



Relationship between Prospective Teachers' Epistemological Beliefs and their Conceptions about Teaching and Learning

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Abstract- Epistemological belief is the process about knowledge acquisition and the nature of information. These beliefs shape the concepts regarding teaching and learning. It eventually influenced the strategies of instructions and its quality in the classroom. The main purpose of this quantitative study was to find out the relationship between prospective teachers' epistemological beliefs and their conceptions about teaching and learning. Data were collected from 759 Prospective teachers of two public universities by using stratified proportionate random sampling technique. Findings of the Correlational research study revealed that there was significance moderate positive correlation between prospective teachers' epistemological beliefs and their conceptions about teaching and learning. Findings further concluded that male and female prospective teachers have significant difference regarding conceptions of teaching and learning. It is recommended that the teacher educators may engage prospective teachers in understanding in depth the epistemological beliefs and its different dimensions and have clarified their conceptions regarding teaching and learning.

Keyword: Epistemological beliefs, Conceptions about learning, Conceptions about teaching, Prospective teachers.

I. INTRODUCTION

Epistemological beliefs that are connected to reasoning and metacognition operations (Chai, Khine, & Teo, 2006). These beliefs are explained as the beliefs about attainment of information and its nature (Burning, Schrew, Norby, & Ronning, 2004). These beliefs are interrelated to some of the variables that are the strategies of study and solving the problematic issues, increasing the motivation level, achievement of the goals, and approaches of learning (Buehl & Alexander, 2005). Some of the concepts like teaching and learning are linked with epistemological beliefs and concepts are influenced by these respective beliefs (Sungur, 2009). Epistemological beliefs (EB) are attainment of knowledge system that is essential in learning process (Aypay, 2009). Epistemological beliefs include Includes the link with teaching and learning and the task of students in the classroom environment (Chan & Elliott, 2004). These beliefs have extended the beliefs of pre service and in service (Chan & Elliott, 2004a).

Epistemology answers to the questions that how knowledge is obtained and how it could be justified, what are the theories and background of knowledge and how it could be formulated. In the other phenomenon, it is related to the philosophical mode that is connected to the essence of knowledge and seeks the reasons of the knowledge and the speculation of the theory. Epistemology tries to find the basis of knowledge construction (Schommer, 1994). These beliefs are important for constructing new knowledge and its level of perceiving and understanding the knowledge in depth with the help of experience interpretation and constructivism and its theory of learning. (Cheng, 2009). These beliefs and concepts regarding teaching and learning are seems to be very essential because they highlight the behavior of prospective teachers in the practicing classroom and identify the teaching learning strategies and techniques. Therefore, it's very crucial for decision making and underlying instructors' epistemological convictions and the conceptions of teaching and learning and connection among them (Aypay, 2009).

Epistemology in other words clarify such discipline of inquiry, reinvestigation gaining of knowledge, its boundaries, stability, reliability and validity of knowledge in term of transmission and attaining the knowledge (Necka, 2017). Epistemological beliefs have extends underlying because it covers and have in depth relationship with the teaching and learning perspective. It also linked with the aptitude that related to the process of gaining and usefulness of the knowledge and all these processes have a connection with the epistemological belief. The dimensions of epistemological beliefs regarding to the individuality may

