beliefs on knowledge from their freshman year to their senior year. As a result of his study, Perry determined that in their freshman year the participants assessed knowledge as *"an absolute and exact (right or wrong), simple, easy to understand structure created by a combination of unrelated parts and developed by an expert to transfer to students"* while towards their senior year they believed that, *"knowledge could not be absolute or exact, that is, it could be right or wrong, it had a complex structure of many interrelated parts created by individuals through thinking or based on trials and evidence"* (Perry, 1968). Based on his findings, Perry put forward Theory Intellectual and Ethical Development and associated biological developments of persons over time with the increase in their biological development over time, social interactions, and increase in their level of education.

The fact that this developmental perspective presented by Perry was compatible with constructivist outlook, supported acceptance of the model in the literature (Bahcivan, 2017) and lead to various developmentalist models referring to Perry. In this sense, *Women's Ways of Knowing* model by Belenky, Clinchy, Goldberger, and Tarule (1968), *Epistemological Reflection* model by Baxter Magolda (1992), *Reflective Judgment* model by Kuhn (1991) and *Reflective Judgment* model by King and Kitchener (1994) *could be considered among developmental models following Perry's study*. In such models, epistemology is discussed at various developmental levels that have some level of equivalency among each other (Hofer & Pintrich, 1997). However, in developmentalist models epistemology is not considered as a belief system. Instead, the concept "personal epistemology" defined as a significant part of reasoning is used while discussing epistemological statuses of individuals (Bahcivan, 2017).

The second perspective that dominates studies on epistemology is Schommer's (1990) belief system perspective. Many authors studying epistemological beliefs until Schommer (1990) based their arguments on Perry's Epistemological Development Model [EDM] and considered epistemological beliefs of individuals as a single dimensional developmental structure. Schommer (1990) describes personal epistemology as a belief system that includes dimensions that are more or less independent from each other.

Schommer (1990; 1994) considers epistemic development in two extremes as naïve and sophisticated epistemological beliefs. Among those, naïve epistemological beliefs represent relatively underdeveloped, qualitatively weak beliefs while sophisticated epistemological beliefs point at a qualified epistemological

profile. Accordingly, in certainty dimension while individuals with naïve epistemological beliefs think that knowledge is made up of exact right or wrong and in unchangeable, individuals with sophisticated epistemological beliefs accept that knowledge has a changeable and renewable structure. In simplicity dimension individuals with naïve epistemological beliefs think that knowledge is composed of simple and isolated parts while persons with sophisticated epistemological beliefs think that knowledge is a totality of complicated and related parts that are difficult to understand as a whole. In terms of source dimension, while individuals with naïve epistemological beliefs consider that right knowledge can only be created by authorities, individuals with sophisticated epistemological beliefs see themselves in the light of knowledge or knowing and accept themselves as authorities in a relevant assessment (Sinatra, Kienhues & Hofer, 2014; Schommer, 1990). Schommer (1990; 1994) underlined that a simultaneous development between these dimensions was not necessary and an individual that had naïve epistemological belief in one dimension could have sophisticated epistemological belief in another. In this sense Schommer (1994) expressed it would be more correct if epistemological beliefs were examined as a distribution and not at certain levels with marked boundaries.

It is possible to argue that many studies in the literature conducted with different data collection tools on different samples verify this multidimensional structure of epistemological beliefs. For instance, in their study on determination of epistemological beliefs of science teachers, Bahcivan and Cobern (2016) determined that while participants had naïve beliefs on certainty of knowledge, they could have sophisticated beliefs in other dimensions. Schommer-Aikins, Mau, Brookhart, and Hutter (2000) applied the belief system perspective Schommer (1990) developed through high school and college students to primary school students and as a result of their factor analysis achieved a similar, multi-factoral structure. In addition, many studies in the literature repeated with different measurement tools and different types of samples, this multidimensional structure suggested by belief system perspective is confirmed (Bahcivan, 2014; Bahcivan, 2016; Buehl, 2008; Kapucu & Bahcivan, 2015; Hofer, 2000).

