FWU Journal of Social Sciences, Winter 2020, Vol.14, No.4, 12-25

Teacher Educators' Epistemological Beliefs and their Implications for Teacher Education

Itbar Khan
University of Malakand

Azhar Mahmood
International Islamic University Islamabad

Syed Munir Ahmad
University of Peshawar

Research has consistently shown that teachers' epistemological beliefs have a significant impact on their teaching and teacher effectiveness in the teaching- learning process. This study investigated epistemological beliefs (EBs) of teacher educators in higher education institutions and teacher education institutes in Khyber Pakhtunkhwa (KP). The study aimed at identifying teacher-centered and learners' centered EBs, examine the relationship of EBs and gender, find out the relationship of teachers' qualification with the EBs of teacher education, and explore differences between the EBs of teacher educators of public universities and RITEs. Of the 212 teacher educators of the study population, the data were collected through stratified random sampling from 145 respondents. Epistemological beliefs questionnaire (EBQ) and a scale for demographics were used for gathering data from the research participants. Percentages, Mean, One way ANOVA and Pearson r was used for data analysis. Findings of the study show that a majority of the teacher educators believed that the structure of knowledge is simple, half of the teacher educators believed that knowledge is certain. Similarly, a majority of the teachers did not believe in authority as a source of knowledge and considered that the ability to learn is not innate. A majority of the respondents did not agree that learning is a quick process. There was no significant difference in the EBs of male and female teacher educators; there was no significant difference in the EBs of teachers from universities and RITES, except in the dimension of the stability of knowledge, wherein educators from RITEs have unsophisticated beliefs and there is no significant effect of experience on the epistemological beliefs of teacher educators.

Keywords: epistemological beliefs, teacher educators, teacher education, RITEs, Khyber Pakhtunkhwa, Pakistan

---

Correspondence concerning this article should be addressed to Dr. Syed Munir Ahmad, Associate Professor, Institute of Education and Research Peshawar. munir_ahmad@uop.edu.pk

Contribution of Authors:

1. Dr. Itbar Khan contributed towards conceptualization, research design, data collection and analysis, and writing the initial draft of the paper.
2. Dr. Azhar Mehmood contributed towards and guided the study, from conception to completion of the research paper.
3. Dr. Syed Munir Ahmad contributed significantly to improving theoretical and empirical sections of the paper and revising and finalizing the drafts of the paper.

Our understanding and the beliefs that we have about learning and knowledge significantly influence our learning, and enhancing the understanding of this process can make teaching more effective (Hofer, & Pintrich, 1997). Understanding teachers' beliefs for effective teacher education is important (Pintrich, 1990). Teachers' beliefs play an important role in bringing change in schools and the application of new instructional methods and techniques in the classroom (Fluck, & Dowden, 2010). However, when teachers' beliefs are not aligned with the philosophical underpinnings of reforms, reform initiative implementation is usually compromised.

Beliefs are elusive to definite definitions (Bryan, 2003). Beliefs are "Messy constructs", and they have been given different names by different researchers (Pajares, 1992). These include "Explicit propositions" (Nisbett, & Ross, 1980), "Personal theories" (Borg, 2006), "Pedagogical principles" (Breen, Hird, Milton, Rhonda, & Thwaite, 2001). Teachers are the most important elements in educational reforms and at the same time the biggest hurdles in the way of implementation of reforms in education (Prawat, 1992).

The role of professional development programs is an established factor in giving quality education to the young generation. Elementary teacher education curricula were re-designed, with provision for improving the teaching skills and pedagogical knowledge of the teachers, thereby bringing change in the overall education sector in Pakistan. In the new curricula of teacher education, for Associate Degree in Education (ADE) and four-year Bachelor Degree developed in 2006 and revised in 2012, students centered approaches, reflective practices, pair work, group work, authentic assessment have been stressed upon, for benefitting from the universally accepted cherished qualities like critical thinking, hands-on study and collaborative learning. The curriculum development was based on 5 Cs: Cooperative, Classroom-based, Constructivist, Contextual, and Creative classroom practices (Higher Education Commission [HEC], 2012). It was expected that the changes in curricula would produce effective educators. However, these curricular changes need other changes like proper building, laboratory schools, training and exposure of teacher educators, and above all changes in beliefs and practices.

In education, innovation is multi-dimensional; there are three elements at stake in curriculum innovation. These include: (1) the possible use of new instructional material, curriculum material, (2) the likely use of new instructional strategies and (3) changes in the beliefs of curriculum implementers. These three elements are necessary for successful implementation of curriculum and change in beliefs is fundamental for lasting reforms (Fullan, 2007).

Teachers are important actors in the implementation of curriculum, innovations, and policy implementation. They implement changes according to their perceptions and the setting where they teach (Spillane, Reiser, & Reimer, 2002; Woods, 1996). Implementation of reforms in education needs teachers to change their behaviors and beliefs about the teaching process. Changes in education can become effective when teachers bring necessary conceptual changes in their approaches, rethink their practices and beliefs (Adey, Hewitt, Hewitt & Landau, 2004; Spillane, Reiser, & Reimer, 2002). Reforms have little influence on the real classroom teaching. The required change does not take place because teachers do not practice the innovation (Cuban, 1988). Personal epistemologies are linked to types of classroom behaviors (Sinatra, & Kardash, 2004; Tsai, 2002; Tsai, & Liang, 2009).

