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Adaptation of the Epistemological Belief Scale to Kosovo

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Abstract: The investigation of epistemological beliefs has become important in both pre-service and in-service education of teachers. Different scales have been developed to determine teachers' epistemological beliefs. The same scale yields different results in different cultures especially due to the cultural aspects of education. Therefore, testing the scales in different cultures contributes to their use. Within this framework, the scale developed by Schommer and adapted to Turkish culture by Deryakulu and Büyüköztürk was adapted to Kosovo culture. In the study, whether the Albanian, Bosnian and Turkish versions of the scale support the same factor structure was tested by employing the quantitative research method. First, the Epistemological Belief Scale was translated into Albanian and Bosnian and expert opinion was received. The scale was applied to 200 teachers who serve in schools where education languages are Albanian, Bosnian and Turkish. The scale comprised 35 items and 3 factors. Linguistic equivalence was prioritized, as the study was carried out in Kosovo. The Confirmatory Factor Analysis was employed to confirm the suitability of the three-factor structure of the scale. The analyses were carried out separately for each language and revealed acceptable fit indices. Reliability analysis produced satisfactory results.

Keywords: *Epistemological beliefs, epistemological beliefs scale, scale adaptation, linguistic validity.*

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Introduction

Epistemology is a scientific field and the term is derived from the Greek words "episteme" and "logos" meaning knowledge and information (Cevizci, 2003). In other words, it is a study area investigating and examining the nature, limitations, reliability and validity of knowledge and how knowledge is acquired and communicated (Demir & Acar, 1992; Schommer, 1998). Furthermore, epistemology is known to dwell on the knowledge problem of philosophy, tries, and answers the questions of what is knowledge and its sources and how people know (Deryakulu, 2004). As stated by Cevizci (2012), epistemology is the most rhetorical discipline that questions "knowledge". Epistemology tackles and tries to solve five main problems that consist of the nature of knowledge, what knowledge is, source of knowledge, existence of knowledge and limitations of knowledge.

Epistemological beliefs involve all beliefs about the "definition, structuring, evaluation, position and formation of knowledge" (Hofer, 2001, p. 355). In short, epistemological beliefs refer to the personal beliefs about what knowledge is and how learning comes about (Schommer, 1990). Different models have been developed for epistemological beliefs (e.g., Hofer, 2004; Kitchener & King, 1981; Muis et al., 2006; Perry, 1970). For example, Perry (1970) stated that people's understanding of knowledge develops from a more dualistic perspective such as "right" and "wrong" to a multiple perspective and then, people develop an understanding of the relativity of knowledge such as conditional and contextual knowledge.

Another model for epistemological beliefs was developed by Schommer (1990). Schommer classified epistemological beliefs into two as sophisticated (developed/mature) and naive (undeveloped/immature) beliefs. According to Schommer (1994), personal epistemology denotes a belief system of five dimensions that are made up of "the structure, certainty and source of knowledge and control and speed of knowledge acquisition" (pp. 293-319). The source of knowledge refers to the belief in the transfer of knowledge by authorities on one end and derivation of the knowledge by the individuals themselves through objective means on the opposite end. The certainty of knowledge describes an understanding of certain and absolute knowledge on one end and knowledge with a constantly developing structure on the other end. The control of knowledge acquisition refers to the belief that the ability to learn is genetically inherited

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and predetermined on one end and belief that knowledge is acquired through experience on the opposite end. The speed of knowledge acquisition refers to the belief that learning is either quick or none-at-all on one end and a gradual process on the other end. These belief dimensions can be co-existing or independent. At one end of the five structures lie undeveloped/naïve beliefs, while the opposite end is developed/sophisticated beliefs. For example, an epistemological belief that knowledge is unchanging, simple and plain, communicated by authorities and knowledge acquisition is innate fall under a naïve epistemological belief system. On the other hand, the sophisticated or developed/mature epistemological belief system involves believing that knowledge is not certain and, rather, complicated and complex and have a changing and developing structure and learning can gradually evolve with effort (Schommer-Aikins, 2004).

Factors such as personal experience, age, culture and learning affect the formation and development of epistemological beliefs (Brownlee, 2003; Chan & Elliott, 2004; Hofer & Pintrich, 1997; Tolhurst, 2007). The dependency of epistemological beliefs on experience also influences the behaviours of individuals. Learning is an important factor in the development of epistemological beliefs, while teaching is also affected by learning (Chan, 2003; Maggioni & Parkinson, 2008; Oğuz, 2008). Silverman (2007) stated that the epistemological beliefs of teachers affected their communication and interaction with students. Ferguson and Braten (2018) said that there was a direct relationship between the in-class behaviours of teachers and their beliefs about education. Pajares (1992) also stated that the epistemological beliefs of teachers influenced what teaching methods they used in classrooms. Moreover, the researchers determined that the students from the classroom in which traditional teaching was applied had undeveloped epistemological beliefs, while the students from the classrooms of teachers who applied the constructivist approach had more developed epistemological beliefs.

