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The Relationship between University Students' Epistemological Beliefs and Teaching/Learning Conceptions

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Abstract

The purpose of this study is to explore the relationship between the Epistemological Beliefs and Teaching/Learning Conceptions of the 1st, 2nd, 3rd and 4th grade students in the departments of Physical Education and Sports Teaching, Coaching Education, Sports Management and Recreation Education in the School of Physical Education and Sports in Erciyes University. The research population consists of randomly selected 706 students of the School of Physical Education and Sports. In the study, Epistemological Beliefs Questionnaire (Aypay, 2012) and Teaching/Learning Conceptions Questionnaire (Aypay, 2011) were used as data collecting tools. Data obtained through Personal Information Form, Epistemological Beliefs Questionnaire and Teaching/Learning Conceptions Questionnaire were statistically analyzed using SPSS 20.0 package program. Candidates' personal information and inventory total points and factor points were presented by identifying frequency (f) and percentage (%) values. To indicate the relationship between the scores obtained from the questionnaires, Pearson Moment Product Correlation analysis (r) was conducted while multiple regression analysis was performed to determine whether the points are predictive of each other. (β) Consequently, it was found that the Epistemological Beliefs Questionnaire subdimensions Learning Process and Learning Effort positively influence the constructivist teaching/learning conceptions of the students of the School of Physical Education and Sports while the subdimensions Learning Process and Certainty of Knowledge positively affect the students' traditional teaching/learning conceptions. According to these results, it is considered that students will take an active role in the learning process and the constructivist education and training processes will develop and contribute to the new generation constructivist education and training process while performing the teaching profession.

Keywords: Epistemology, Belief, Teaching/ Learning, Student, University

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INTRODUCTION

The influence of individuals' beliefs on their ideas and behaviours drove pedagogues to take into consideration beliefs in many different categories in terms of learning and teaching processes. Various theories of education occasionally gave prominence to different kinds of beliefs, making them the subject of educational studies. Among these beliefs, the subject of epistemological beliefs is critical in this framework (Eroğlu, 2004). In the broadest terms, epistemological beliefs can be defined as the subjective beliefs held by individuals as to what is knowledge and how knowing and learning occurs (Schommer, 1990). Schommer-Aikins and Hutter maintain that epistemological beliefs refer to the beliefs held by individuals about the certainty and organization of knowledge and about their control on knowledge (Schommer and Hutter 2002). Individuals' personal interpretation about how they learn and teach is based on their epistemological conceptions. Individuals' epistemological conceptions influence their perspective on reality, and based on this reality, what knowledge is, how it is learned, taught and produced (Tezci and Uysal, 2004). The tendency for the notion of belief in education stems from the consideration that beliefs are a factor that guides our behaviours. Starting from the assumption that beliefs can be changed, we can enable students to become more active "learners" and achieve more qualified learning. Their academic achievements can be affected in a positive way, and more importantly, they can become more competent at lifelong learning and succeed in different stages of their lives. In this context, the significance of epistemological beliefs in learning and teaching process cannot be denied (Karahan, 2007). The concept of teaching and learning conceptions refers to teachers' preference for how they address teaching and learning methods (Chan and Elliot, 2004). In other words, teaching and learning conceptions correspond to teachers' beliefs about their own educational practices (Eryaman, 2007; Chan, 2003). Developments at different periods of educational sciences have brought along differences in teaching and learning conceptions. In this regard, we can mention two opposing teaching and learning conceptions in education (Schunk, 2008). These two are traditional and constructivist teaching-learning conceptions (Duffy and Roehler, 1986). In constructivist teaching/learning conceptions, knowledge cannot be considered independently from the individual, and while it is accepted that knowledge is contextual and personal, it is also highlighted that these meanings cannot be transmitted to others (Phillips, 2000). Constructivist teaching/learning involves an active process that individuals construct meaning by combining their prior knowledge with new ideas (Jones and Araje, 2002). In constructivist teaching/learning conception, students are not a passive recipient of external stimulus, but they internalize such stimulus and actively construct knowledge (Biggs, 1996; Eryaman & Genc, 2010). On the other hand, in traditional teaching/learning conception, teachers as the sole source of knowledge transmit knowledge to the students in the classroom who receive this knowledge without questioning (Riedler & Eryaman, 2016; Senemoğlu, 2004). Hence, it can be said that teachers that adopt traditional conception apply a teacher-centred teaching style in the classroom, considering students as the passive recipients of knowledge (Cheng et al. 2009).