differ from one another. For example, some individuals think that the knowledge might have simple or fixed structure and some think that the knowledge is quite complex and complicated, all these beliefs are derived from epistemological beliefs. The ideas that are encompassing towards the knowledge are driven from the epistemological beliefs (Schommer & Walker, 2000). With this content, Epistemological beliefs contribute to the development of formulating, describing, evaluating, and defining of the knowledge at the same time by the individuals themselves because it is enabling them to have a clear viewpoint towards knowledge construction. The results of all the formulation of knowledge of the individuals can reach towards the conceptions of teaching and learning they have adopted by themselves and this all is contributing in understanding the knowledge. Deryakulu and Ursavaş (2014) pointed out that some factors are associated in affecting the construction and formation of the epistemological beliefs are mentality development, age, structure of the family, education system and culture and tradition. Similarly, Essentially, Duran, & Mihladić (2014) brings up that epistemological convictions might be created and it brings to the conclusion that the teachers' training programs whether formal or informal education point out that those individuals how can understand the situation correctly and interpret it scientifically can have the positive attitude towards the knowledge acquisitions and beliefs regarding epistemology. Although, these training programs are helpful in interpretation of the beliefs of the individuals and these might have an effective connection with teaching and learning conceptions. Individuals must have the ability to construct the knowledge in the educational process that is basic and have a long term effect on the learning process that brightens the teaching and learning conceptions. They must be taught the importance of teaching and learning conceptions. Conceptions regarding learning are tough because they require perfect planning to perform, interpret knowledge, analytical skills, studying material, comparing the knowledge to the existing knowledge, same like that these can be interrelated and connected and be matched in recalling the knowledge and thoughts and behavior that the students have in the previous learning years.

The teaching and learning conceptions that are followed by teachers in the educational process have a great importance. Chan and Elliot (2004) explained that concepts of teaching as well as learning adopted by the teachers in the educational system indicated that the teachers have some beliefs that they preferred highlight the beliefs system. Epistemological beliefs encompass the teacher's role in teaching and the involvement of them in the learning process. The main concern of the beliefs regarding epistemology indicated that the epistemology and its dimensions directing the behavior in learning. It values such system that directly influence the teaching strategies in the classroom and association of it with the learning conceptions (Cheng, Chan, Tang, & Cheng, 2009).

Epistemological beliefs are beliefs in regard to the idea of information and learning (Elby & Hammer, 2001; Schommer, 1990). In this regard the epistemological beliefs indicate to the idea of information and delivering of learned material. All those beliefs of the students towards knowledge construction and some other facts that how knowledge is to be gained, how it could be assessed, from where information lives, and how it could be realistic in nature. In the view of Schommer (2004), that holds some independent dimensions. Same like that in a study by Schommer (2003), that epistemological beliefs affect the information that the students have in the early years of education, it also monitors the system that individuals have in the learning process. There is a developing assemblage of writing on epistemological beliefs today in light of the fact that there are numerous examinations uncovering that epistemological beliefs are significant indicators in understudies learning procedure (Chan, 2004).

Conception about educating and learning allude to the convictions held by educators about their favored methods for instructing and learning. The conception indicates the pure meaning of learning with teaching and teachers' role in education. (Chan & Elliot, 2004). The conceptions of teaching with learning are linked with two models respectively. They are constructive model of learning and traditional model of learning. In the light of traditional model of learning, teacher is the main element of the process of educational system. In this perspective the students are the passive listeners and recipients of knowledge and all the authority lies in the hands of a teacher. Students gain knowledge from the different sources that help them to encounter educational goals. Students seek help from textbooks and learn well-defined conceptions towards teaching.

The constructivist model of learning is different and opposite to the traditional model of learning. The model emphasizes the active participation of the students in the classrooms. The model further stressed upon the students' critical thinking, development of thinking ability, habit of discovery and cooperation among them. There are two principle inverse conceptions in educating and learning (Traditional and constructive). The foundation of constructivism is derived from Piaget's and Vygotsky's theories. In this phenomenon the both of the theories stressed the students' involvement in learning process and value the experiences. Vygotsky calls attention to significance in the collaboration of pupils with their companions in knowledge construction. Traditional model of learning utilizes strategies of

teaching in the teaching process. These conceptions see teachers the knowledge facilitator and students the passive receiver of the knowledge in whole of the educational process. On the other side, constructivist conceptions are quite opposite because they are student centered and apply those to the teaching strategies; all these are helpful in developing the critical thinking, analytical skills and learning in situations where understudies can take an interest effectively (Chan & Elliot, 2004). These conception and beliefs make up a person's epistemological beliefs. This conception drives a person to the advancement of a world view, lasting beliefs information and information obtaining process. This all process is also true for the both whether students or teachers. There are different studies that identify clearly that there is a strong relationship among epistemological beliefs and its dimensions and conceptions about teaching and learning. It is also reported that epistemological beliefs of students and teachers have relationship in the sense of conceptions about teaching and learning (Tekkaya & Sungur, 2009). The basic thinking abilities of the students with the connection to information and acquiring knowledge are increasingly modern hence they might have much better critical thinking abilities (Aksan & Sozer, 2007).

