

# The Adaptation of the Teaching-Learning Conceptions Questionnaire and Its Relationships with Epistemological Beliefs

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## Abstract

The primary purpose of this study was to adapt the Teaching-learning Approaches Questionnaire. The working group of the study consisted of 341 student-teachers. The results indicated that the factor structure is partially consistent with the model. Cronbach reliability coefficient for the whole instrument was .71, while sub-scale reliabilities were .88 and .83. The 30-item questionnaire loaded into two factors. The secondary purpose of this study was to determine the relationship between epistemological beliefs and teaching-learning conceptions. Further analyses carried out whether teaching-learning conceptions differ based on gender and class-levels. Results indicated that there were significant relationships between epistemological beliefs and teaching-learning conceptions; the student-teachers preferred constructivist approach over the traditional approach, and student-teacher views differed based on gender and class-level. Finally, significant correlations were found among epistemological beliefs (Innate/Fixed Ability, Learning Effort, Learning Process - Casting Doubt on Authority/ Expert Knowledge, and Certainty of Knowledge) and approaches to teaching and learning (Constructivist Conception, Traditional Conception).

## Key Words

Teaching and Learning Conception, Epistemological Belief, Confirmatory Factor Analysis, Questionnaire.

The conceptions about teaching and learning refer to the beliefs held by teachers about their preferred ways of teaching and learning. These include the meaning of teaching and learning and the roles of teacher and pupils” (Chan & Elliot, 2004). There are two main opposite conceptions in teaching and learning (traditional and constructivist). Constructivist conception received its foundations from the Piaget’s and Vygotsky’s theories. These theorists emphasize the importance of experience and active participation of the individual in learning process in the construction of knowledge. Vygotsky points out the importance of interaction of a child with his/her peers or with adults in the construction of knowledge (Miller, 1997). The foundations of

constructivism may be listed as: knowledge is not received by the child passively; rather, he/she is involved and structure it actively. Children create new knowledge by thinking physically and intellectually on their actions. This means that if a child integrates his/her thoughts with the existing knowledge structures, then knowledge becomes meaningful. There is not one reality but only an interpretation of the world based on individual experiences and social interactions. Learning is mostly a social process in which a child grows in the intellectual life that surrounds him/her (Clements & Battista, 1990). Traditional conception in teaching utilizes teacher-centered teaching strategies. This conception sees the teacher as the source of knowledge and the student as the passive receiver of knowledge. On the other hand, the constructivist conception uses student-centered teaching strategies because this type of learning will help students develop critical thinking and collaboration skills and learning takes place in

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environments where students are able to participate actively (Chan & Elliot, 2004; Cheng, Chan, Tang, & Cheng, 2009).

Teaching and learning processes are influenced by different cognitive variables. Some important among them are epistemological beliefs and teaching and learning conceptions. Epistemological beliefs express the beliefs on the nature of knowledge and gaining knowledge (learning). Schommer defines personal epistemology as a system which includes five independent dimensions which can also be together (knowledge organization, certainty of knowledge, source of knowledge, and the control and the speed of knowledge acquisition). Personal epistemological beliefs have an important influence on personal cognitive and meta-cognitive processes. These beliefs also influence learning not only individually but also as a whole (Schommer, 1990, 1994).

Teachers' epistemological beliefs influence their conceptualization of teaching (Chan & Elliott, 2004). Therefore, researchers attempted to determine teacher candidates' epistemological beliefs in their studies. In a study that aims to determine the Turkish candidate teachers epistemological beliefs (Aypay, 2009), Turkish candidate teachers had a tendency of believing that knowledge acquisition process was important in learning and expert knowledge needed to be questioned. However, they were undecided whether ability comes with birth or whether it was constant. A similar result was found on whether knowledge was constant or certain. Moreover, they thought that effort was important. There were similarities between the findings of this study and Chan and Elliott's (2002, 2004) studies on candidate teachers in Hong Kong. Chan's (2003) study on the candidate teachers in Hong Kong and Chai, Khine and Teo's (2006) study on the candidate teachers in Singapore indicated that candidate teachers highly believe that effort and process were important in learning. Jehng, Johnson and Anderson's (1993), Chai et al. (2006) and Aypay's (2009) studies found that epistemological belief change as a function academic field. Chan (2003) found that candidate teachers' epistemological belief was independent of their academic field of study in Hong Kong.