Two main motivations are instrumental for researching teacher educators' general epistemological beliefs (Olafson, & Schraw, 2010); firstly, research studies have been conducted on identifying those influencing factors of teachers' instructional beliefs about Mathematics teaching (Vacc, & Bright, 1999), science (Czerniak, & Lumpe, 1996), literacy (Fang, 1996), social study (Khader, 2012), high school teachers' epistemological beliefs (Montgomery, 2014), and the beliefs of primary school teachers (Samuel, & Ogunkola, 2015). However, there are a few studies on the EBs of teacher educators (teachers of prospective teachers), especially, in the context of innovation in the teacher education curriculum. Secondly, this study investigated the epistemological beliefs of teacher educators to find out which of their beliefs promote students' centered instructional practices and teacher-centered teacher practices.

Theoretical Framework and Review of Literature

Epistemology is the theory of knowledge and knowing. It is a sub-discipline of philosophy concerned with the limits and scope, as well as, the sources and nature of human knowledge (Muis, Bendixen & Haerle, 2006). Educational psychologists have theorized epistemology as "a man's implied assumptions about the nature, gaining, structure, origin, and validation of knowledge" (Hofer, & Pintrich, 1997).

Models of Epistemological Beliefs

EBs work falls into three groups. The first group developed a unidirectional model in which beliefs develop in a sequence (Belenky, Clinchy, Goldberger, & Tarule, 1986; Magolda, 2004; King, Kitchener, Wood, & Davison, 1989). The second group worked on how epistemological development influences thinking and reasoning processes (Kitchener, Lynch, Fischer, & Wood, 1993; Schommer, 1990; Calderhead, 1996).

In the third one, epistemological ideas as a body of beliefs may be independent, do not a clear developmental organization (Alexander, & Dochy, 1995). These beliefs may impact understanding and thought for academic tasks, and they are also related with classroom learning and practices (Hofer, & Pintrich, 1997). According to Schommer (1990), personal epistemologies are a scheme of beliefs; and established her first multi-dimensional theory. Her theory states that each of the dimensions of epistemological beliefs may grow separately from the others, especially, when beliefs are in an impermanent phase. Her theory identifies 05 dimensions of general epistemological beliefs (Alexander, & Dochy, 1995).

Table 1

Schommer's Epistemological Beliefs Model

Dimensions	Unsophisticated beliefs	Sophisticated beliefs
1. Stability of knowledge	Knowledge is definite and static	Knowledge is tentative and changeable
2. Source of Knowledge	Knowledge is given by experts	Knowledge is created by reasoning
3. Structure of Knowledge	Knowledge is simple and absolute	Knowledge is multifaceted
4. Ability to learn	Ability to learn is inborn and static	Ability is altering everybody can learn
5. Speed of learning	Learning is a quick process	Learning is a slow process of acquisition

Importance of Studying Beliefs

Studies have shown that teachers have to go beyond the classroom practices to their beliefs (Pajares, 1992; Fang, 1996; Alexander & Dochy, 1995). The popularity of belief studies is based on the understanding that teaching needs to go beyond teachers' behavioral patterns and look at what is in teachers' minds. Beliefs forecast the behavior and classroom practices of teachers (Pajares, 1992). EBs are important because they shape individuals' thoughts and actions (Richards, & Lockhart, 1994). Teachers' actions are reflections of what they know and believe. The teachers' thinking and knowledge provide a frame, which guides the teachers' actions in the class (Chan, 2008).

The Impact of Epistemological Beliefs on Teaching and Students' Learning

Research into EBs has made progress in the area of pre-service teacher education. There exists a positive relationship between pre-service teachers' EBs and their beliefs about what founds effective teaching (Lee, Zhang, Song, & Huang, 2013; Chan, 2011). Many pre-service teachers perceive that knowledge is constructed by individuals; EBs are positively related with constructivist approaches (Brownlee, 2001). Similarly, teachers with more relativistic epistemological beliefs are more likely to support autonomy of students in learning (Roth, & Weinstock, 2013).

Teachers with sophisticated personal epistemologies prefer child-centered and constructivist approaches to teaching. Child-care teachers, with more simple personal epistemologies, preferred such teaching methods, which were more teacher-centered (Tsai, & Liang, 2009).

Teachers who have more sophisticated beliefs (knowledge is complex and uncertain and it can be constructed) have less teacher-centered classes (Sing, & Khine, 2008; Schraw, & Sinatra, 2004). Teachers with sophisticated beliefs use different teaching strategies and they engage their students in learning (Windschitl, 2002). Teachers with sophisticated epistemologies create constructivists approaches towards leaning. Such teachers give real-life examples and relate classroom learning to real-life situations. Students are always engaged in higher-order thinking. They do not focus on the reproduction of what they learned. In contrast, when teachers have less developed epistemologies, they create surface practices in the classroom. Teachers try their level best to use constructivist approaches according to the extent of sophistication in their beliefs.

Some studies found a discrepancy between beliefs and practices (Nisbett, & Ross. 1980). A majority of the teachers do not enact their beliefs in classrooms and there is an inconsistency between beliefs and practices (Liu, 2011; Chew, 2012). It has been reported that there is variation in the stated beliefs and practices, which are caused by lack of essential conditions in the context, for instance, overcrowded classroom, busy schedule, and other assignments (Chan, & Elliott, 2004). There are many teachers who have the same beliefs, but they have different classroom behaviors (Tanriverdi, 2012). Some researchers found that not only beliefs influence actions but it is also the other way round (Mansour, 2009; Mouza, 2009). Similarly, longitudinal studies of pre-service and practicing teachers' beliefs and practices provide evidence of the reciprocal and dialectical relations between beliefs and practices. Practices can change teachers' EBs (Fives, & Buehl, 2012).