There are some studies revealing that there is a relationship between the qualities of epistemological beliefs and conceptions about teaching and learning. It has been reported that there is a relationship between the epistemological beliefs possessed by students and learning conceptions (Kızılgunes, Tekkaya,& Sungur, 2009).The thinking abilities of the thinking generally in connection to information and learning are increasingly modern and hence they have better critical thinking abilities (Aksan & Sozer, 2007). The concepts are easily be understood by strong epistemological beliefs but if the knowledge has complexity it could be difficult to understand (Schommer, Aikins,& Hutter, 2002). The students who have advanced epistemological beliefs about the essence and learning are progressively industrious in getting a handle on a profound comprehension of the substance and in adapting to testing scholastic undertakings. Hofel (2001) described that a study was conducted in the university, where majority of the students were believing that more invested time and more invested effort in learning something will make the beliefs stronger and this is linked with cognitive strategies; however, making less effort on the learning, investing little time on the studies and learning immediately with clarifying the conceptions leads to unsuccessful learning and weak epistemological beliefs. Moreover, Apart from this, it has been also identified that epistemological beliefs of the individuals are positively correlated with the learning process (Schommer-Aikins & Hutter, 2002). It has been described that when individuals are engaged in any ill-structured or difficult to defined problems they can be solved by different developmental stage of epistemological beliefs that leads towards the construction of critical thinking. They study concluded that the individuals having strong beliefs might have better understanding as compared to those having weaker or naïve epistemological beliefs on the basis available conditions or problems can bitterly solve any problem without focusing on any hurdle in educational set up. Schommers-Aikins (2009) explained that individuals with naïve beliefs generally act like an unassertive receiver of knowledge. And individuals with stronger or sophisticated beliefs are able to solve problems in the learning process, they think they have strong knowledge that is related towards the empirical evidences and they feel themselves to be the problem solver and capable for performing task. The teacher educators have a better instructing position taking in learning concepts conventional educating that depends towards the exchange of information in structure. The both concepts teaching and learning are different from each other, they focus on different perspective. The generation of knowledge and the specified roles of teacher and students in the educational process are the main concerns of them. That the teacher educators have a better instructing position taking in learning concepts conventional educating that depends towards the exchange of information in structure. The both concepts teaching and learning are different from each other, they focus on different perspective. The generation of knowledge and the specified roles of teacher and students in the educational process are the main concerns of them. Constructivism learning techniques demands the dynamic support of understudies during the time spent comprehending or developing the information(Aypay,2011).

Objectives of the Study

Following were the objectives of the study to;

1. Investigate the relationship between prospective teachers' epistemological beliefs and their conceptions about teaching and learning.
2. Find out significance difference of prospective teachers' Epistemological beliefs and their conceptions about teaching and conceptions learning on the basis of gender and public universities.

Research Questions of the Study

Following were the research questions of the study.

1. Is there any significance relationship between prospective teachers' epistemological beliefs and their conceptions about teaching and learning?

2. Is there any significance difference of prospective teachers' Epistemological beliefs and their conceptions about teaching and conceptions learning on the basis of gender and public universities?

II. RESEARCH DESIGN

Research was quantitative in nature and correlation research design was used to investigate relationship between prospective teachers' epistemological beliefs and their conceptions about teaching and learning at university level.

Population and Sample of the study

The population of the study was comprised of all the prospective teachers enrolled in the masters' program session (2018-2020) in the two public universities i.e. (university X and university Y). According to Higher Education Commission (2018), there approximately 1376 students enrolled in Masters' program (M.A Education) session (2018-2020) in the two respective universities of District Lahore, Pakistan.