Epistemological beliefs influence the teaching skills of teachers in addition to their understanding of learning-teaching, (Chai et al., 2009). There are numerous studies that show teachers who have sophisticated (developed/mature) beliefs use more student-oriented teaching methods and techniques, while teachers who have naïve (undeveloped/ immature) beliefs employ more teacher-oriented teaching methods and techniques (Aypay, 2011; Cheng et al. 2009; Hofer, 2004; Mashweh, 1996; Muller et al., 2008). Tezci et al. (2016) determined a positive relationship between “Belief that Learning Requires Effort” and constructivist teaching and a negative relationship between “Belief that Learning Requires Effort” and traditional teaching. In a similar manner, the researchers found a negative relationship between “Belief in a Single Truth” and “Belief That Learning Requires Talent” and constructivist teaching, while they had a positive relationship with traditional teaching. Close results were also obtained in the study carried out by Chai et al. (2006).

Epistemological beliefs have become important areas of investigation both pre-service and in-service education due to their effects on learning and teaching (Deryakulu & Büyüköztürk, 2002). Considering their influence on the teaching skills of teachers and, hence, program adaptations, determining the epistemological beliefs of teachers will light the way for the success of reform efforts. Therefore, a series of scales that are either field-related or -unrelated have been developed to determine the epistemological beliefs of teachers (Berding, 2017; Oksal et al., 2006; Renken et al., 2015; Rubba & Anderson, 1978; Schraw et al., 2002; Tsai & Liu, 2005). One of the commonly used scales in the field is the “Epistemological Belief Scale” developed by Schommer (1990, 1993). The scale is a 5-point Likert scale and comprises 63 items. It includes four factors, which are “Ability to Learn is Innate”, “Learning is Quick”, “Knowledge is Simple” and “Knowledge is Certain”.

Epistemological beliefs are shaped by personal experiences and, therefore, show cultural characteristics (Schommer, 1990; Chan & Elliott, 2004). Especially due to the cultural characteristics of education, the same scales have been observed to yield different results in different cultures. There are numerous studies on the adaptation of a scale developed in a certain culture to a different culture in the literature (Cam et al., 2012; Cardona-Molto et al., 2020; Teo & Chai, 2012).

Furthermore, there are many researches made with different ethnic groups (Asil et al., 2020; Dilekli & Tezci, 2020; Youn, 2000). Accordingly, the epistemological belief scale developed by Schommer (1990, 1993) has been shown to yield different results in different cultures. For example, in their study, Qian and Alverman (1995) determined three factors, while Schraw et al. (2002) determined five factor structures. Using the scale, Paechter et al. (2013) reviewed the items of the scale for German culture and determined the factor structure and reliability of the scale. In the Chinese version of the scale, Wang, Zhang and Hou (2013) determined five factor structures. DeBacker et al. (2008) found that the factor structure of the scale differed in different cultures. In their study on prospective teachers in Hong Kong, DeBacker et al. (2008) found the same number of factors but determined that the factors had a different nature. The adaptation of the scale to Turkish culture was carried out by Deryakulu and Büyüköztürk (2002). The researchers determined three factors comprising “Belief that Learning Requires Effort” (18 items), “Belief that Learning Requires Talent (9 items)” and “Belief in a Single Truth” (8 items). Moreover, Deryakulu and Büyüköztürk (2005) re-examined the scale and found that an item (Item 24) had a low factor loading and, thus, excluded the item from the scale and determined that the factor of an item (Item 10) had changed. On the other hand, the researchers determined that the scale had the same factor structure and nature.

The testing of scales in different cultures contribute to their use. Examining the validity of scales especially in multicultural settings will contribute to their adaptation. Asil et al. (2020) indicated that any scale may refer to different meanings for the people speaking different language even the people speaking the same language but not sharing the same socio-cultural background. Therefore, the same scale cannot be used for different culture in order to make a comparison. As there is no adapted epistemological belief scale into Kosovo culture, it is hoped that this study may help practitioners and decisions makers. Within this framework, we aimed the adaptation of the scale that was developed by Schommer (1990, 1993) and adapted to Turkish culture by Deryakulu and Büyüköztürk (2002) to Kosovo culture. The answer to the question “Does the Epistemological Belief Scale adapted by Deryakulu and Büyüköztürk (2002) to Turkish culture yield the similar valid and reliable results in Kosovo culture?” is sought. The adaptation of the scale to Kosovo culture will contribute to our understanding of the nature of epistemological beliefs in the use of the Turkish version of the scale in countries with a different cultural structure. There is no scale adaptation that can be used in the measurement of the field-related or -unrelated epistemological beliefs of both teachers and students in Kosovo. The adaptation of the scale in countries where diverse subcultures are represented will contribute to determine whether similar factor structures are supported and the results are reliable. Kosovo is a multicultural country (Koro, 2008; Yıldırım & Tezci, 2020). People with different ethnic backgrounds including Albanian, Serbian, Turkish as well as Askali and Gorani live in Kosovo. Albanian, Serbian, Bosnian and Turkish are commonly used as the official language depending on the majority of the population. Language of education vary from Albanian to Turkish and Bosnian depending on population density (Yıldırım & Yıldırım, 2012). Therefore, whether the same factor structure of the Epistemological Belief scale is supported both in Albanian, Bosnian and Turkish in Kosovo culture was also tested.