Hofer and Pintrich (1997) revised Schommer's belief system perspective and carried it one step further. As it is known, previously there was a structure focused on justification of knowing dimension in developmental models related to personal epistemology. Making a compilation of epistemological belief models in the literature following Schommer's studies, Hofer and Pintrich (1997) conducted a revision by adding justification of knowledge dimension brought forward by developmental models to certainty, simplicity, and source of knowledge dimensions described at Schommer's belief system perspective. In this new four-dimensional structure justification and source of knowledge dimensions were described as *beliefs on nature of knowing* while certainty and simplicity of knowledge dimensions were accepted as *beliefs on nature of knowledge*.

The final model used by scholars in the literature is domain-context specific epistemological beliefs perspective. An important issue that frequently emerges upon study of theories and modellings in the literature on epistemology is whether epistemological beliefs must be assessed as domain-general independent of a certain domain of discipline or domain-specific particular to a certain domain or discipline (Buehl, Alexander & Murphy, 2002; Hofer, 2000; Muis, 2004; Sinatra, Kienhues & Hofer, 2014). In domain-general epistemology perspective, epistemological beliefs are not considered specific to a discipline and are assessed as general beliefs directly on knowledge and knowing. In domain-specific epistemological belief structure, it is accepted that individuals have domain-general epistemological beliefs while it is claimed that such beliefs could differ with their measurement in the context of a specific domain; meaning domain-general epistemological beliefs do not completely reflect nature of domain-specific epistemological beliefs (Buehl & Alexander, 2006; Buehl, Alexander & Murphy, 2002). Although a domain-specific epistemological belief perspective seems to be more prominent among these, a consensus has not yet been achieved (Eren, 2006).

When epistemological beliefs are considered in a single context, different sub-dimensions may point to different epistemic levels. However, different epistemic profiles of the same person may arise when the context changes. For example, when the epistemological beliefs about scientific knowledge are examined, a person who seems to have sophisticated epistemological beliefs in the dimension of the certainty of knowledge may appear to have naive epistemological beliefs in the dimension of justification of knowledge at the same time. On the other hand, when the epistemological beliefs about online learning environments are considered, it may be seen that the same person has naive epistemological beliefs about the certainty of knowledge. For this reason, we think that it would be appropriate to consider epistemological beliefs within a belief system perspective in a domain-specific way. Thus, it will be possible to make sense of the epistemological beliefs underlying the behavior within the relevant context.

1.1.2. Online specific epistemological beliefs

Today, the internet is one of the most important sources in the production and sharing of knowledge. For consumers (of the knowledge), the internet is almost like a shortcut to access information. However,

simultaneously with the increase in the speed of information production, it has become a necessity to develop various "epistemic judgments" to deal with the increasing information pollution in online mediums (Mason and Boldrin, 2008). In this context, epistemological beliefs about online environments are domain-specific beliefs about the source, certainty and structure of information on the internet, which are used to evaluate the validity and reliability of information packages and information resources in this environment (Strømsø and Bråten, 2010). These beliefs are decisive in determining the strategies to be used in accessing information resources in the online information search process, and in evaluating the accuracy and suitability of the accessed information (Chiu et al., 2013; Greene et al., 2010; Mason, Boldrin and Ariasi, 2010). For this reason, just like in this study, it is considered valuable by many researchers in the literature to consider epistemological beliefs in online environments (Bråten et al., 2019; Hartley and Bendixen, 2001; Strømsø and Bråten, 2010). Therefore, it is important to determine epistemological beliefs about online learning environments.

1.1.3. Assessment of epistemological beliefs

Epistemological beliefs were initially determined using qualitative methods with the effect of scholars following developmental perspective (Baxter Magolda, 1992; Kitchener & King, 1981; Kuhn, 1991; Perry, 1970). Afterwards, with Schommer's (1990) belief system perspective and the "Epistemological Belief Scale" the author developed, quantitative methods were started to be widely used in determination of epistemological beliefs next to qualitative methods (Hofer & Pintrich, 1997; Bahcivan, 2017).