Objectives of the Study

1. Find out the epistemological beliefs of teacher educators in teacher education institutions in Khyber Pakhtunkhwa
2. examine gender-wise differences in the epistemological beliefs of teacher educators Khyber Pakhtunkhwa

3. find out difference in the epistemological beliefs of teacher educators based on age in Khyber Pakhtunkhwa
4. find out difference in the epistemological beliefs of teacher educators based on qualification in Khyber Pakhtunkhwa
5. examine difference in the epistemological beliefs of teacher educators based on institutions in Khyber Pakhtunkhwa

Hypotheses

H01**:** There is no significant difference in the epistemological beliefs of teacher educators based on gender in Khyber Pakhtunkhwa

H02: There is no significant difference in the epistemological beliefs of teacher educators based on age of the participants in Khyber Pakhtunkhwa

H03: There is no significant difference in the epistemological beliefs of teacher educators based on academic qualification of the participants in Khyber Pakhtunkhwa

H04: There is no significant difference in the epistemological beliefs of teacher educators based on the difference in institutions of the participants in Khyber Pakhtunkhwa

Method

The study used a descriptive research design, which involved examining the epistemological beliefs of teacher educators in Khyber Pakhtunkhwa Province in Pakistan, using an epistemological beliefs questionnaire.

Population of the Study

The population of the study involved of 214 teacher educators from the 20 RITEs and 09 Departments of Education (DoE) in public universities of KP. There are 20 RITEs and 09 Departments of Educations in 9 universities. Total faculty members in the 9 Departments of Education are 64, of which 24 are female and 38 are male members. Of the 20 RITEs, 08 institutes are for males only and 12 are for females only. The total faculty in RITEs is 214.

Sampling

The study used stratified random sampling technique for the selection of participants. So, 112 teacher educators from 21 RITEs and 37 teacher educators from 9 universities took part in the study.

Results

Questionnaire for Epistemological Beliefs (EBQ)

This study used the questionnaire developed by Schommer (1990) for measuring general EBs. There are five dimensions of Schommer's Model as presented in Table 1. The questionnaire used a 5-point Likert scale, ranging from 'Strongly Disagree' to 'Strongly Agree.' The lesser the score on the EBs scale, the more sophisticated the beliefs. The questionnaire was translated into Urdu language for a better understanding of the respondents. The reliability of the questionnaire was .82 and the alpha values of the five dimensions: stability of knowledge, source of knowledge, the structure of knowledge, ability to learn, speed of learning, were .72, .60, .65, .73, and .60 respectively. The criteria for epistemological beliefs were fixed as: mean score from **1**-2 = highly sophisticated beliefs, 2-3 = low sophisticated Beliefs, 3- 4 = low unsophisticated beliefs, 4-5 = highly unsophisticated beliefs.

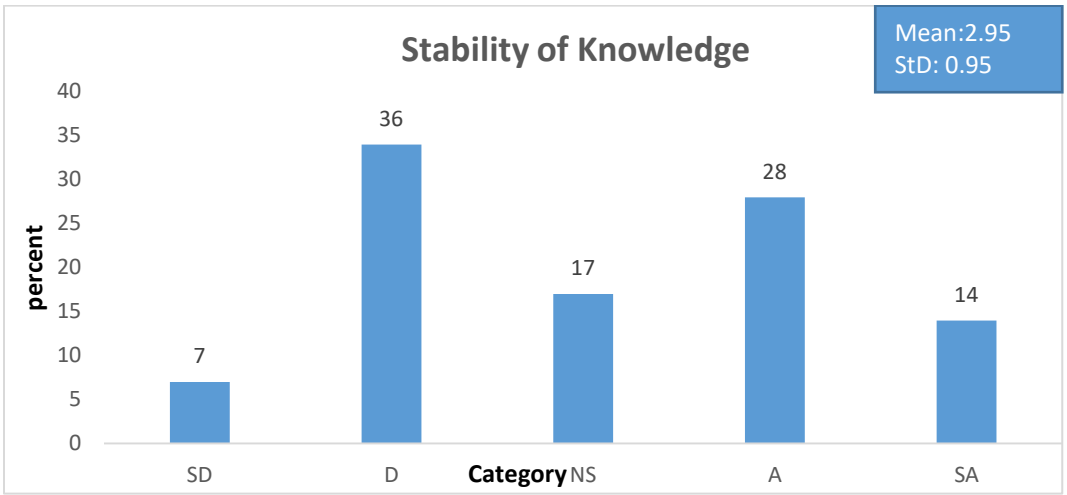

Figure 1: Dimension 1: Stability of Knowledge

Figure 1 shows data about dimension 1, the stability of knowledge, which enquired if the teacher educators view knowledge as certain rather than tentative. On average, 7% teacher educators 'Strongly Disagreed', 34% 'Disagreed', 17% were 'Not Sure', 28% 'Agreed' and 14% 'Strongly Agreed.' It shows that around half of the teacher educators disagreed that knowledge is certain and some (17%) were not sure. The mean value 2.95, S.D. = .95 also shows that teachers believe in the certainty of knowledge. It also shows that half of the teacher educators have such beliefs, which will push them to practice teacher-centered practices in the classroom.