In the literature, there are findings that epistemological beliefs are related to some variables

such as school achievement (Buehl & Alexander, 2005; Cano, 2005; Hofer, 2000; Schommer, 1993; Trautwein & Lüdtke, 2007), achievement motivation (Bråten & Olaussen, 2005; Bråten & Strømsø, 2004; Buehl & Alexander, 2005; Chen & Pajares, 2010; DeBacker & Crowson, 2006; Muis, 2004; Muis & Franco, 2009), cognitive processing strategies (Kardash & Howell, 2000; Ravindran, Grene, & DeBacker, 2005), learning and teaching approaches (Cano, 2005; Kizilgunes, Tekkaya, & Sungur, 2009; Ozkal, Tekkaya, Cakiroglu, & Sungur, 2009; Phillips, 2001; Sinatra & Kardash, 2004), motivation and learning (Buehl & Alexander, 2005; Cavallo, Rozman, Blickenstaff, & Walker, 2003; Hofer & Pintrich, 1997; Paulsen & Feldman, 1999), study strategies and problem solving (Phillips, 2001), learning styles and reflective thinking (King & Kitchener, 2002; Phan, 2008; Wood, Kitchener, & Jensen, 2002). Research findings indicate that epistemological beliefs are important factors in student learning (Hofer, 2001).

In addition, a strand of research findings on learning approaches (deep versus surface learning) and epistemological beliefs indicate that learning approaches are by products of epistemological beliefs (Cano, 2005; Kizilgunes et al., 2009; Phan, 2008; Phillips, 2001; Rodriguez & Cano, 2007). Moreover, results also indicate that learning approaches are performance outcomes for epistemological beliefs (Cano, 2005; Phan, 2008), and they play an intermediary role on reflective thinking (Phan, 2008). This supports the theoretical assumption that learning approaches and epistemological beliefs work like a part of a larger cognitive system which influence academic performance outcomes (Phan, 2008). Learning approaches (deep versus surface learning) are closely related to learning understandings (traditional versus constructivist). Surface learning approach is more consistent with the traditional learning-teaching approach while deep learning approach is more closely related to constructivist learning-teaching approach (Schunk, 2009).

Recent studies argued that epistemological beliefs were related to teaching and learning conceptions and these conceptions were influenced by epistemological beliefs (Chan & Elliot, 2004; Cheng et al., 2009). Student teachers' epistemological beliefs and conceptions of teaching and

learning are viewed as important since they will influence their behavior in classroom and determine their teaching strategies. Thus, it is important to determine student teachers' epistemological beliefs and their conceptions as well as the relationships among them. Aypay (2009), studied the Turkish student teachers' epistemological beliefs and found that knowledge acquisition process was important in learning, expert knowledge should be questioned and effort in learning was important. The study also indicated that the student teachers did not have clear view on whether ability is innate or whether it is fixed or subject to change. A study to determine the Turkish student teachers' teaching and learning conceptions and the relationships among these conceptions and epistemological beliefs will be useful.

The Turkish education system have implemented the traditional teaching and learning approach for a long time. A constructivist-approach based curriculum has been implemented since 2005 (Kiroğlu, 2008). However, since there are few studies that weather future teachers accept the constructivist approach, it is important to study this topic. Teachers' epistemological beliefs and their teaching-learning conceptions determine the behaviors and strategies that they use in-classroom. Therefore, it has been deemed important to investigate the teaching-learning conceptions and epistemological beliefs as well as the relationships between the two. Specifically, the adaption of a questionnaire that might determine their teaching-learning conceptions and to determine its relationships with epistemological beliefs for the Turkish student-teachers is important.

### Purpose

The main purpose of this study was to adapt the Teaching-learning Conceptions Questionnaire for using in Turkey. The secondary purpose of the study was to investigate the relationships among the teaching-learning conceptions and epistemological beliefs of student teachers. Finally, whether student teachers' teaching-learning conceptions differ based on gender and class levels was investigated.

## Method

### Study Group

Working group in this study was determined by convenience sampling. Convenience sampling was based on accessibility and convenience. Convenience sampling was preferred because it allows the researcher to collect data quickly in some of the research situations (Berg, 2001). The study group consisted of undergraduate student teachers at Çanakkale Onsekiz Mart University (ÇOMÜ) Faculty of Education (primary education; pre-school education; science education; English language education; geography education; history education; and computer education and instructional technology (CEIT) departments) and student teachers at Institute of Social Sciences of ÇOMÜ (history education and science education). The sample includes a total of 341 student teachers. The breakdown of the sample into the departments as follows: CEIT (28), biology (11), geography (46), English (11), pre-school (65), primary education (101), history (16), and science education (63).