Schommer's Epistemological Belief Scale approaches epistemology in four dimensions being the structure of knowledge, the speed of learning, the stability of knowledge, and the ability to learn. High scores from this scale prepared in five-point Likert form point at naïve epistemological beliefs while low scores point at sophisticated epistemological beliefs. The Epistemological Belief Scale that is accepted as a practical tool in determination of epistemological beliefs was frequently used in determination of epistemological beliefs of university students (Duell & Hutter, 2005; Hofer, 2000; Hofer & Pintrich, 1997; Paulsen & Wells, 1998; Schommer-Aikins, 2004; Qian & Alvermann, 1995) and with revisions at high school (Schommer, 1993) and secondary school levels (Schommer-Aikins et al., 2000). Nevertheless, Schommer's scale is a domain-general scale.

Regarding measurement of domain-specific epistemological beliefs, two different methods are embraced in the literature. In the first approach, domain-general scales are transformed into domain-specific scales with adaptations (Hofer, 2006). When considered specific to online learning media, the "Internet-Specific Epistemic Beliefs Scale" developed by Bråten, Srømsø, and Samuelstuen (2005) could be presented as an example of such adaptations. Bråten et al. (2005) attempted at developing a 36-item domain-specific scale adapting epistemological faith dimensions of Hofer and Pintrich (1997) to online learning media assessing epistemological beliefs under two headings as "nature of internet-based knowledge" *[which covers certainty of internet-based knowledge and simplicity of internet-based knowledge dimensions] and "nature of internet-based knowing" [which covers source of knowledge and justification for knowing dimensions]*. As a result of factor analysis conducted by scholars, a 2-factor scale named *general internet epistemic beliefs* [14 items] and *justification for knowing* [4 items] was developed. Other examples of adaptation of independent [domain-general] scales to domain-specific would be the "Domain-Specific Beliefs Questionnaire" developed by Buehl, Alexander and Murphy (2002) specifically in history and mathematics based on Schommer's (1990) scale and Discipline Focused Epistemological Beliefs Questionnaire (DFEBQ) developed by Hofer (2000).

Another domain focused scale development approach adopted in the literature is developing specific scales directly exclusive to the domain in question (Hofer, 2006). The "Scientific Epistemological Belief Scale" developed by Conley, Pintrich, Vekiri, and Harrison (2004) to determine epistemological beliefs of students at primary school level and used at various studies in the literature (Bilecik & Bahcivan, 2017; Gunes & Bahcivan, 2018) could be presented as an example to scales directly developed as domain-specific. When scales developed to determine epistemological beliefs exclusive to online media are studied, it could be argued that these are limited for being culturally specific and for failing to represent epistemology as a whole. Also, literature scan did not reveal a domain-specific scale used in measuring epistemological beliefs of individuals at higher education level on online media. In this context, the main purpose of this study is developing a domain-specific scale to be used to determine epistemological beliefs of university students regarding online learning media. In this scale, epistemological beliefs are discussed in a multidimensional approach to reflect both belief system perspective and developmental perspectives as revised by Hofer and Pintrich (1997). In addition, it is considered that development of the scale at intersection of the Eastern and the Western culture, which has a rich cultural diversity and acts as a bridge between the Asian and European continents thanks to its location will add an intercultural structure to the scale.

2. Method

Cross sectional survey design was applied for the research since data was collected from a plethora of university students at one time (Fraenkel, Wallen & Hyun, 2012).

2.1. Participants

1058 undergraduate students (687 female and 371 male) from 101 departments (of 15 faculties, 2 colleges and 8 vocational schools) participated in the research. Of them 208 were 4th grade, 158 were 3rd grade, 316 were 2nd grade and 376 were 1st grade students. Mean age was observed as 22.18. Participants were invited from a state university by convenience sampling to reach higher number of participation in the study (Table 1).