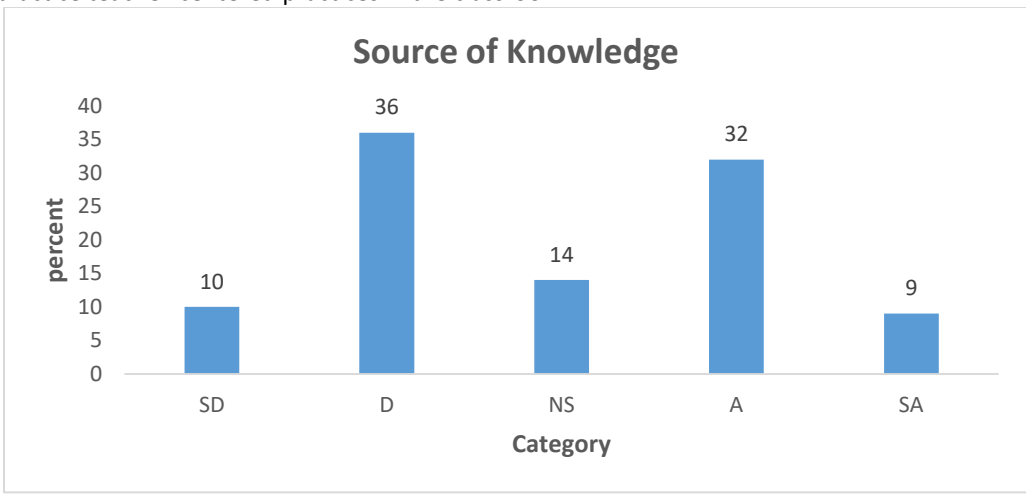

Figure 2: Dimension 2: Source of Knowledge

Figure 2 shows the beliefs of the respondents about the source of knowledge, implying that whether the educators believed about the source of knowledge being the authority, reasoning, or evidence. Authority here means a knowledgeable person in a specific field. The data shows that on average 10% of teacher educators 'Strongly Disagreed', 36% 'Disagreed', 14% were 'Not Sure,' 32 % 'Agreed', and 9% 'Strongly Agreed' that authority is a source of knowledge. The mean value (2.89) is below 3.00, which shows that educators do not have faith in only expert (authority) as a source of knowledge, but it is a slight majority; still many respondents believed that source of knowledge is authority.

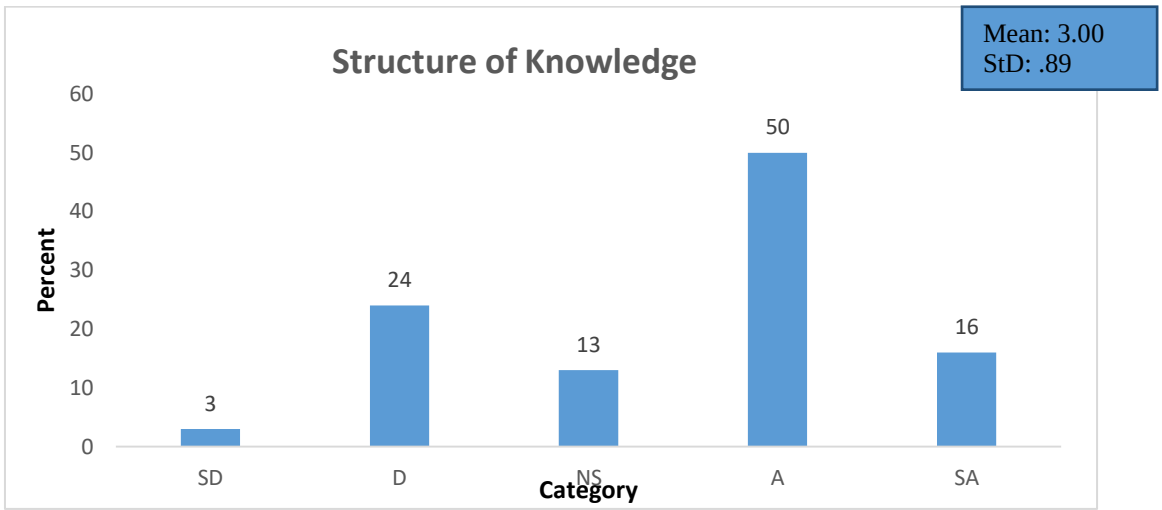

Figure 3: Dimension 3: Structure of Knowledge

Figure 3 is related to the structure of knowledge and the data shows that on average 3% of teacher educators 'Strongly Disagreed', 24% 'Disagreed', 13% were 'Not Sure', 50% 'Agreed' and 16% 'Strongly Agreed'. It shows that a majority of the teacher educators agreed that the structure of knowledge is simple. The mean value (3.00, Standard Deviation: .89) of the data regarding the structure of knowledge also shows that teachers educators do not have sophisticated beliefs about the structure of knowledge. In other words, they do not have student centered beliefs.