Research Instrumentation

Relationship between prospective teachers' Epistemological Beliefs and their Conceptions about Teaching and Learning" was determined by using self-made questionnaire. There were 46 statements in the questionnaire. First scale was epistemological beliefs which include 4 sub factors. This scale was consisted of 26 statements. The detail description of statements of each factor is as follow: (1) innate ability, (2) learning process, (3) certainty of knowledge and (4) expert knowledge. Second scale was Conceptions of Learning which include 10 statements. And third scale was Conceptions of Teaching which include 10 statements. This tool was validated with the opinions of the field experts of Educational Research and Assessment. The reliability of the questionnaire was checked by Cronbach's Alpha $\alpha = .876$ prospective teachers' were randomly selected for reliability of the questionnaire.

Data Analysis and Interpretation

Descriptive statistics techniques means, standard deviation and frequencies were calculated to explore Epistemological Beliefs of prospective teachers at university level. Relationship between prospective teachers' epistemological beliefs, teaching and learning was investigated by using Pearson r and difference between demographic variables i.e. (gender and university) was investigated by applying independent samples t-test.

III. RESULTS

Perceptions of Male and Female Prospective Teachers' about Epistemological beliefs at University Level

Gender		Innate Ability	Learning Process	Certainty of Knowledge	Expert Knowledge
Male	Mean	24.59	25.55	27.62	19.26
	N	100	100	100	100
	SD	2.68	3.85	2.44	2.32
Female	Mean	25.48	25.74	26.20	19.10
	N	659	659	659	659
	SD	3.23	3.97	3.25	2.54
Total	Mean	25.36	25.71	26.38	19.12
	N	759	759	759	759
	SD	3.18	3.95	3.19	2.51

In above table 1 the mean scores of male and female prospective teachers' epistemological beliefs with respect to different domains (innate ability, learning process, certainty of knowledge and expert knowledge) are given. Findings of the study revealed that prospective teachers were believed that certainty of knowledge (M=27.62, SD=2.44) was more focused in teaching-learning process as compared to the other domains (innate ability, learning process and expert knowledge) at University level.

Table 2

Correlation between Prospective Teachers' Epistemological Beliefs and Conceptions of Learning at University Level

Measures	M	SD	r- value	Sig.
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Epistemological Beliefs	96.60	8.37	.528*	.000
Conceptions of Learning	38.47	4.73		

Correlation between prospective teachers' epistemological beliefs and conceptions of learning at University level was calculated by using Pearson r. It was concluded that there was significant moderate positive correlation $r = .528^*$, $p = .000$ was existed between prospective teachers' epistemological beliefs and conceptions of learning at $p \leq 0.05$ level of significance.

Table 2(a)

Effect of Epistemological Beliefs and Conceptions of Learning at University Level

Model	<i>B</i>	<i>t-value</i>	<i>p</i>	<i>df</i>	<i>F</i>	<i>R</i> ²
Epistemological Beliefs	.528	5.621	.000	757	293.083	.279

Dependent Variable Conceptions of Learning

A linear regression analysis was conducted in order to find the significance effect of epistemological beliefs on prospective teachers' conceptions of learning. "It was revealed from the findings that by the epistemological beliefs were found to be significant with ($R^2 = .279$) at $p \leq 0.05$ level of significance". "The findings of the effect of epistemological beliefs on conceptions of learning was significantly predict the dependent variable with" ($\beta = .528$, $F = 293.083$, $p = .000$).

Table 3

Correlation between Prospective Teachers' Epistemological Beliefs and Conceptions of Teaching at University Level

Measures	<i>M</i>	<i>SD</i>	<i>r-value</i>	<i>Sig.</i>
Epistemological Beliefs	96.60	8.34	.373**	.000
Conceptions of Teaching	38.85	4.52		

Correlation between prospective teachers' epistemological beliefs and conceptions of teaching at University level was calculated by using Pearson r. It was concluded that there was significant moderate positive correlation $r = .373^{**}$, $p = .000$ was existed between prospective teachers' epistemological beliefs and conceptions of teaching at $p \leq 0.05$ level of significance.