Table 1. Participants Frequency and percentage distributions

Variable	Trait	Number	Percentage
Gender	Female	687	64.93
	Male	371	35.07
Age	19 and under	87	8.22
	20	211	19.94
	21	257	24.29
	22	206	19.47
	23	137	12.95
	24	57	5.39
	25	27	2.55
	26 and below	76	7.19
Class	1 (Freshman)	376	35.54
	2 (Sophomore)	316	29.87
	3 (Junior)	158	14.93
	4 (Senior)	208	19.66
School type	Faculty	787	74.39
	College	10	0.94
	Vocational School	261	24.67
School name	Faculty of Education	153	14.46
	Faculty of Economics & Administrative Science	152	14.37
	Faculty of Arts and Sciences	141	13.33
	Faculty of Engineering	81	7.66
	Gerede Vocational School	72	6.81
	Bolu Vocational School	54	5.10
	Gerede Faculty of Applied Sciences	50	4.73
	Faculty of Communication	44	4.16
	Bolu Vocational School of Technical Sciences	42	3.97
	Faculty of Theology	41	3.88
	Sports Science Faculty	37	3.50
	Seben Vocational School	25	2.36
	Vocational School of Health Services	25	2.36
	Other (25 under)	141	13.31
Total		**1058**	**100**

2.2. The Procedure

A group of researchers from teacher education and technology education areas have written item statements individually. All the researchers had already scientific papers on epistemological beliefs so that their expertise was convenient for development of such an instrument. Each item was inspected by all the researchers before including in the item pool. This process positively contributed to content-related evidence for validation (Fraenkel, Wallen & Hyun, 2012). After that all items were investigated by a language educator as well as several undergraduate students in terms of grammatical convenience and semanticity. At the end, item pool covered 30 items distributed to source (7 items), justification (8 items), certainty (8 items) and simplicity (7 items) dimensions. Items were distributed to participants in 5-point Likert form (1 for strongly disagree, 5 for strongly agree). Scale was applied through online learning management system of the university.

2.3. Data Analysis

16 items were recoded just before the analyses so that higher scores corresponded to sophisticated epistemological beliefs. First of all, Kaiser-Meyer-Olkin (KMO) and Bartlett sphericity tests were performed. After that an exploratory factor analysis was conducted because the scale was developed for the first time (Tabacknick & Fidell, 2007). Maximum likelihood analysis together with promax rotation was performed through SPSS which was also utilized for calculating Alpha reliability scores.

3. Findings

3.1. Validation

Just before the validation analyses, KMO and Bartlett sphericity tests were conducted to examine appropriateness of sampling. KMO sampling adequacy index was calculated as .90. In addition, Bartlett's sphericity test was significant with a chi-square of 4232 (n=1058). Following this step, a maximum likelihood with promax rotation was executed. Analysis produced a two-factor solution including 15 items as represented by Table 2.

Table 2. Distributions of items to factors*

Factor	Item	Text	FL
Nature of Knowing	S1	Online media is only one of the sources that enable me accessing knowledge.	0.74
	S2	Even when shared by domain experts I confirm accuracy of information on online media using diverse resources.	0.50
	J1	I use my prior knowledge while deciding on accuracy of knowledge from online media.	0.73
	J2	It is important that knowledge I find on online media are logical.	0.64
	J3	I study scientific works to decide on accuracy of knowledge on online media.	0.66
	J4	I decide on accuracy of knowledge on any online media by comparison with other online media.	0.40
	J5	I verify knowledge on online media using various resources even if I believe its accuracy.	0.63
Nature of Knowledge	C1	I can always access correct answers using online media. (R)	0.60
	C2	Knowledge on online media are mostly correct. (R)	0.55
	C3	Knowledge on online media are definitely correct. (R)	0.52
	C4	Knowledge on online media present absolute truths. (R)	0.65
	C5	I am sure of the accuracy of knowledge on online media. (R)	0.62
	Si1	Most of the knowledge on online media are individual messages and content. (R)	0.59
	Si2	Knowledge on online media can be the truth by itself. (R)	0.63
	Si3	Knowledge on online media far from presenting a holistic and correct approach. (R)	0.53

* S for source, J for justification, C for certainty, Si for simplicity and (R) for recoded.

According to Table 2, first factor labelled as "nature of knowing" covered two items from source and five items from justification. In addition, second factor, "nature of knowledge", included five items from certainty and three items from simplicity. All factor loadings were observed among .40 and .74. This two-factor solution explained 39.44% of total variance. Finally, Cronbach's Alpha was calculated as .80 for both of factors.
The two-factor structure created by the 15 items following the exploratory factor analysis can also be seen in the scatter plot in Figure 1.