### Instruments

**The Teaching and Learning Conceptions Questionnaire (TLCQ):** The Teaching and Learning Conceptions Questionnaire Chan and Elliot'in (2004) was used. The development study of the instrument was conducted in Hong Kong in a sample of 385 volunteer candidate teachers. Researchers first conducted a review of the literature to determine existing conceptions on learning and teaching. Following that, they conducted interviews with candidate teachers who were inexperienced in teaching to get their ideas, thoughts, and beliefs on teaching and learning. Researchers mainly tried to determine the meaning of teaching and learning; the role of experience and students in teaching and learning; classroom management; teaching and learning strategies. They developed a 35-item draft instrument based on the review of literature and interviews with the students. This instrument had 30 items. A CFA was conducted on this instrument and results indicated a good fit (GFI 0.93, AGFI 0.91, RMR 0.50, RMSEA 0.54). Based on CFA results, the data confirmed the two-factor structure of the instrument (Constructivist Conception, Tradi-

tional Conception). The scaling of this instrument was also a Likert-type with (5=Strongly Agree- 1=Strongly Disagree). The reliability of the instrument overall was Cronbach Alpha = .86 and for the reliability for both constructivist and traditional conceptions were .84.

**The Epistemological Beliefs Questionnaire (EBQ):** The Epistemological Beliefs Questionnaire (Chan & Elliot, 2002, 2004) was also used to collect the data. Chan and Elliot's Epistemological Beliefs Questionnaire was based on Schommer's (1990) 63-item "Epistemological Beliefs Questionnaire." Researchers revised the Schommer's instrument by using factors analysis, adding new items and changing the existing items developed a new questionnaire. Towards this purpose, Chan and Elliot translated Schommer's 63-item instrument into Chinese and conducted a study for the linguistic equivalence. Factor analysis results indicated that Schommer's factor structure did not emerge (Chan & Elliot, 2000, 2004). Later, researchers, taking criticisms into account, developed a new instrument through adapting and changing Schommer's instrument. The basis for this was Schommer's 63-item instrument. To meet face validity, researchers used some of the items as they are from the Schommer's instrument. In addition, they used some of the items through revision and added new items based on the review of literature. A 45-item draft instrument emerged. Data collected from a sample of 385 candidate teachers in Hong Kong and analyzed by exploratory factor analysis. The results indicated that a 30-item instrument was reliable. The items were on a five-point Likert scale (5=completely agree- 1=completely disagree). Then, a confirmatory factor analysis was conducted on the 30-item instrument. The results of confirmatory factor analysis supported a four-factor solution. A reliability analysis was conducted both for the whole instrument and for each one of the factors. Cronbach Alpha coefficients ranged from .60 to .70. The Epistemological Beliefs Questionnaire (Chan & Elliot, 2002, 2004) was adapted by Aypay (2009) to be used in Turkey. The Epistemological Beliefs Questionnaire includes 30 questions. The 30 item questionnaire was tested with a Confirmatory Factor Analysis (CFA). The results of CFA indicated a good fit (NFI 0.64, CFI 0.77, RMSEA 0.054). Based on

CFA results, the factors structure of the instrument consisted of four factors of beliefs (Innate/Fixed Ability, Learning Effort, Learning Process/Expert Knowledge, and Certainty Knowledge). It has a five-point Likert type scaling (5=strongly agree- 1=strongly disagree). The overall reliability of the instrument was tested with Cronbach Alpha and the reliability was found as.78.

### Procedure

The adaption study of the Teaching and Learning Conceptions Questionnaire conducted as follows: translation and back-translation procedure was used. First, the instrument was translated into Turkish by two experts separately in (one assistant professor and one associate professor). The two translations were compared and translation was finalized.

The Turkish version of the instrument was translated back to English by an expert in the field (one assistant professor). Later, the field expert and the researcher worked together whether the original instrument and translated-back translated instruments had kept the meaning. The researcher along with the second expert concluded there was no difference in terms of meaning of the instruments. Thus, the researcher concluded that the instrument was ready for validity and reliability studies. In addition to descriptive statistics, correlation, CFA, Cronbach Alpha, t-test, and ANOVA were conducted to analyze the data.