Methodology

Sample

The Epistemological Belief Scale that was adapted by Deryakulu and Büyüköztürk (2002) to Turkish culture was applied in Kosovo in Turkish, Albanian and Bosnian. Since Kosovo is a multilingual country, the scale was first translated to Albanian and Bosnian and expert opinion was received on the study to determine the epistemological beliefs of teachers. Then, the scale was applied to 200 teachers who serve in schools that give education in the three languages. Total of 60 teachers were Turkish, while 50 of the teachers were Bosnian and 90 were Albanian. The distribution of the teachers by gender revealed that 127 of the teachers were female and 73 of the teachers were male. In terms of their professional seniority, 35 teachers had 1-5 years of experience, 39 teachers had 6-10 years of experience, 20 teachers had 11-15 years of experience and 106 teachers had professional experience of 16 years or more. The teachers who participated in the application comprised 7 preschool teachers, 75 primary school teachers and 118 branch teachers (6th -9th grade). The teachers who participated in the study had associate’s, bachelor’s and master’s degrees. The number of teachers with an associate’s degree was 34, while 152 teachers had bachelor’s degree and 14 teachers had master’s degree. Prior to the application, the teachers were informed about the content of the scale and an application was carried out to show how it is answered.

Data collection tool

The scale that was developed by Schommer (1990) to determine the epistemological beliefs of students and adapted by Deryakulu and Büyüköztürk (2002) to Turkish culture was used in the study. The original scale developed by Schommer (1990) comprised 63 items and 4 factors. The items were measured on a 5-point Likert scale, where “5=Strongly agree”, “4=Agree”, “3=Undecided”, “2=Disagree” and “1=Strongly disagree”. In the Turkish adaptation of the scale carried out by Deryakulu and Büyüköztürk (2002), 28 items were excluded from the scale due to their low factor loadings. In the repeated adaptation process of the scale that was also carried out by Deryakulu and Büyüköztürk (2005), Item 24 was also excluded from the scale for having a low factor loading. However, the adaptation of the scale comprising 35 items and 3 factors was given priority for investigation.

The scale comprised 35 items and 3 factors. The first factor of the scale was “Belief that Learning Requires Effort” contained 17 items. The second factor of the scale was “Belief that Learning Requires Talent” and made up of 9 items. The third factor was “Belief in a Single Truth” and made up of 9 items. Obtaining a high score from the scale (obtaining high total points from each sub-dimension) indicates developed/mature epistemological belief. The original 63-item scale had a reliability coefficient of 0.74, while the reliability coefficients of its sub dimensions varied between 0.63 and 0.85 (Schommer, 1993). In the Turkish adaptation of the study, the reliability of the 34-item scale was 0.81 and the first sub-dimension had a reliability of 0.84, the second sub-dimension had a reliability of 0.69 and the third sub-dimension had a reliability of 0.64 (Deryakulu & Büyüköztürk, 2005). The reliability of the 35-item scale that was adapted by Deryakulu and Büyüköztürk (2002) was 0.83 for “Belief that Learning Requires Effort”, 0.62 for “Epistemological Belief that Learning Requires Talent” and 0.59 for “Belief in a Single Truth”. The Turkish version of the scale was used in various studies (Can & Arabacıoğlu, 2009; Oğuz, 2008) and close results were obtained. The items were measured on a 5-point Likert scale, where “5=Strongly agree”, “4=Agree”, “3=Undecided”, “2=Disagree” and “1=Strongly disagree”.

Data analysis

Confirmatory factor analysis (CFA) was applied to the data obtained from the application. CFA is an analysis used in the testing of structural validity. It can be used to determine whether the latent variables of a scale can be explained by observed variables (Çokluk et al., 2014). The CFA yields a series of fit indices. The indices help to decide the fit of the structure. In this study, the CFA was applied to test the identified factor structures of the Epistemological Belief Scale in Kosovo culture (Ding et al., 1995; Gomez & Fisher, 2003). The results of the analysis require examining a series of indices (Bayram, 2010; Jöreskog & Sörbom, 1996; Tabachnick & Fidell, 2007). The χ^2 index is affected by sample size and, thus, evaluated together with degrees of freedom. Moreover, the closer the Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Normed Fit Index (NFI) and Non-Normed Fit Index (NNFI) to 1, the better, but values equal to 0.90 or higher are also acceptable (Bentler & Bonett, 1980). On the other hand, Hu and Bentler (1999) stated that values equal to 0.95 or higher indicate a good fitness. Root mean square error of approximation (RMSEA) values of 0.08 or lower are sufficient but a value of 0.06 indicates a good fit (Hu & Bentler, 1999).

For the convergent validity of the scale, the AVE values of each factor were examined and the correlation of each factor with other factors were compared and determined (Fornell & Larcker, 1981). The divergent validity was evaluated by comparing the square root of each shared variance extracted with square of between-factor correlations. Convergence and discriminant validity are other types of validity that are used in the testing and confirmation of models (Fornell & Larcker, 1981; Malhotra, 2011). The Cronbach's alpha, Omega Reliability and Composite Reliability were calculated for reliability analysis. Composite Reliability (CR) is used to measure the internal consistency of factors and a value of 0.70 or higher is accepted as good (Hair et al., 2010). Within the framework of internal consistency, the Cronbach's alpha analysis is considered appropriate for structures with multiple factors. Furthermore, calculating the Omega reliability coefficient is also recommended (Dunn et al., 2014).

Since the scale was a Likert-type scale, the Cronbach's alpha coefficient was used in reliability analysis. The results for the item-total correlations and mean item-total correlations were also obtained using the analysis.