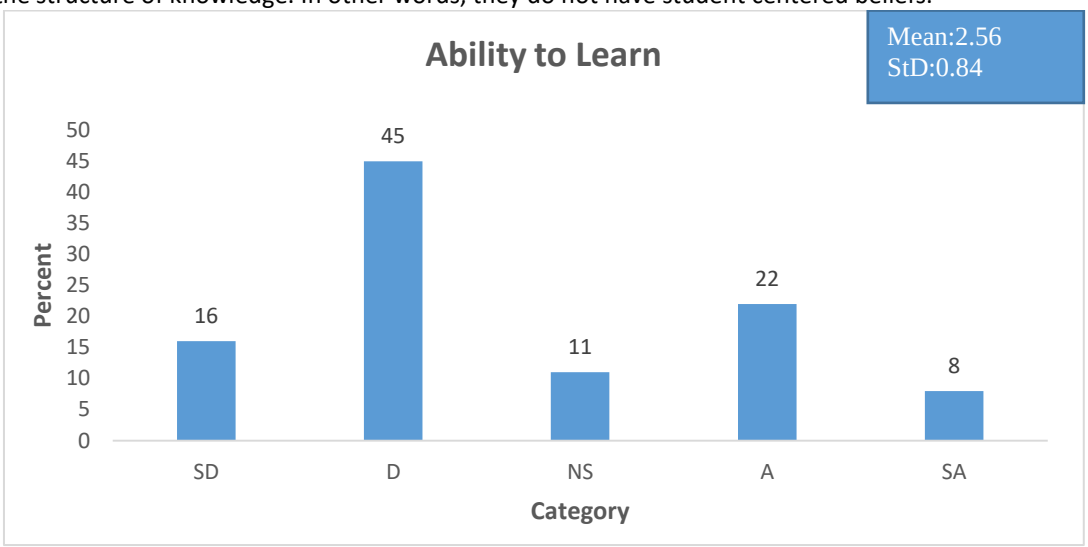

Figure 4: Dimension 4: Ability to Learn

Figure 4 shows the beliefs of teacher educators; if they believed that the "ability to learn is innate" or it could be acquired. For this dimension, 16% teacher educators 'Strongly Disagreed', 45% 'Disagreed', 11% were 'Not Sure', 22% 'Agreed' and 8% 'Strongly Agreed'. A majority of the teacher educators did not agree that the ability of learning is innate. The mean value (2.56, SD: .84) also

shows that teacher educators believed that the ability to learn is not innate. Teachers' beliefs are sophisticated in this dimension i.e. student centered.

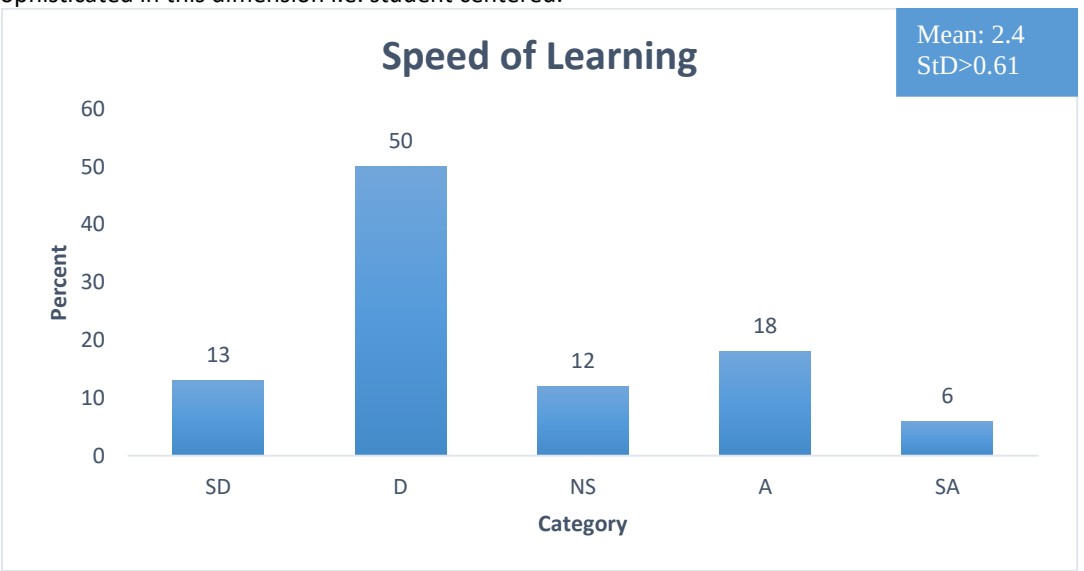

Figure 5: Dimension 5: Speed of Learning

Figure 5 shows data about dimension 5, which enquires if the teacher educators believed that learning is a quick process or a slow process of acquisition. Average response shows that 13% teacher educators 'Strongly Disagreed', 50% 'Disagreed', 12% were 'Not Sure', 18% 'Agreed' and 6% 'Strongly Agreed'. The data reveals that a majority of the teacher educators did not agree that learning is a quick process. As a whole, the respondents have sophisticated beliefs that learning can take place when learners keep on working. However, again many teacher educators (24%) agreed that learning is a quick process.

Table 2

Difference in Epistemological beliefs based on Gender

Dimension	Gender	Number	Mean	Sig. (2-tailed)
Structure of Knowledge	Male	84	2.87	.964
	Female	56	2.88	
Stability of Knowledge	Male	84	2.96	.900
	Female	56	2.95	
Source of Knowledge	Male	84	2.91	.400
	Female	56	2.86	
Ability to learn	Male	84	2.91	.400
	Female	56	2.86	
Speed of Learning	Male		2.44	.117
	Female		2.35	

Table 2 shows data about differences in EBs based on gender. There is no difference in the EBs based on gender in teacher educators.

Table 3

Difference in Epistemological beliefs based on Institutions

Dimension	Institution	Number	Mean	Sig. (2-tailed)
Structure of Knowledge	RITE	92	2.89	.306
	University	48	2.84	
Stability of Knowledge	RITE	92	3.02	.02
	University	48	2.84	
Source of Knowledge	RITE	92	2.89	.807
	University	48	2.88	
Ability to learn	RITE	92	2.41	.722
	University	48	2.39	
Speed of Learning	RITE	92	2.41	.722
	University	48	2.39	

Table 3 shows the differences in epistemological beliefs based on institutions Khyber Pakhtunkhwa. It was found that there was no significant difference in the EBs of teacher educators on other dimensions of epistemological beliefs except the stability of knowledge where there is a significant difference in the epistemological beliefs of teachers. Teacher educators from DoE have sophisticated beliefs while teacher educators from RITEs have unsophisticated beliefs on this dimension.