### Results

#### Findings for the Adaption of the Teaching and Learning Conceptions Questionnaire

A CFA was conducted to see whether the data fit. The CFA model was presented in the Figure-1. The fit indices of CFA was investigated and Chi-square value ( $\chi^2=1020,3$  N=341, sd=404,  $p=0.00$ ) was significant. Fit indices indicated that RMSEA was found (RMSEA) 0.067. RMSEA value indicated a good fit, between 0 and 0.05, and if the value was within 0.05- 0.08 indicates an acceptable fit (Şimşek, 2007; Yılmaz & Çelik, 2009). Thus, the RMSEA value 0.067 was, and this value indicated an acceptable fit. RMSEA is the most comprehensive statistics that

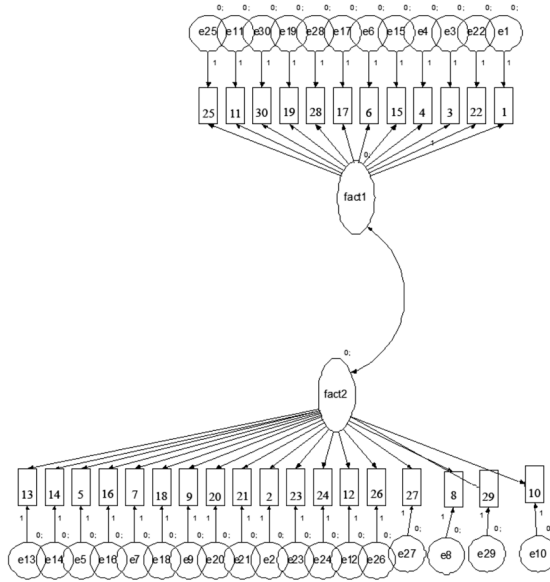


Figure 1. Cfa Result on the Teaching and Learning Conceptions Questionnaire

inform us on the model fit (Thompson, 2000). Normed Fit Index (NFI) 0.72, Comparative Fit Index (CFI) 0.80. As a result, these results lead to a conclusion that there is a fit in the model.

The reliability of the instrument was measured with Cronbach Alpha coefficient. The overall reliability was .71, the sub-scale reliabilities were for the Constructivist Conception .88 and Traditional Conception .83.

**Findings for Student Teachers’ Conceptions of Teaching and Learning**

The mean scores of the student teachers’ views on the Teaching and Learning Conceptions Questionnaire was used to construct a profile regarding teaching and learning conceptions. The first conception was called as the “Con-

structivist Conception” and the mean score was  $\bar{X}=4.1$  (S.D.=.60). This finding indicates that student teachers largely accept the constructivist approach in the teaching and learning process. The second dimension was named as the “Traditional Conception” and the mean value for this sub-dimension was  $\bar{X}=2.7$ dir (S.D.=.58). This finding indicates that the student teachers prefer constructivist approach over the traditional approach.

A t-test was conducted to see whether the conceptions of teaching and learning of student teachers differs based on gender. The results of the t-tests were presented in the Table-1.

The first factor of the instrument, namely the scores of “constructivist conception” significantly differed between male and female stu-

**Table 1.**  
T-test Results of Teaching and Learning Conceptions Questionnaire Based on Gender

	Gender	n	$\bar{X}$	s.d.	df	t
Constructivist	Male	77	4.07	.53	248	-2.15
	Female	173	4.23	.55		
Traditional	Male	74	2.91	.60	247	2.81
	Female	175	2.67	.59		

**Table 2.**  
ANOVA Results on Teaching and Learning Conceptions Questionnaire Based on Class Levels

	Source of Variance	Sum of Square	df	Mean Square	F
Constructivist	Between Groups	1,882	4	,471	1,303
	Within Groups	88,128	244	,361	
	Total	90,011	248		
Traditional	Between Groups	10,308	4	2,577	7,844
	Within Groups	80,162	244	,329	
	Total	90,471	248		

dent teachers [ $t_{(248)} = -2.15, p < .05$ ]. Female student teachers' "constructivist conception" scores ( $\bar{X}=4.23$ ) was higher than that of males ( $\bar{X}=4.07$ ). Thus, it may be claimed that female student teachers prefer a more constructivist approach when compared to males.

There was also a significant difference on student teacher views based on gender regarding the second factor "traditional conception" [ $t_{(247)} = 2.81, p < .05$ ]. However, at this time, male student teachers' "traditional conception" scores ( $X=2.91$ ) was higher than that of female student teachers ( $X=2.67$ ). This finding indicated that male student teachers prefer a more traditional approach when compared to female student teachers.

In order to test whether the student teacher views on teaching and learning conceptions based on class levels, a one-way ANOVA was conducted. The results of ANOVA were presented in the table-2. As indicated in the Table-2, a significant difference was found on "traditional conception" [ $F_{(4-244)}=7,84, p < .01$ ].

The post-hoc Scheffee test indicated that there

was a significant difference between freshman level (First year) and graduate level, between sophomores (second year) levels, senior level and graduate level student teachers on traditional conception. The scores on the "traditional conception" decreases as the class levels increases (Freshman  $\bar{X}=2.92$ ; Sophomore  $\bar{X}=2.94$ ; Junior  $\bar{X}=2.80$ ; Senior  $\bar{X}=2.46$ ; and graduate  $\bar{X}=2.35$ ).