Results

Results for the Language Translation Process

Since the validity and reliability of the scale were analysed for its adaptation to Turkish culture and the study was carried out in Kosovo, linguistic equivalence was firstly controlled to measure the validity and reliability of the scales. As the study includes Albanian and Bosnian teachers in addition to Turkish teachers, the linguistic equivalence of the Turkish to Bosnian and Turkish to Albanian versions of the scale was controlled. The Turkish scale forms were translated into Bosnian and Albanian by experts. After receiving the opinions of Bosnian and Albanian language experts, the scale was applied to 30 teachers 10 of whom spoke and wrote in Turkish-Albanian, 10 of which spoke and wrote in Turkish-Bosnian and 10 of whom spoke and wrote in Bosnian—Albanian. The scale was applied individually and face to face. The need for correction was monitored and the teachers were asked to read out and fill out the scale. The correlation obtained from the Turkish-Albanian version was 0.90, the correlation obtained from the Turkish-Bosnian version was 0.92 and the correlation obtained from the Albanian-Bosnian version was 0.91. Moreover, the goodness of fit was determined to be 90% or above. In this study, no correction was made to the items and the scale was accepted to be appropriate for translation into other languages.

Results for the Confirmatory Factor Analysis of the Epistemological Belief Scale

After the translation of the scale to other languages, the CFA was applied to test the fitness of the three-factor structure for the confirmation of the factor structures. First, the scales answered in each language were separately evaluated (Brown, 2014). The confirmatory factor analysis of the data obtained from the application can be used to determine whether the latent variables of a scale with pre-determined factors can be explained by observed variables (Büyüköztürk et al., 2014). Table 1 shows the fit indices obtained with the analysis.

Table 1. Separate Three-Factor CFA Analysis for Each Language

| | | χ^2 | df | RMSEA | GFI | CFI | NFI | NNFI | SRMR | IFI |
|----------|------------------------|----------|-----|-------|-----|-----|-----|------|------|-----|
| Turkish | - | 672.44 | 557 | .065 | .87 | .96 | .93 | .96 | .05 | .97 |
| | Md:5-14; 19-24; 28-29 | 649.73 | 554 | .059 | .89 | .98 | .94 | .97 | .05 | .98 |
| Albanian | - | 1100.90 | 524 | .078 | .88 | .92 | .93 | .96 | .07 | .96 |
| | Md:24-26; 27-29; 28-34 | 996.85 | 520 | .066 | .88 | .96 | .95 | .97 | .06 | .98 |
| Bosnian | - | 549.58 | 557 | .000 | .85 | .99 | .88 | .99 | .08 | .99 |

Md: Modification

The analyses that were made separately for each language yielded acceptable fit indices. As per the recommendations, better fit indices were obtained by making modifications between the items 5 and 14, 19 and 24 and 28 and 29 in Turkish and items 24 and 26, 27 and 29 and 28 and 34 in Albanian. According to the factor loadings obtained in the

standardized path analysis, the lowest factor loading in Turkish was .40 and obtained with item 18, while the highest factor loading was .80 and obtained with item 21. The lowest factor loading in Albanian was .43 and obtained with Item 26, while the highest factor loading was 0.78 and obtained with Item 23. The lowest factor loading in Bosnian was 0.44 and obtained with Item 5, while the highest factor loading was 0.81 and obtained with Item 21.

In the second stage of the CFA, multigroup CFA was carried out to test the three-factor model as a single group. Moreover, the cross validity of the data obtained from the samples of each language was also tested using multigroup CFA (Jöreskog & Sörbom 2002; Mels, 2006). Table 2 shows the indices obtained with the analyses.

Table 2: Combined and Multiple Group CFA

| | χ^2 | df | RMSEA | GFI | CFI | NFI | NNFI | SRMR | IFI |
|----------------------|----------|-----|-------|-----|-----|-----|------|------|-----|
| Single Group (N=200) | 1061.04 | 557 | .067 | .78 | .94 | .88 | .94 | .069 | .94 |
| Cross Validation | 1246.12 | 712 | .064 | .78 | .96 | .90 | .94 | .071 | .96 |

A perfect fit index was obtained with the single group analysis with a χ^2/df of 1.90. Good fit indices were obtained in the RMSEA, NFI, NNFI, CFI and IFI indices. An acceptable fit index was obtained for SRMR and low fit indices were obtained for GFI and AGFI. The recommended modifications did not improve the fit indices.

The χ^2/df (1246.12/712) = 1.750 obtained in the cross-validation analysis (Multiple Group CFA) was significant, albeit low ($p < .05$). Furthermore, the chi-square values obtained from each language group were also significant. This does not support cross-validity and considering the chi-square value is affected by sample size, other indices should also be included in the evaluation (Harrington, 2009; Kyriazos, 2018). Accordingly, the GFI=0.78 was at an acceptable level, but the CFI= 0.96, NFI= 0.90, NNFI= 0.90 and IFI= 0.96 indices indicated good fit. Both the single-group and multiple-group CFA results revealed that the paths from the observed variables to latent variables were significant t ($p < .05$). The results of the analysis revealed that Item 8 in the Turkish group had the lowest factor loading with a value of .46, while Item 26 in the Albanian group had the highest factor loading with a value of 0.86.