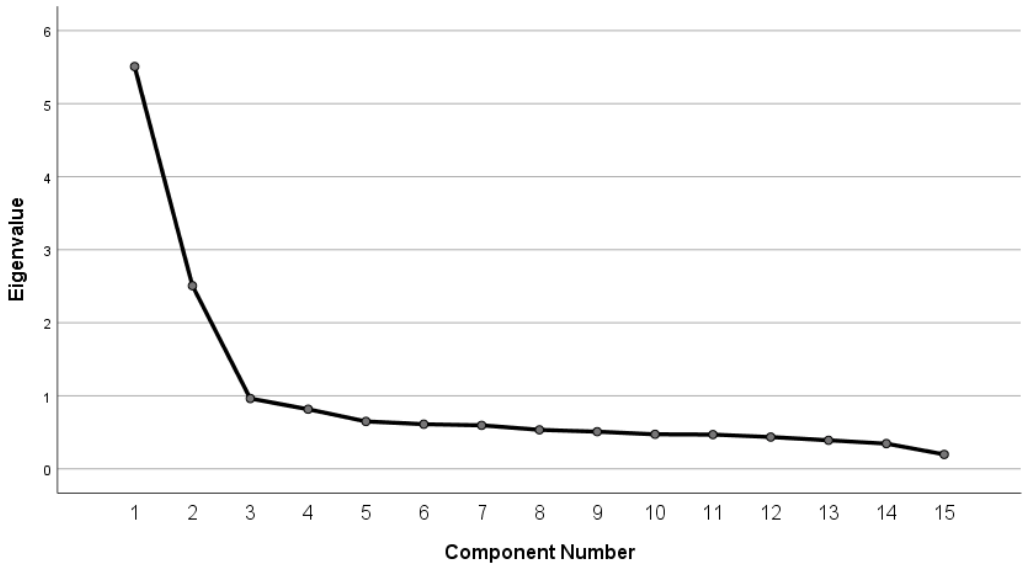

Figure 1. Scatter plot for exploratory factor analysis

It can be seen that the total eigenvalue of the scale was 5.51 which explained 39.44% of the total variance. The original Turkish version of the scale is presented in the appendix.

4. Discussions and Conclusion

As a result of this study a domain-specific scale was developed that could be used to determine epistemological beliefs of university students towards online learning media. Validity and reliability study of the scale was conducted with 1058 university students that volunteered to participate in the study. In the scope of validity study, exploratory factor analysis was made for construct validity of 30-item draft scale. As a result of factor analysis, the items with factor loading value below 0.40 were removed from the scale. In the resulting 2-dimensional structure the first dimension was labelled as Nature of Knowing (7 items) and the second dimension was labelled as Nature of Knowledge (8 items). The resulting 2-dimensional structure explained 39.44% of total variance. Regarding reliability of the scale Cronbach Alfa internal consistency coefficient was calculated as 0.80 for both dimensions. This result demonstrated that the scale has high reliability.

As a result of validity and reliability analysis conducted in the scope of the study, the "Online-Specific Epistemological Beliefs" scale, including 15 items and 2 dimensions, was developed. It is considered that the scale developed in this context would contribute to studies on determining domain-specific epistemological beliefs of university students on online media.

In addition, it is considered that development of the scale at intersection of the Eastern and the Western culture, which has a rich cultural diversity and acts as a bridge between the Asian and European continents thanks to its location will add an intercultural structure to the scale.

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Etik, Beyan ve Açıklamalar

1. Etik Kurul izni ile ilgili;

☑ Bu çalışmanın yazar/yazarları, Bolu Abant İzzet Baysal Üniversitesi Sosyal Bilimlerde İnsan Araştırmaları Etik Kurulu'nun 29.04.2021 tarih 2021/149 sayı ve 2021/04 nolu toplantı kararı ile etik kurul izin belgesi almış olduklarını beyan etmektedir.

2. Bu çalışmanın yazar/yazarları, araştırma ve yayın etiği ilkelerine uyduklarını kabul etmektedir.

3. Bu çalışmanın yazar/yazarları kullanmış oldukları resim, şekil, fotoğraf ve benzeri belgelerin kullanımında tüm sorumlulukları kabul etmektedir.

4. Bu çalışmanın benzerlik raporu bulunmaktadır.