Table 4

One Way ANOVA Showing Difference in Epistemological Beliefs Based on Age

Age	N	Mean	Std. Deviation	B/T groups	Within Groups	Df	F	Sig.
24-30	5	2.6954	.18605			136	.048	.686
31-40	44	2.7179	.19572	.006	5.845			
41-50	55	2.7110	.20843					
Above 50	36	2.7020	.22124					
Total	140	2.7103	.20516					

Table 4 shows the ANOVA description of the relationship of age with the epistemological beliefs of teachers. The F value is .048, which is low and not significant as the p-value is higher than .05.

Discussion

Beliefs about knowledge and beliefs about instruction influence classroom practices of teachers. The study investigated the epistemological beliefs of teacher educators in KP. The study found that the teacher educators did not believe in the complexity of knowledge. Teachers with such beliefs are inclined towards teacher-centered classroom practices (Bromme, Kienhues, & Stahl, 2008; Windschitl, 2002). The holder of sophisticated EBs would opt more for inquiry-based teaching practices (Deniz, 2011). There would be an effect on the classroom practices of teacher educators, and that is the reason that in Pakistan most of the teacher educators use traditional practices in classrooms.

The findings have shown that half of the teacher educators believed that knowledge is certain, which is alarming. This is against the basic tenets of constructivism. In constructivism, knowledge is considered as changeable, not certain. The study contradicts and confirms the findings of Alsumait (2015) who found that the participants believed in the certainty of knowledge. However, the respondents in the research were graduates. The current study found that a majority of the teacher educators did not believe in authority as a source of knowledge; however, it was a slight

majority. Many teachers believed that the source of knowledge is authority. It means that such teachers will not encourage individual efforts, investigation, inquiry and they will limit teaching and learning to specific documents which is against the very spirit of constructivism.

A majority of the teacher educators believed that the ability to learn is not inborn which is considered as sophisticated belief according to the scale. However, again many teachers believed that the ability to learn is inborn. This finding extends the findings of Alsumait (2015) who found that Saudi undergraduates believe in hard work and inborn ability of learning; however, in this study, the respondents were teacher educators and in Alsumait's study the respondents were graduate students. The belief of many educators that learning is innate at this level is a matter of concern for education in general and teacher education in particular. When teachers believe that the capability of learning is innate, they will not give equal attention to all students. May be this effect has trickled down to our schools wherein a few students become the center of attention in classrooms.

A majority of the teacher educators did not agree that learning is a quick process. As a whole, the respondents have sophisticated beliefs that learning can take place when learners keep on working. This finding supports the findings of Samuel and Ogunkola (2015) who investigated the beliefs of primary teachers. In the current study, many teacher educators (24%) agreed that learning is a quick process. This will affect their classroom practices. They will not be focusing on hard work. Moreover, the study confirms the findings of Schommer (1990), Calderhead (1996) and other researchers that the dimensions of epistemological beliefs are independent; a person may have unsophisticated beliefs in one dimension but he/she would have sophisticated beliefs in another dimension.

There was no difference in the epistemological beliefs of male and female teacher educators, experience and qualification. The study extends the findings of Kalsoom and Akhtar (2013). Similarly, this study also extends the findings of Chan (2008) and Tanriverdi (2012), who found no significant statistical differences across age, gender in preservice teachers' beliefs. The study contradicts the findings of Walter (2009) who studied the EBs of 83 practicing teachers, 62 studying in a graduate program. He found differences in EBs based on education level, gender, and type of licensure. The author found that more educated teachers held more sophisticated EBs; small differences in the type of education could influence EBs; women in the study endorsed more in authority as a source of knowledge. Similarly, this also contradicts the findings of Samuel and Ogunkola (2015) who found that with experience EBs become more constructivist. However, in the current study, all teacher educators were highly qualified. All of them had at least double master's degrees. The difference in the EB on education will be up to a certain level; it will not be evident after a certain level like a master's degree or so. There was no significant difference in the epistemological beliefs of teachers from universities and RITEs, except the stability of knowledge dimension, wherein teacher educators from Universities had sophisticated beliefs while teacher educators from RITEs had unsophisticated beliefs. It is a matter, which needs further investigation, and teacher educators may be given orientation on epistemological beliefs with special emphasis upon the stability of the knowledge dimension.

Conclusion and Implications

There are many factors, which influence the classroom practices of teachers. EBs are the most important factors. This research found that many teacher educators in Khyber Pakhtunkhwa did not have student centered beliefs/ sophisticated EBs. Teachers with teacher-centered beliefs may ask simple questions, they would not involve students in complex learning activities (Khan, Mehmood &

Jumani, 2020). Therefore, teacher educators need to work on their beliefs consciously. Government and other such organizations, working on teacher training and professional development activities, should also consider the beliefs of teachers.

Many teacher educators believed in authority as a source of knowledge. It is related to the culture; people, generally, give much respect to people who are considered as an authority in a field. People rarely question their opinion and knowledge. Such beliefs stop inquiry and critical thinking among students and they become blind followers of their teachers and other such people at the helms of affairs (Chan, 2004).