In the single-group CFA, there were positive and moderate relationships between the Effort and Talent ($r = .20$, $p < .05$), Effort and Single Truth ($r = .33$, $p < .05$) and Talent and Single Truth ($r = .43$, $p < .05$) latent variables. The correlations between the latent variables in the cross-validity analysis revealed that there were positive and moderate relationships between the Effort and Talent ($r = .36$, $p < .05$), Effort and Single Truth ($r = .38$, $p < .05$) and Talent and Single Truth ($r = .56$, $p < .05$) latent variables. Figure 1 shows the single-group CFA Path Diagram.

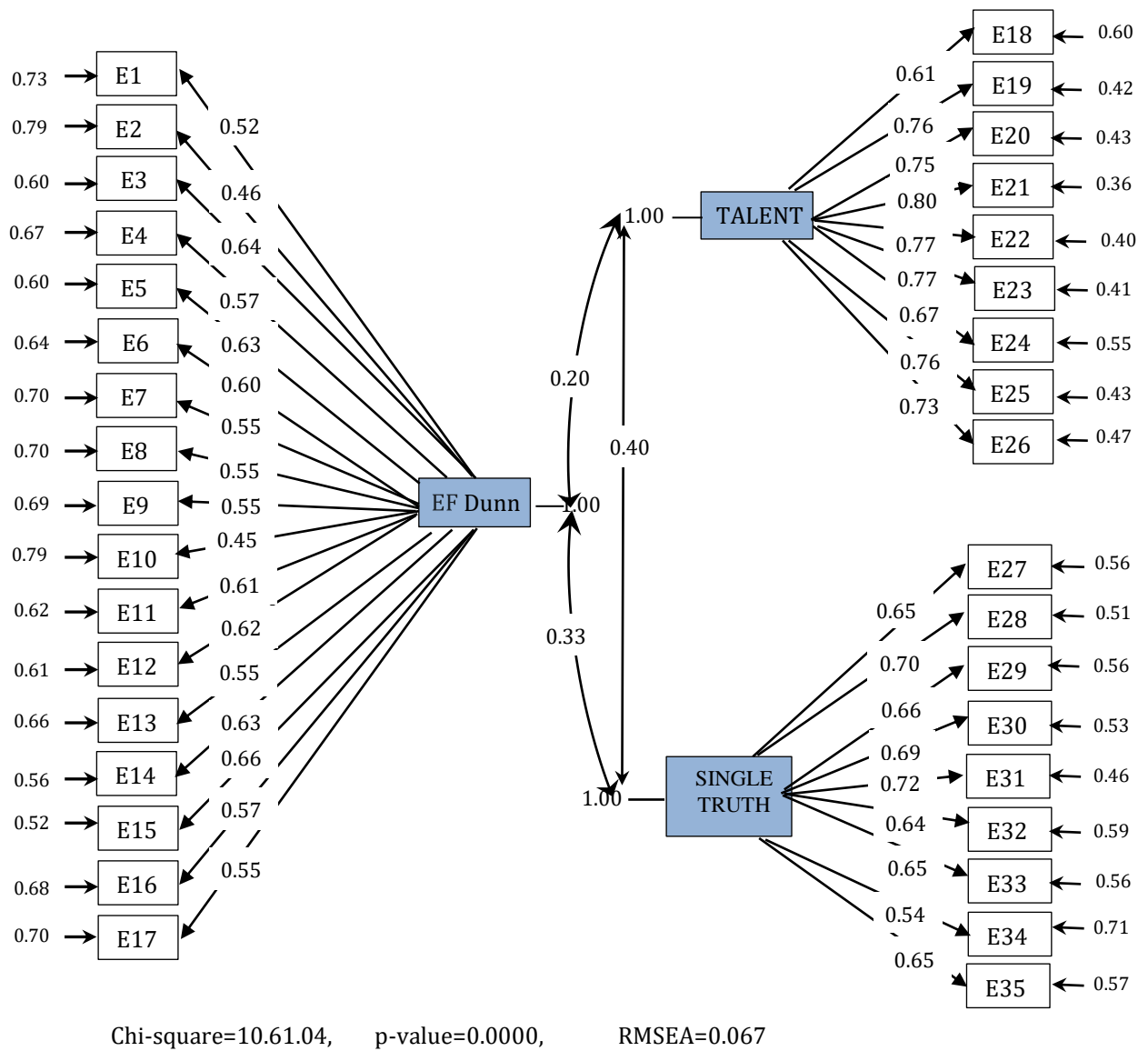


Figure 1: The Standardized Path Analysis Diagram for the Confirmatory Factor Analysis of the Epistemological Belief Scale

According to the confirmatory factor analysis of the Epistemological Belief Scale, items 2 and 10 in the Belief that Learning Requires Effort factor had the highest factor loading with a value of 0.79, while Item 15 had the lowest factor loading with a value of 0.52. Item 18 in the Belief that Learning Requires Talent factor had the highest factor loading with a value of 0.63 and Item 21 in the factor had the lowest factor loading with a value of 0.36. Item 34 in the Belief in a Single Truth factor had the highest factor loading with a value of 0.71. Item 31 in the third factor had the lowest factor loading with a value of 0.46.