In the relevant literature review, we can find numerous studies on epistemological beliefs both abroad like Hofer and Pintrich (1997), Baxter Magolda (1987), Schommer, (1990), Schommer, Crouse and Rhodes, (1992), Brownlee et al. (2001) and Tolhurst (2007), and at home like Aksan and Sözer (2007), Izgar and Dilmaç (2008), Terzi (2005), Erdem, Yılmaz and Akkoyunlu (2008), Meral and Çolak (2009). Similarly, there are studies on teaching/learning conceptions both abroad like Murray & McDonald, (1997), Chan (2003), Chan & Elliot, (8), Chai & Khine, (28), Cheng et al. (2009), and at home like Aypay (2011), Bıkmaz (2011), Oğuz (2011), Şahin & Yılmaz, (2011).

Although there are several local and foreign studies on epistemological beliefs and teaching-learning conceptions in the relevant literature, we have encountered no study that explores these two variables together. In this context, starting from the idea that the examination of these two notions that are considered to be affecting each other significantly would be very useful, we decided to examine the relationship between the Epistemological Beliefs and Teaching-Learning Conceptions of the students of the School of Physical Education and Sports in Erciyes University.

MATERIAL-METHOD

Study Group

In the study, relational screening model was used. The model can be defined as "a screening model aiming to determine the existence and/or level of covariance between two or among more than two variables (Karasar, 2007).

The study is a descriptive one as it attempts to determine the relationships between the epistemological beliefs, teaching/learning conceptions, and demographical characteristics of the students of the School of Physical Education and Sports.

Data Collection Tools

When conducting the questionnaires in the study, the researcher and instructors in the university tried to create a healthy evaluation process for the candidates by making necessary explanations to each candidate in a broad time period, without making any rush. In addition, appropriate materials and environmental conditions were provided so that the candidates could fill the forms in a comfortable atmosphere. As data collection tools, Epistemological Beliefs Questionnaire, Teaching/Learning Conceptions Questionnaire and Socio-demographic Information Form were used in the study.

Formation of Volunteer Groups:

The research was conducted on the study group which is made up of the candidates in the 1^{st}, 2^{nd}, 3^{rd} and 4^{th} grades in the departments of Physical Education and Sports Teaching, Coaching Education, Sports Management and Recreation Education at Erciyes University.

A total of randomly chosen 706 students out of 1440 students in the School of Physical Education and Sports participated in the study.

Socio-demographic Information Form

When preparing the socio-demographic information form for the study, the socio-demographic information forms on academic frauds, academic delay and success orientation studies in literature were examined and a pool of the characteristics of students to be examined was created. Then, with the help of statistics specialists, a socio-demographic information form was prepared. The form included 6 questions in order to get information about the age, gender, department, grade, grade point average and weekly study time of the participants.

Table 1. Socio-demographic Characteristics of Participants

	Variables	N	%
Gender	Male	413	58.5
	Female	293	41.5
Age	18-20	126	17.8
	21-23	393	55.7
	24-26	118	16.7
	27 and above	69	9.8
Department	SPES	118	16.7
	Coaching Education	185	26.2
	Sports Management	196	27.8
	Recreation Management	207	29.3
Grade	1	160	22.7
	2	166	23.5
	3	208	29.5
	4	172	24.4
GPA	1.75-2.25	65	9.2
	2.51-3.00	438	62.0
	3.01-3.50	192	27.2
	3.51-4.00	11	1.6
Weekly Study Time	1-10	472	66.9
	11-20	198	28.0
	21-30	33	4.7
	31 and above	3	0.4

Epistemological Beliefs Questionnaire

Chan and Elliot (2004) adapted Schommer's (1990) 63-item "Epistemological Beliefs Questionnaire" to the EBQ. After testing its validity and reliability, Aypay (2012) adapted the instrument into Turkish. In the study group, the EBQ is considered as four factors which explain 37.18% of total variance. Load factor values of the items in the first factor vary between 0.732 and 0.360. It varies between 0.732 and 0.372 for the items in the second factor, and between 0.629 and 0.492 for the items in the third factor. Finally, the load factor values of the items in the fourth factor vary between 0.561 and 0.387. The first factor explains 12.6%, the second 10.47%, the third 7.53% and the fourth 6.54% of total variance.