There were many teachers among the respondents Khyber Pakhtunkhwa who believed that the ability to learn is innate i.e. some students are born good learners, they need little hard work and some students, even if they try their best, would not become good learners (Chan, 2004; Cheng, Chan, Tang, & Cheng, 2009). This belief closes the doors of learning for many students. They become backbenchers; they are called 'Kings'. Teachers never try different approaches of learning with these students because their conception about these students is to stop them from taking such actions. Hence, teachers have to bring necessary changes in their beliefs so that such students are not relegated to backbenches. Rather, they are mingled with other students; their learning styles are explored and they are taught according to their learning styles.

Teacher curricula in Pakistan generally have no provision for accommodating content or studies on teachers' beliefs and their impact on the classroom behaviors of teachers. Therefore, teachers usually do not have knowledge of beliefs. As discussed, beliefs have a strong relation with the type of classroom practices. Therefore, it is required to make it a part of the teacher education curricula at all levels. This will ensure a change in beliefs, and thus change in classroom practices as well. Lee, Zhang, Song, and Huang (2013) have posited that teacher educators may make prospective teachers conscious about their EBs.

Primary and high school teachers may be given intensive training on EBs; they should also be trained in how sophisticated beliefs could be cultivated among students. They may teach in such a way, which could promote sophisticated beliefs among students. There is little research on the EBs of teacher educators. Teacher educators mold teaching skills, perceptions and facilitate prospective students. If their beliefs are not sophisticated, their beliefs have a trickle-down effect and the required epistemologies of students would not develop.

References

Adey, P., Hewitt, G., Hewitt, J., & Landau, N. (2004). *The professional development of teachers: Practice and theory*. London: Kluwer Academic Publishers.

Alexander, P. A., & Dochy, F. J. (1995). Conceptions of knowledge and beliefs: A comparison across varying cultural and educational communities. *American Educational Research Journal*, 32(2), 413-442.

Alsumait, D. S. F. (2015). *The epistemological beliefs of undergraduates towards Information Science* (Doctoral dissertation, Brunel University London).

Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind* (Vol. 15). New York: Basic Books.

Borg, S. (2006). The distinctive characteristics of foreign language teachers. *Language Teaching Research*, 10(1), 3-31.

Breen, M. P., Hird, B., Milton, M., Oliver, R., & Thwaite, A. (2001). Making sense of language teaching: Teachers' principles and classroom practices. *Applied linguistics*, 22(4), 470-501.

Bromme, R., Kienhues, D., & Stahl, E. (2008). Knowledge and epistemological beliefs: An intimate but complicated relationship. *In Knowing, knowledge, and beliefs* (pp. 423-441). Springer, Dordrecht.

Brownlee, J. M. (2001). Knowing and learning in teacher education: A theoretical framework of core and peripheral beliefs in application. *Asia-Pacific Journal of Teacher Education and Development*, 4(1), 131-155.

Bryan, L. A. (2003). Nestedness of beliefs: Examining a prospective elementary teacher's belief system about science teaching and learning. *Journal of research in science teaching*, 40(9), 835-868.

Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 709−25). New York: Macmillan.

Chan, K. W. (2004). Preservice Teachers' Epistemological Beliefs and Conceptions about Teaching and Learning: Cultural Implications for Research in Teacher Education. *Australian Journal of Teacher Education*, 29(1), 1-13.

Chan, W-T. (2008). *A sourcebook in Chinese philosophy. Princeton*: Princeton University Press.

Chan, K. W. (2011). Preservice teacher education students' epistemological beliefs and conceptions about learning. Instructional Science, 39(1), 87-108. Retrieved November 14, 2020, from http://www.jstor.org/stable/23882785

Chan, K. W. & Elliott, R. G. (2004). Epistemological beliefs across cultures: critique and analysis of belief structure studies. *Educational Psychology*, 24 (2), 123–142.

Cheng, M. M., Chan, K. W., Tang, S. Y., & Cheng, A. Y. (2009). Pre-service teacher education students' epistemological beliefs and their conceptions of teaching. *Teaching and Teacher Education*, 25(2), 319-327.

Chew, L. (2012). *An Exploratory Study on the Beliefs and Practices of Teacher-Child Interactions of Selected Early Childhood Educators in Singapore* (Doctoral dissertation, Durham University).

Cuban, L. (1988). Managerial imperative and the practice of leadership in schools, *Albany,* NY: SUNY Press.

Czerniak, C. M., & Lumpe, A. T. (1996). Relationship between teacher beliefs and science education reform. *Journal of Science Teacher Education*, 7(4), 247-266.

Deniz, H. (2011). Examination of changes in prospective elementary teachers' epistemological beliefs in science and exploration of factors meditating that change. *Journal of Science Education and Technology*, 20(6), 750-760.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, 38(1), 47-65.

Fives, H., & Buehl, M. M. (2012). Spring cleaning for the ''messy'' construct of teachers' beliefs: What are they? Which have been examined? What can they tell us? In Eds. K.R. Harris, S. Graham, T. Urdan, S. Graham, J.M. Royer, and M. Zeidner (Eds.), *APA educational psychology handbook, Vol. 2: Individual differences and cultural and contextual factors*, Washington, DC: American Psychological Association.

Fluck, A., & Dowden, T. (2010). *Can new teachers be ICT change-agents?* In Proceedings of the International Education Research Conference (AARE 2009) (pp. 1-10). Australian Association for Research in Education.

Fullan, M. (2007). *The new meaning of educational change*. New York: Teachers College Press.

Higher Education Commission (HEC) (2012). *Curriculum of education B.Ed. Honors Elementary; Associate Degree in Education*. Islamabad: Higher Education Commission.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge, knowing, and their relation to learning. *Review of educational research*, 67(1), 88-140.