Convergent and Discriminant Validity

The confirmatory factor analysis is used to determine the structural validity. In addition, Campbell and Fiske (1959) suggested the use of convergent and discriminant validity to determine the structural validity of a measurement tool. Convergent validity is the validity level of a construct that is well-measured using its indicators, while the discriminant validity is measuring unrelated or different constructs (Hair et al., 2010). Discriminant validity is used to determine whether observed variables represent the latent constructs to which they are related (Ford et al., 1986). According to the Fornell and Larcker’s (1981) criterion, the degree of the shared variance between the latent variables is used in evaluation. Therefore, convergent validity can be evaluated together with Average Variance Extracted (AVE) and Composite Reliability (CR) (Campbell & Fiske, 1959). The acceptable CR value is 0.70 or higher, while an AVE value of 0.70 or higher is considered very good and an AVE value of 0.50 or higher is considered sufficient. Furthermore, the CR value should be higher than the AVE value (Raykov, 1997). On the other hand, the square root of the AVE value should be higher than the correlation values between latent variables (Bagozzi & Yi, 1988; Hair et al., 2010; Hu & Bentler, 1999). The Maximum Shared Variance (MSV) and Average Shared Variance (ASV) values were examined for

discriminant validity. The AVE >MSV and AVE>ASV criteria proposed by Hair et al. (2010) was taken into consideration for discriminant validity. Table 2 shows the Average Variance Extracted (AVE) and Composite Reliability (CR) values.

Table 3. AVE, CR and Between-Factor Correlations.

| | AVE | CR | MSV | ASV | 1 | 2 | 3 |
|---|-----|-----|-----|-----|--------------|--------------|--------------|
| 1- Belief that Learning Requires Effort | .39 | .97 | .11 | .15 | (.63) | | |
| 2- Belief that Learning Requires Talent | .54 | .98 | .15 | .23 | .20 | (.73) | |
| 3- Belief in a Single Truth | .44 | .97 | .15 | .29 | .33 | .43 | (.66) |

The scale had factor loadings higher than 0.40 and AVE values higher than 0.50, which are indicators of the discriminant validity of a measurement tool (Ford et al., 1986). However, in the case of CR values that are 0.70 or higher, AVE values of 0.40 or higher are considered acceptable (Fornell & Larcker, 1981; Peterson, 2000). The AVE values higher than 0.50 and CR higher than 0.70 are indicators of the convergent validity of the scale. Despite the low AVE value (0.39) of the Belief that Learning Requires Effort, it was regarded as acceptable due to its CR coefficient of 0.97. The criterion of Fornell and Larcker was used for discriminant reliability. Thus, the square root of the AVE value and the correlation coefficients of each construct in each row-column were examined. Hence, the correlation between each construct was lower than the square root of the AVE value. Moreover, the MSV and ASV values in all sub-dimensions were below the AVE value. This positively contributes to the discrimination of the measurement model. The results indicated that each construct measured a different property.

Results for the Reliability Analysis of the Epistemological Belief Scale

The measurements obtained from the application to a group of 200 people were used for the reliability analysis of the scale that was developed to determine the epistemological beliefs of teachers in multicultural education. Since the scale was a Likert-type scale, the Cronbach's alpha reliability coefficient was used in the reliability analysis. In addition, considering the multifactorial structure of the scale, the Omega reliability coefficient was used. Table 3 shows the analysis results for the measurements obtained with the Epistemological Belief Scale.

Table 4: Reliability Analysis Results for the Epistemological Belief Scale

| Scale Dimensions | Item Number | Cronbach's Alpha | Omega Reliability |
|--|-------------|------------------|-------------------|
| Belief that learning requires effort | 17 | .90 | .91 |
| Belief that learning requires talent | 9 | .91 | .91 |
| Belief that learning is the single truth | 8 | .88 | .89 |
| Overall scale | 34 | .91 | .92 |

The analysis results in Table 4 showed that the 17 items in the Belief that Learning Requires Effort sub-dimension had an Alpha reliability coefficient of .90. The Alpha reliability coefficient of the 9 items in the Belief that Learning Requires Talent sub-dimension was calculated to be 0.91. The Alpha reliability coefficient of the 9 items in the Belief in a Single Truth sub-dimension of the scale was calculated to be .88. The overall Alpha reliability coefficient of the scale comprising 34 items was 0.91. Close results were obtained for the Omega reliability coefficients. Table 5 shows the results for the item-total correlations and mean item-total correlations obtained with the analysis.

Table 5: Results for the item-total correlations and mean item-total correlations

| | Scale mean when item is deleted | Scale variance when item is excluded | Item-total correlation | Scale reliability when item is deleted |
|-----|---------------------------------|--------------------------------------|------------------------|--|
| e1 | 309.600 | 87.697 | .573 | .901 |
| e2 | 307.750 | 88.326 | .461 | .905 |
| e3 | 311.900 | 86.496 | .657 | .899 |
| e4 | 308.850 | 86.243 | .565 | .902 |
| e5 | 310.250 | 85.783 | .633 | .900 |
| e6 | 309.200 | 85.692 | .594 | .901 |
| e7 | 308.050 | 86.721 | .556 | .902 |
| e8 | 306.000 | 87.618 | .553 | .902 |
| e9 | 310.400 | 87.003 | .555 | .902 |
| e10 | 307.200 | 87.911 | .452 | .906 |
| e11 | 310.750 | 87.256 | .595 | .901 |
| e12 | 309.350 | 86.453 | .587 | .901 |