Teaching/Learning Conceptions Questionnaire

Teaching and Learning Conceptions Questionnaire was developed by Chan and Elliot (2004), and translated into Turkish by Aypay (2011) after its validity and reliability were confirmed. The thirty-item questionnaire was subjected to Confirmatory Factor Analysis, and the results indicated a compatible model (GFI = 0.93, AGFI = 0.91, RMR 0.50, RMSEA 0.54). According to the results of the analysis, the questionnaire indicates a two-factorial structure that points out two approaches (constructivist conception and traditional conception). Thus, Alpha reliability coefficient was calculated for the whole of and sub-factors of the 30-item questionnaire form, and the values were found as .86, .84 and .84 respectively. To answer the items in the questionnaire, 5-Likert scale was used (5=Strongly agree - 1=Strongly disagree). Higher points obtained for the sub-factors are interpreted that the conception represented by that factor is adopted.

Data analysis

Data obtained through Personal Information Form, Epistemological Beliefs Questionnaire and Teaching/Learning Conceptions Questionnaire, and exam grades were coded and entered into SPSS 20.0 package program through which analyses were conducted. The candidates' personal information and inventory total points, and factor points were presented by identifying frequency (f) and percentage (%) values. To indicate the relationship between the points obtained from the questionnaires, Pearson Moment Product Correlation analysis (r) was conducted while multiple regression analysis was performed to determine whether the points are predictive of each other. (β)

FINDINGS

Table 2. Descriptive statistics of the students' responses to the questionnaire

	N	Minimum	Maximum	X±SS
Learning Process- Casting Doubt on Authority/Expert Knowledge	706	1.64	5.00	3.71±0.54
Inherent /Fixed Ability	706	1.25	4.75	3.13±0.65
Learning Effort	706	1.20	5.00	3.69±0.68
Certainty of Knowledge	706	1.50	5.00	3.28±0.64
Constructivist	706	2.00	5.00	3.74±0.60
Traditional	706	1.56	4.94	3.49±0.55

As seen in Table 2, it was found that the university students' mean score for the Epistemological Beliefs Questionnaire subdimensions Learning Process-Casting Doubt on Authority/Expert Knowledge is 3.71 while the mean score for the subdimension Innate/Fixed Ability is 3.13, and 3.28 for the subdimension Certainty of Knowledge. The mean scores for the Teaching and Learning Conceptions Questionnaire subdimension Constructivist Learning/Teaching is 3.74 and it is 3.49 for the subdimension Traditional Learning/Teaching.

Table 3. Correlation Coefficients between the Students' Epistemological Beliefs and Teaching/Learning Conceptions (n=706)

		1	2	3	4	5	6
Learning Process-Authority/Expert Knowledge[1]	r	1					
	p						
	N	706					
Inherent /Fixed Ability[2]	r	.254**	1				
	p	.000					
	N	706	800				
Learning Effort[3]	r	.522**	.217**	1			
	p	.000	.000				
	N	706	706	706			
Certainty of Knowledge[4]	r	.319**	.551**	.287**	1		
	p	.000	.000	.000			
	N	706	706	706	706		
Constructivist[5]	r	.516**	.189**	.417**	.272**	1	
	p	.000	.000	.004	.000		
	N	706	706	706	706	706	
Traditional[6]	r	.370**	.341**	.281	.422**	.599**	1
	p	.000	.000	.052	.000	.000	
	N	706	706	706	706	706	706

The analysis of Table 3 indicated that there is a medium positive correlation between the subdimensions Learning Process-Casting Doubt on Authority/Expert Knowledge and Constructivist Teaching/Learning (r=.516, p=.000), and a low positive correlation with the subdimension Traditional Learning/Teaching (r=.370, p=.000).