Table 3(a)

Effect of Epistemological Beliefs and Conceptions of Teaching at University Level

Model	<i>B</i>	<i>t-value</i>	<i>P</i>	<i>df</i>	<i>F</i>	<i>R</i> ²
Conceptions of Teaching	.373	10.892	.000	757	121.980	.139

Dependent Variable Conceptions of Teaching

A linear regression analysis was conducted in order to find the significance effect of epistemological beliefs on prospective teachers' conceptions of teaching. "It was revealed from the findings that by the epistemological beliefs were found to be significant with ($R^2 = .139$) at $p \leq 0.05$ level of significance". "The findings of the effect of epistemological beliefs on conceptions of teaching was significantly predict the dependent variable with" ($\beta = .373$, $F = 121.980$, $p = .000$).

Table 4

Gender wise Differences of Perceptions of Teachers' Perceptions about Epistemological Beliefs at University Level

Measures	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t-value</i>	<i>Sig.</i>
Innate Ability	Male	100	24.59	2.68	-3.027	.003
	Female	659	25.48	3.23		

Learning Process	Male	100	25.55	3.85	-.452	.651
	Female	659	25.74	3.97		
Certainty of Knowledge	Male	100	27.62	2.44	5.157	.000
	Female	659	26.20	3.25		
Expert Knowledge	Male	100	19.26	2.32	.564	.573
	Female	659	19.10	2.54		

An independent samples t-test was applied to find out the differences of perceptions between male and female prospective teachers' perceptions about different dimensions of epistemological beliefs at University level. Findings of the study revealed that a significant difference of perceptions between male and female prospective teachers was found regarding the innate ability $p \leq .003$ and certainty of knowledge at $p \leq .000$. On the other hand a significant difference of perceptions between male and female prospective teachers was not found regarding the learning process and expert knowledge at $p \leq .05$ level of significance.

Table 4

Comparison of University Prospective Teachers' Perceptions about Epistemological Beliefs

Measures	Gender	N	M	SD	t- value	Sig.
Conception of Learning	Male	100	39.42	3.49	2.747	.001
	Female	659	38.32	4.87		
Conception of Teaching	Male	100	39.14	3.53	.814	.002
	Female	659	38.81	4.65		

An independent samples t-test was applied to find out the differences of male and female perceptions of prospective teachers' perceptions about conceptions of learning and teaching at University level. Findings of the study revealed that a significant difference of perceptions of male and female prospective teachers was found at $p \leq .05$ level of significance. It is concluded that male and female prospective teachers have differences of opinion regarding conceptions of learning and teaching at higher education level.

Table 5

Comparison of University Prospective Teachers' Perceptions about Conceptions of Learning and Teaching

Measures	N	M	SD	t- value	Df	Sig.
Innate Ability	402	25.43	3.28	.564	757	.520
	357	25.29	3.06			
Learning Process	402	25.57	4.15	-1.051	757	.119
	357	25.87	3.71			
Certainty of Knowledge	402	26.19	3.16	-1.738	757	.302
	357	26.60	3.21			
Expert Knowledge	402	19.01	2.52	-1.372	757	.980
	357	19.21	2.49			

An independent samples t-test was applied to find out the differences of perceptions of prospective teachers' perceptions about different dimensions of epistemological beliefs at University level. Findings of the study revealed that a significant difference of perceptions between university prospective teachers was not found at $p \leq .05$ level of significance. It is concluded that prospective teachers have no differences of opinion regarding epistemological beliefs at university level.

Table 6

Comparison of University Prospective Teachers' Perceptions about Conceptions of Learning and Teaching

Measures		<i>N</i>	<i>M</i>	<i>SD</i>	<i>t- value</i>	<i>Sig.</i>
Conceptions of Learning	of	402	38.05	5.11	-2.616	.009
		357	38.94	4.21		
Conceptions of Teaching	of	402	38.25	4.79	-3.965	.016
		357	39.53	4.10		

An independent samples t-test was applied to find out the differences of perceptions of prospective teachers' perceptions about conceptions of learning and teaching at University level. Findings of the study revealed that a significant difference of perceptions of prospective teachers was found at $p \leq 0.05$ level of significance. It is concluded that prospective teachers have differences of opinion regarding conceptions of learning and teaching at University level.