Table 5: Continued

| | Scale mean when item is deleted | Scale variance when item is excluded | Item-total correlation | Scale reliability when item is deleted |
|-----|---------------------------------|--------------------------------------|------------------------|--|
| e13 | 307.750 | 86.658 | .583 | .901 |
| e14 | 307.250 | 85.949 | .638 | .899 |
| e15 | 308.750 | 85.728 | .657 | .899 |
| e16 | 305.650 | 86.930 | .545 | .902 |
| e17 | 309.300 | 87.382 | .572 | .901 |
| e18 | 221.400 | 57.840 | .582 | .912 |
| e19 | 218.550 | 55.260 | .712 | .904 |
| e20 | 219.750 | 55.241 | .712 | .904 |
| e21 | 217.600 | 52.806 | .778 | .899 |
| e22 | 218.650 | 54.791 | .733 | .902 |
| e23 | 218.650 | 55.886 | .738 | .902 |
| e24 | 219.800 | 57.065 | .631 | .909 |
| e25 | 217.750 | 55.070 | .718 | .903 |
| e26 | 218.650 | 55.997 | .698 | .905 |
| e27 | 179.450 | 44.303 | .603 | .872 |
| e28 | 180.950 | 44.297 | .686 | .866 |
| e29 | 180.650 | 44.182 | .622 | .871 |
| e30 | 183.100 | 42.657 | .696 | .864 |
| e31 | 181.450 | 42.738 | .702 | .863 |
| e32 | 180.950 | 44.619 | .605 | .872 |
| e33 | 177.950 | 44.174 | .603 | .872 |
| e34 | 185.400 | 46.702 | .540 | .877 |
| e35 | 181.700 | 44.725 | .615 | .871 |

The analysis of the correlations between the scale items for reliability analysis revealed that Item 21 had the highest correlation with a value of 0.778, while Item 10 had the lowest correlation with a value of 0.452. The correlations of other items ranged within these values. Most item-total correlations indicated moderate relationships.

The discriminant validity of the scale items was analysed using the 27% uppergroup-subgroup method. The analysis revealed that all items had discriminant validity. The highest t value was 18.172 and obtained with Item 4 ($p < .05$), while the lowest t value was 5.685 ($p < .05$) and obtained with Item 28.

Discussion

The study was carried out to adapt the Epistemological Belief Scale to Kosovo culture. First, the scale was translated into Albanian and Bosnian and the equivalence of the translated scales was ensured. Accordingly, no changes were made to the Albanian and Bosnian versions. If linguistic equivalence is not ensured when a scale is adapted to different cultures and languages, problems will arise in the fit indices obtained with CFA and model fit. Stes et al., (2010) pointed out the problems caused by language and cultural differences in scale adaptation studies. Thus, linguistic equivalence was deemed appropriate to minimize the problems due to language issues. In the study, the scale that is adapted to Albanian and Bosnian from Turkish was translated by professional translators. Then, the Turkish, Albanian and Bosnian versions of the scale were applied to a total of 30 teachers comprising three groups of 10 teachers who practice their profession in either Turkish, Albanian or Bosnian. The results of this application showed that the statements in the scale had the same meaning in three languages. The results of the reliability analysis that was based on the three-factor structure of the scale revealed that the 17 items in the Belief that Learning Requires Effort sub-dimension had an Alpha reliability coefficient of 0.90. The Alpha reliability coefficient of the 9 items in the Belief that Learning Requires Talent sub-dimension of the scale was determined to be 0.91. The Alpha reliability coefficient of the 9 items in the Belief that Learning is the Single Truth sub-dimension of the scale was calculated to be 0.88. The Alpha reliability coefficient that was calculated for the overall scale containing 35 items was 0.91. The coefficients obtained both for the sub-dimensions and overall scale revealed that the scale had perfect reliability. The reliability coefficients obtained in this study were higher than those obtained in the study carried out by Deryakulu and Büyüköztürk (2005). In the first studies of Büyüköztürk and Deryakulu (2002), the scale comprised 35 items, but researches excluded an item for having a low reliability coefficient and continued their studies with 34 items. However, in the intercultural scale studies, different constructs had emerged in some cultures, while similar constructs had emerged in other cultures. The reliability coefficient of the 25-item scale used in the adaptation study in Kosovo culture was high. Thus, there was no need to exclude an item and the scale was applied with its original 35 items. These studies show that cultural differences should be taken into consideration in this type of studies on the development and adaptation of scales. Same studies (Berding, 2017; Dilekli & Tezci, 2019; Mutlu et al., 2019; Stes et al., 2020; Stes et al., 2010) have shown that cultural differences are an important factor in scale development. Similarly, Tasaki (2001) used the scale by

Schommer within a group of university students who are coming from different ethnic groups and Tasaki indicated that the number of the factor has decreased. Chan and Elliott (2004) and Quaian and Alvermann (1994) showed that cultural difference may effect scale structure. Sulimma (2009) in his study related to epistemological belief scale indicated that cultural differences affect scale structures. From this respect, it can be said that scales may reveal different results because of the translation process, cultural and linguistic differences and people experiences.

The CFA of the fit indices revealed a perfect fit index with $X^2/df= 1.79$. A good level of fit was obtained in the RMSEA, NFI, NNFI, CFI and IFI. An acceptable fit index was obtained for SRMR, while the fit indices in GFI and AGFI were low. Obtaining low coefficients in some fit indices is attributable to the sample comprising individuals from a different culture. It has been observed that CFA results differ from Turkish version of the scale adopted by Deryakulu and Büyüköztürk (2002) in some aspects. In this study, it was observed that some fit indices were better as a result of the modifications.