A low positive correlation was found between the subdimension Innate/Fixed Ability and the subdimensions Constructivist Teaching/Learning (r=.189, p=.000) and Traditional Teaching/Learning (r=.341, p=.000).

While there are low positive correlations between the subdimension Learning Effort and Constructivist Teaching/Learning (r=.417, p=.004), there is no significant relationship with the subdimension Traditional Learning/Teaching (r=.281, p=.052).

There are low positive correlations between the subdimension Certainty of Knowledge and the subdimensions Constructivist Teaching/Learning (r=..272, p=.000) and Traditional Teaching/Learning (r=.422, p=.000).

Table 4. Regression Table for the Students' Epistemological Beliefs to Predict Their Teaching/Learning Conceptions

		β	t	*p*	*R*	*R²*	F	p
Learning Process	**Learning Conceptions**				.522	.272	131.611	.000
	Constructivist	.460	11.451	.000				
	Traditional	.094	2.344	.019				
Innate fixed ability	**Learning Conceptions**				.342	.117	46.529	.000
	Constructivist	-.024	-.541	.589				
	Traditional	.356	8.036	.000				
Learning effort	**Learning Conceptions**				.418	.175	74.615	.000
	Constructivist	.387	9.049	.000				
	Traditional	.049	1.151	.250				
Certainty of Knowledge	**Learning Conceptions**				.422	.178	76.212	.000
	Constructivist	.031	.718	.473				
	Traditional	.403	9.446	.000				

F (2,703)

The analysis of Table 4 shows that the model established between the subdimension Learning Process-Casting Doubt on Authority/Expert Knowledge and teaching/learning conceptions presents a significant relationship (R=.522, R2=.272, p<0.01). The analysis of t-test results for the significance of regression coefficients indicates that Learning Process predicts the characteristics of Constructivist Teaching/Learning (t=11.451, p=.000), Traditional Teaching/learning (t=2.344, p=.019), Learning and Teaching Conceptions, explaining 27% of total variance (F2,703 = 131.611, p=.001).

The analysis of Table 4 shows that the model established between the subdimension Innate/Fixed Ability and teaching/learning conceptions presents a significant relationship (R=.342, R2=.117, p<0.01). The analysis of t-test results for the significance of regression coefficients indicates that the subdimension Innate/Fixed Ability predicts the characteristics of Traditional Teaching/Learning (t=8.036, p=.000), and Learning and Teaching Conceptions, explaining 11% of total variance (F2,703 = 46.529, p=.001).

The analysis of Table 4 shows that the model established between the subdimension Learning Process and teaching/learning conceptions presents a significant relationship (R=.418, R2=.175, p<0.01). The analysis of t-test results for the significance of regression coefficients indicates that the subdimension Learning Process predicts the characteristics of Constructivist Teaching/learning (t=9.049, p=.000), and Learning and Teaching Conceptions, explaining 17% of total variance (F2,703 = 74.615 p=.001).

The analysis of Table 4 shows that the model established between the subdimension Certainty of Knowledge and teaching/learning conceptions presents a significant relationship (R=.422, R2=.178, p<0.01). The analysis of t-test results for the significance of regression coefficients indicates that the subdimension Certainty of Knowledge predicts the characteristics of Traditional Teaching/learning (t=9.446, p=.000), and Learning and Teaching Conceptions, explaining 17% of total variance (F2,703 = 76.212 p=.001).

DISCUSSION – CONCLUSION

Physical education and sports are essential for physically, mentally and spiritually healthy individuals, so for a healthy society. In its multi-disciplinary structure, sports can be examined with its psychological dimensions on the one hand while an anatomic or physiological examination and philosophical questioning of sports can also be made on the other hand. In this sense, the findings of this study that aims to explore the relationship between the university students' epistemological beliefs and teaching/learning conceptions indicate that there are significant relationships between the Epistemological Beliefs Questionnaire subdimensions (Learning Process-Casting Doubt on Authority/Expert Knowledge, Innate/Fixed Ability, Learning Effort, Certainty of Knowledge) and teaching/learning conceptions subdimensions (Constructivist, Traditional).