IV. DISCUSSION

According to epistemological belief dimensions identified in this research, the Pakistani prospective teachers tended to believe that knowledge is acquired through one's effort and the learning process rather than being offered by specialists or experts. They also inclined not to believe that teaching ability is innate and distinctive; and they tended not to believe that knowledge is definite and unchanged. The study shows that prospective teachers' epistemological beliefs and its dimensions (i.e. learning process and expert knowledge) were insignificant different due to gender but significant difference in innate ability and certainty of knowledge beliefs. The result was in line with study conducted by Bruning et al. (2004). The study concluded that prospective teachers' conception of teaching was significantly different on the bases of gender. This finding was aligned with studied conducted by Elby and Hammer (2001) and Hofer (2000, 2001) as well. According to Chan and Elliot (2004), the conceptions of teaching are belief driven. The study also revealed that prospective teachers' conceptions of teaching were insignificantly different between two public universities. This finding was harmonized with result of study conducted by (Tumkaya, 2007). The individuals shouldn't be the passive receivers of knowledge they must follow the reflective thinking models. Teaching conceptions and strategies are not very easily changeable but require such type environment that helps them easily adopt new knowledge (Chan & Elliot, 2004).

The study shows the significant difference of prospective teachers' conceptions of learning regarding gender. According to Koç and Köybaşı (2016), concepts regarding learning have a powerful impact on previous studies conducted during the class. Conceptions of learning are encouraged by the environment that enhances the use of the factors as reward, repetition. The study concluded the significant difference in prospective teachers' conceptions of learning on the basis of public universities. The result was consisted with Entwistle and Peterson (2004). They stated that different factors influence the learning conceptions i.e. nature of knowledge, system of expressing the knowledge can affect the quality of learning acquisition. Similarly, Deryakulu and Ursavaş (2014) also emphasized that environment where the prospective teachers are provided with knowledge and development of knowledge requires different chances and opportunities and provided with higher facilities have higher thinking order and skills and effort provide independence acquisition of knowledge not rote learning.

The present study also revealed that prospective teachers' epistemological beliefs and dimensions (IA, LP, CK and EK) were significantly correlated with conceptions of teaching and learning. In the literature it is explained that most of the prospective teachers believes that epistemological are important for creating a higher thinking order (Oğuz, 2008; Schommer-Aikins, 2009). Furthermore, Chan and Elliot (2004) study reveals that there is a hold of set of epistemological beliefs along with some dimensions i.e. innate ability, learning process, certainty of knowledge, expert knowledge etc. and these can influence the conceptions towards teaching and learning of every knowledge gainer. These believes influence the concepts strategies of teaching and learning, this all shows the relationship between beliefs and conceptions (Cheng et al., 2009).

V. RECOMMENDATIONS

Following recommendations were formed from this study.

1. The teacher educators may give a chance to prospective teachers to give lectures on epistemological beliefs to enhance their beliefs about teaching and learning.
2. Teacher's educators may create such environment that can increase their beliefs regarding epistemology. They may create opportunities i.e. (conferences, presentations in the classroom and monitor group activities). They may cooperate in performing activities and responsibilities to nurture epistemological belief.
3. Prospective teachers' may know how to implement the positive and useful conceptions of teaching and learning. They may know how to control and organize the environment that advance their beliefs about knowledge and have positive impact on teaching and learning.
4. During their lectures the interaction between teachers and students, teacher education may highlight the basic need for the prospective teachers to deliberately plan their learning efforts to make good use of the study.
5. The use of good teaching strategies and learning may be practice during the classroom. On the other side, the administration may organize workshops, different seminars on the awareness about epistemological beliefs and realizing its relationship with teaching and learning conceptions.
6. The policy makers may include the epistemological beliefs and the benefits of enhancing the teaching and learning strategies and conceptions.

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