Table-3 presents the correlation coefficients among the Epistemological Beliefs Questionnaire's belief factors (Innate/Fixed Ability, Learning Effort, Learning Process/Expert Knowledge, and Certainty Knowledge) and Teaching and Learning Conceptions Questionnaire's\_conception factors (Constructivist Conception, Traditional Conception).

The correlations in the Table-3 indicated that there was a medium positive correlation between constructivist conception and learning process/expert knowledge belief ( $r= 0.539, p < .01$ ) while a low positive relationship with learning effort belief ( $r= 0.267, p < .01$ ) and a low negative relationship between certainty knowledge belief ( $r=- 0.116, p < .01$ ) were found. Thus, as there was an increase in the importance of

**Table 3.**  
Correlations among EBQ and TLCQ Factors

Conceptions	Learning Process/ Expert Knowledge	Innate/ Fixed Ability	Learning Effort	Certainty Knowledge
Constructivist	,539**		,267**	-,116'
Traditional		,437**	,218**	,441**

\* $p < .05$  \*\* $p < .001$

process in learning and the belief that the expert knowledge should be questioned and the importance of effort in learning, the constructivist conception in learning increases.

While as the conception that the knowledge was certain and remain unchanged increased, the constructive conception in teaching and learning decreased. There was a medium positive correlation between traditional conception, the innate/fixed ability, and certainty of knowledge ( $r= 0.437, p<.01$ ;  $r= 0.441, p<.01$ ). There was also a low positive correlation between certainty of knowledge and learning effort belief ( $r= 0.218, p<.01$ ). Based on these results, as the belief that the innate/fixed ability, learning effort, and certainty of knowledge increase, traditional conception in teaching and learning increases as well.

### Discussion

The data in this study supported a two-factorial structure like Chan and Elliot's (2004) Teaching and Learning Conceptions Questionnaire, namely constructivist and traditional. The factor structure that the factor analysis pointed out and the factors that emerged Chan and Elliot's study were identical. Findings indicated that the Turkish student teachers were strongly preferred constructivist conception in teaching and learning to the traditional conception. One reason for that might be the recent reform in the curriculum and teaching-learning activities based on constructivism in the Turkish Education System. Chan and Elliot (2004), found that in Hong Kong student teachers did not adopt one of the conceptions strongly, whether it was constructivist or traditional. However, the findings of this study were parallel to Cheng et al. (2009) study of student teachers in Hong Kong.

This study found that teaching and learning conceptions differed based on gender. The mean scores of female student teachers on the constructivist conception was significantly higher than that of males while the scores of male student teachers' on the traditional conception was significantly higher than that of females. Oğuz's (2008) study on the Turkish student teachers pointed out that females more strongly believed that learning depends on effort rather than ability than males. These findings together indicate that female student teachers agree with the view that knowledge is constructed by students.

In this study, it was found that as the student teachers progressed towards their senior year, their scores on the traditional conception were decreased. Based on these findings, it might be claimed that the training they received in the faculty of education might have negatively influenced their beliefs regarding the traditional conception.

The findings on the relationship between epistemological beliefs and conceptions on teaching and learning pointed out that as the student teachers' beliefs on process was important in learning, expert knowledge should be questioned, and effort in learning was important increased, the constructive conception also increased. On the other hand, while student teachers' beliefs on the certainty of knowledge increased, their scores on the constructivist conception were lower. These findings were consistent to the constructivist approach. Other findings on this topic, as the beliefs on innate/fixed ability, effort in learning, and certainty of knowledge increased, the mean score on the traditional conception in learning was also increased. When one keeps in mind that the traditional approach is teacher-centered, the transfer of knowledge from teacher to student is one-way, these findings was consistent with the traditional approach. The belief that the effort in learning is important had similar relationships with both traditional and constructivist conception. This finding points out that it might be safe to argue that the Turkish student teachers believe the role of effort in learning in general. Chan's (2003) study on Hong Kong candidate teachers found a positive relationship between belief that on ability is fixed and surface learning approach while he found no relationship with deep learning approach.

For future researchers, for a better and more comprehensive adaption of the Teaching-Learning Conceptions Questionnaire into the Turkish Culture, more studies with larger samples and various universities are needed. This study took only teaching and learning conceptions and epistemological beliefs based on gender and class-levels. Further studies may include whether teaching-learning conceptions differ based on the department, university, and discipline.

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