The discriminant validity of the scale was examined in addition to its convergent validity. Item-total correlation and item discrimination indices were also investigated. Although the Average Variance Extracted (AVE) value was low (.39) in the Belief that Learning Requires Effort factor (Factor 1), the Composite Reliability (CR) was high (.97). Except for this factor, the AVE values of the other two factors were at acceptable levels in terms of their convergent validity. However, despite the low AVE value in the Belief that Learning Requires Effort factor, its discriminant validity was high and the items under the factor were distinctive and had factor loadings of 0.40 or higher. In the other two factors, the discriminant validity levels were high, item distinctiveness levels were sufficient and item-total correlations and factor loadings were high.

Ensuring the linguistic equivalence of the scale plays an important role in supporting the same results in Kosovo culture using the original factor structures. In studies on different cultures, if failed to achieve linguistic equivalence, the possibility of having different factor structures increases. Meyer and Eley (2006) and Stes et al. (2010) investigated the effects of language differences on factor structures. Beaton Bombardier et al. (2000) discussed different approaches to scale adaptation in intercultural studies. The researchers pointed out the importance of adaptation in countries that have language and cultural differences. Although Kosovo culture is similar to Turkish culture in some aspects and teachers serve in different languages of education comprising Turkish, Albanian and Bosnian, obtaining the same fit indices and factor structures in the sub-dimensions was deemed highly important.

In their study, Beaton et al. (2000) emphasized that the scales in which data is collected from teachers who work in different disciplines can yield different results in different measurements and times due to cultural and linguistic differences. Thus, where teachers live, the culture they live in, where they work, the education they received and school policy related to their branch should be considered in the studies. This indicates that the scale can be used both in pre-service and in-service education as is.

Considering how epistemological beliefs are affected by issues such as culture and education, preparing policies and programs by determining the epistemological beliefs of teachers before service will contribute to reform efforts (Tezci et al., 2016). Taking especially the preparation of the programs that are student-oriented and based on the constructivist approach in recent years into account, their successful applications in classrooms indicate the importance of teachers who have developed epistemological beliefs (Brownlee et al. 2001). In this regard, the scale can be used to determine the epistemological beliefs of teachers in Kosovo.

Conclusion

In this study, epistemological belief scale which has been adopted to many different cultures by Schommer (1993) was adopted to Kosovo culture. For this adaptation, Turkish version of the scale adopted by Deryakulu and Büyüköztürk (2002) was used as it has been simplified by the Turkish researchers. In its original version, the scale is consists of 63 items, but in Turkish version it has 35 items. The reason for preferring the simplified version of the scale with 35 items results from the fact that some other scales were used during the research. By this way, participants did not struggle with many scale items which hinder them to respond frankly and truly. Besides, the scale is discipline free one, by this way it can be used for every disciplines while measuring teachers' epistemological beliefs. After the analyses CFA results showed that the fitting indexes were at acceptable levels. When the results were analyzed related to different language structure, it was found that the best fitting indexes were found in Bosnian. Fit indices for cross-validation are at acceptable levels. Although, the convergence indexes were not so high but it was acceptable. Cronbach's alpha and Omega analyses results showed that the scale is reliable one. Item-total correlation was at medium level. Item discrimination analyses results showed that all items were significantly differentiated. The results indicated that Epistemological Beliefs Scale is sufficiently valid and reliable and also capable of measuring teachers' epistemological belief in Kosovo.

Recommendations

In the study, the results were not compared to original version consisting of 63 items. Especially, both versions of the scale should be used to compare the results. Furthermore, as the original version of the scale by Schommer (1993) was

adopted to many cultures, other adaptations should be applied in different cultures to find out whether it is possible to get a universal scale for teachers' epistemological belief and the nature of the teachers' epistemological beliefs. Furthermore, there are many scales for measuring teachers' epistemological belief using other scales synchronously with this scale will contribute validity and reliability of the scale.

Recommendations for Further Study

In this study, the sampling group was composed of 200 teachers and these teachers have 3 different mother tongues. As teachers have different mother tongues, the scale was translated into 3 different languages. In addition, using the scale with other scales related to different variables effecting teachers' epistemological beliefs will increase predictive power of the scale. In this study, there is no comparison with regard to demographical variables. So, such comparisons will also help researchers to see the relationships between epistemological belief and gender, teaching discipline and professional seniority. Moreover, analysing the results together with the constructs that are related to epistemological beliefs will contribute to validity studies.

Recommendations for Practitioners

As teachers are responsible for applying the curriculums at schools, knowing teachers' epistemological beliefs will help curriculum designers to design more effective ones. Furthermore, there should be a coherence between teachers' epistemological belief and philosophy of the curriculum for better results in terms of reaching goals.

Limitations

The sample of this study included only Turkish, Bosnian and Albanian mother tongue teachers. However, in Kosovo there are also teachers with different mother tongue (e.g. Serbian). The fact that this study does not cover all teachers with different mother tongue has created an important limitation. Another limitation of the study is the low number of teachers who participated in the study. The small sample size and the absence of all languages spoken in Kosovo limits the generalization of results.

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