Kalsoom, T., & Akhtar, M. (2013). Teaching Grammar: Relationship between teachers' beliefs and practices. *Global Journal of Human Social Science Linguistics & Education*, 13(12), 54-61.

Khader, F. R. (2012). Teachers' pedagogical beliefs and actual classroom practices in social studies instruction. *American International Journal of Contemporary Research*, 2(1), 73-92.

Khan, I., Mehmood, A., & Jumani, N. B. (2020). Classroom Practices of Teacher Educators: Constructivist versus Traditional Approach. *Journal of Research in Social Sciences*, 8(1), 20-34.

King, P. M., Kitchener, K. S., Wood, P. K., & Davison, M. L. (1989). Relationships across developmental domains: A longitudinal study of intellectual, moral, and ego development. In M. L. Commons, J. D. Sinnott, F. A. Richards, & C. Armon (Eds.), *Adult development, Vol. 1. Comparisons and applications of developmental models* (p. 57–72). Praeger Publishers.

Kitchener, K. S., Lynch, C. L., Fischer, K. W., & Wood, P. K. (1993). Developmental range of reflective judgment: The effect of contextual support and practice on developmental stage. *Developmental psychology*, 29(5), 893-906.

Lee, J. C. K., Zhang, Z., Song, H., & Huang, X. (2013). Effects of epistemological and pedagogical beliefs on the instructional practices of teachers: A Chinese perspective. *Australian Journal of Teacher Education*, 38(12), 120-146.

Liu, S. H. (2011). Factors related to pedagogical beliefs of teachers and technology integration. *Computers & Education*, 56(4), 1012-1022.

Magolda, M. B. B. (2004). *Making their way: Narratives for transforming higher education to promote self-development*. Stylus Publishing, LLC.

Mansour, N. (2009). "Science teachers' beliefs and practices: Issues, implications, and research agenda". *International Journal of Environmental and Science Education*, 4(1), 25-48.

Montgomery, R. T. (2014). *An Investigation of High School Teachers' Epistemic Beliefs in an Urban District* (Doctoral dissertation, University of Toledo).

Mouza, C. (2009). Does research-based professional development make a difference? A longitudinal investigation of teacher learning in technology integration. *Teachers College Record*, 111(5), 1195-1241.

Muis, K. R., Bendixen, L. D., & Haerle, F. C. (2006). Domain-generality and domain- specificity in personal epistemology research: Philosophical and empirical reflections in the development of a theoretical framework. *Educational Psychology Review*, 18(1), 3-54.

Nisbett, R. E., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice-Hall.

Olafson, L., & Schraw, G. (2010). Beyond epistemology: Assessing teachers' epistemological and ontological worldviews. In L. Bendixen & F. Feucht (Eds.), *Personal epistemology in the classroom: Theory, research, and implications for practice* (pp. 516–552). New York: Cambridge University Press.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of educational research*, 62(3), 307-332.

Pintrich, P. R. (1990). Implications of psychological research on student learning and college teaching for teacher education. In R. Houston (Ed.), *The Handbook of Research on Teacher Education* (pp. 826-857). New York: Macmillan.

Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. *American Journal of Education*, 100(3), 354-395.

Richards, J. C., & Lockhart, C. (1994). *Reflective teaching in second language classrooms*. Cambridge: Cambridge University Press.

Roth, G., & Weinstock, M. (2013). Teachers' epistemological beliefs as an antecedent of autonomy-supportive teaching. *Motivation and Emotion*, 37(3), 402-412.

Samuel, D. F., & Ogunkola, B. J. (2015). Elementary School Teachers' Epistemological Beliefs as Predictors of Their Inquiry-Based Practices in Science Instruction. *International Journal of Elementary Education*, 4(6), 101-112.

Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology*, 82(3), 498-504.

Schraw, G., & Sinatra, G. M. (2004). Epistemological development and its impact on cognition in academic domains. *Contemporary Educational Psychology*, 29(2), 95–102.

Sinatra, G. M., & Kardash, C. M. (2004). Teacher candidates' epistemological beliefs, dispositions, and views on teaching as persuasion. *Contemporary Educational Psychology*, 29(4), 483-498.

Sing, C. C., & Khine, M. S. (2008). Assessing the epistemological and pedagogical beliefs among pre-service teachers in Singapore. In *Knowing, Knowledge, and Beliefs* (pp. 287-299). Springer, Dordrecht.

Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research*, 72(3), 387-431.

Tanriverdi, B. (2012). Pre-service teachers' epistemological beliefs and approaches to learning. *Procedia-Social and Behavioral Sciences*, 46, 2635-2642.

Tsai, C. C. (2002). Nested epistemologies: science teachers' beliefs of teaching, learning, and science. *International Journal of Science Education*, 24(8), 771-783.

Tsai, C. C., & Liang, J. C. (2009). The development of science activities via on-line peer assessment: The role of scientific epistemological views. *Instructional Science*, 37(3), 293-310.

Vacc, N. N., & Bright, G. W. (1999). Elementary preservice teachers' changing beliefs and instructional use of children's mathematical thinking. *Journal for research in mathematics education*, 89-110.

Walter, B. A. (2009). *Epistemological beliefs: Differences among Educators* (Doctoral dissertation, Wichita State University).

Windschitl, M. (2002). Framing constructivism in practice as the negotiation of dilemmas: An analysis of the conceptual, pedagogical, cultural, and political challenges facing teachers. *Review of educational research*, 72(2), 131-175.

Woods, D. (1996). *Teacher cognition in language teaching: Beliefs, decision-making, and classroom practice*. Cambridge: Cambridge University Press.