In the study, we found significant positive relationships between Learning Process-Casting Doubt on Authority/Expert Knowledge and constructivist teaching/learning and traditional teaching/learning conceptions. While there is no significant relationship between Innate/Fixed Ability and constructivist teaching/learning conceptions, significant positive relationships were found with traditional teaching/learning conceptions. While there is no significant relationship between Learning Effort and traditional teaching/learning conceptions, significant positive relationships were found with constructivist teaching/learning conceptions. Yet, there was no significant relationship between Certainty of Knowledge and constructivist teaching/learning conceptions while significant positive relationships were found with traditional teaching/learning conceptions. When the procedure of epistemological beliefs and teaching/learning conception was examined, it was observed that; together with the increasing Doubt Against Learning Process-Authority/Expert Knowledge the understandings of constructivist learning/teaching and traditional learning/teaching increased in low levels, with the increase in inherent/static ability, the understanding of traditional learning/teaching increased in low levels, with the increase in the learning effort the understanding of constructivist learning/teaching increased in low levels, together with the increase in the sharpness of knowledge the understanding of traditional learning/teaching increased in low levels. These findings from the research show that epistemological beliefs are the significant predictors of teaching/learning understandings. However, when the sub-dimensions of the 4 epistemological beliefs scales are addressed separately, it was concluded that the Learning process sub-dimension is a higher level predictor of teaching/learning understandings than the other sub-dimensions. Finally, the findings of the study reveal that epistemological beliefs are a significant predictor of teaching/learning conceptions. However, when the 4 subdimensions of the Epistemological Beliefs Questionnaire are analyzed separately, it is concluded that the subdimension Learning Process is a higher predictor of teaching/learning conceptions compared to the others. Thus, research findings suggest that students with sophisticated epistemological beliefs in learning process have more advantage compared to the students with unsophisticated epistemological beliefs, which means that some students are less successful in learning process because of their beliefs about knowledge and learning, not low IQ, lack of skills or not studying enough (Deryakulu, 2004).

In line with this view, Howard, Mcgee, Schwartz and Purcell (2000) maintain that sophisticated epistemological beliefs are in parallel with constructivist learning conception while unsophisticated beliefs are objectivist and in parallel with traditional learning conception. Hence, epistemological beliefs should be further improved in order to implement constructivist learning models in a more efficient way (Deryakulu, 2004).

Developments at different periods of educational sciences have brought along differences in teaching and learning conceptions. In this regard, we can mention two opposing teaching and learning conceptions in education (Schunk, 2008). These two are (i) traditional and (ii) constructivist teaching-learning conceptions (Aypay, 2011).

In constructivist teaching/learning conceptions, learning is a process for constructing knowledge. This approach is not based on rote-learning, but on the learner to transfer knowledge, reinterpret previous knowledge and construct new knowledge (Perkins, 1999).

On the other hand, in traditional teaching/learning conceptions, teachers as the sole source of information are expected to transfer knowledge to students who receive such knowledge without questioning (Brooks and Brooks, 1999).

When these conceptions are examined, it is found that there is a tendency towards constructivist approach from traditional approach in literature (Ayapay, 2011).

In their study on the relationship between teaching style and epistemological beliefs, Windschitl and Andre (1998) suggest that university students with sophisticated epistemological beliefs learn better with a constructivist approach while students with unsophisticated epistemological beliefs learn better in the teaching processes arranged with a traditional approach (Windschitl, 1998).

Consequently, the study found that the Epistemological Beliefs Questionnaire subdimensions Learning Process and Learning Effort positively affect the constructivist teaching/learning conceptions of the students of the School of Physical Education and Sports while the subdimensions Learning Process and Certainty of Knowledge positively affect the students' traditional teaching/learning conceptions. According to these results, it is considered that students will take an active role in the learning process and the constructivist education and training processes will develop and contribute to the new generation constructivist education and training process while performing the teaching profession.

Based on the findings of the study the following suggestions are developed: The use of constructivist educational method should be increased to improve students' academic achievements. The class activities to improve students' epistemological beliefs should be carried out. Instructors, professors and teachers should enable students to transfer the knowledge they receive, to interpret their previous knowledge, construct new knowledge and finally express their own opinions rather than preferring an educational system based on rote-learning.

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