Teacher education student’s epistemological beliefs and their conceptions about teaching and learning

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Abstract

The purpose of this study is to adapt the teaching-learning approaches questionnaire in to Turkish and determine the relationship between teacher education students’ epistemological beliefs and their approaches to teaching-learning. The results, based on 341 student-teachers, indicated that the factor structure is consistent with the model. Further analyses indicated that student teacher views differ based on gender, department, class-level. Finally, relationships were found among epistemological beliefs (Innate/Fixed Ability, Learning Effort, Learning Process/Expert Knowledge, Certainty Knowledge) and approaches to teaching and learning (Constructivist Conception, Traditional Conception).

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1. Introduction

The teaching and learning processes are influenced by different cognitive variables. Some important of them are epistemological beliefs and teaching and learning conceptions. Epistemological beliefs express the beliefs on the nature of knowledge and gaining knowledge (learning). According to Schommer, defines personal epistemology as a system which includes five independent dimensions and they 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 person’s cognitive and meta-cognitive processes. These beliefs also influence learning not only individually but also as a whole (Schommer, 1990, 1994). Findings in the literature indicated that epistemological beliefs were related to variables such as achievement motivation, learning approaches (Cano, 2005; Kizilgün, Tekkaya ve Sungur, 2009), motivation and learning (Buehl ve Alexander, 2005; Cavallo, Rozman, Blickenstaff ve Walker, 2003; Paulsen ve Feldman, 1999), study strategies and problem solving (Phillips, 2001), learning styles and reflective thinking (Phan, 2008), academic performance (Schommer, 1993).

Recent studies argued that epistemological beliefs were related to teaching and learning conceptions and these conceptions were influenced by epistemological beliefs (Chan and Elliot, 2004; Cheng, Chan, Tang, and Cheng, 2009). “The conceptions about teaching and learning refer to the beliefs held by teachers about their preferred ways

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of teaching and learning. These include the meaning of teaching and learning and the roles of teacher and pupils” (Chan and Elliot, 2004). There are two main opposite conceptions in teaching and learning (Traditional and constructivist). Constructivist conception received its foundations from Piaget’s and Vygotsky’s theories. These theorists emphasize the importance of experience and active participation of 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). Traditional conception in teaching utilizes teacher-centered teaching strategies. Because this conception sees teacher as the source of knowledge and 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’ to develop critical thinking and collaboration skills and learning takes place in environments where students are able to participate actively (Chan and Elliot, 2004; Cheng, Chan, Tang, and Cheng, 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), in her study of the Turkish student teachers’ epistemological beliefs, found that for the Turkish student teachers, 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.

Purpose

The main purpose of this study was to adapt the teaching–learning conceptions questionnaire for student teachers in to Turkish. 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.

2. Method

2.1. Sample

The sample of this study 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), science education (63).

2.2. Instruments

2.2.1. Epistemological beliefs questionnaire (EBQ)

In this study the, “Epistemological Beliefs Questionnaire” was used (Chan & Elliot’ın 2002, 2004). The instrument was adapted into Turkish by Aypay (2009). 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, IFI 0.78, RFI 0.58, 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, 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.
2.2.2. Teaching and learning conceptions questionnaire (TLCQ)

A second questionnaire which was developed by Chan ve Elliot’in (2004) “Teaching and Learning Conceptions Questionnaire” was used. This instrument had 30 items as well. A CFA was also conducted on this instrument and CFA results indicated a 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, Traditional 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.

2.3. Procedure

The adaption study of the “Teaching and Learning Conceptions Questionnaire” into Turkish conducted as follows: translation and back-translation procedure was used. First, the instrument was translated into Turkish by two expert 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.

3. Results

3.1. Findings for the adaption of teaching and learning conceptions questionnaire

A CFA was conducted to see whether the data points out a 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. Thus, the RMSEA value 0.067 was, and this value indicated an acceptable fit. Normed Fit Indice (NFI) 0.72, Comparative Fit Indice (CFI) 0.80, and IFI 0.81, Relative Fit Indice was (RFI) 0.67. As a result, these results lead to a conclusion that there is a fit in the model.

The reliabilit 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.
3.2. Findings for student teachers’ conceptions of teaching and learning.

The mean scores of the student teachers’ views on Teaching and Learning Conceptions Questionnaire was used to construct a profile regarding teaching and learning conceptions. The first conception was called as the “Constructivist Conception” and the mean score was $X = 4.1$ (S.D.=.60). This findings indicates that student teachers largely accepts the constructivist approach in the teaching and learning process. The second dimension was named as the “Traditional Conception” and the mean value fort his sub-dimension was $X = 2.7$ (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-test was presented in the Table-1.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>$X$</th>
<th>S.D.</th>
<th>df</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructivist</td>
<td>Male</td>
<td>77</td>
<td>4.07</td>
<td>.53</td>
<td>248</td>
<td>-2.15</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>173</td>
<td>4.23</td>
<td>.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>Male</td>
<td>74</td>
<td>2.91</td>
<td>.60</td>
<td>247</td>
<td>2.81</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>175</td>
<td>2.67</td>
<td>.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The first factor of the instrument, namely the scores of “constructivist conception” significantly differed between male and female student teachers [$t_{(248)} = -2.15$, $p<.05$]. Female student teachers’ “constructivist conception” scores ($X = 4.23$) was higher than that of males ($X = 4.07$). 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 was presented in the table-2. As indicated in the Table-2, a significant difference was found on “traditional conception” [$F_{(4,244)} = 7.84$, $p<.01$].
Table 2. ANOVA Results on Teaching and Learning Conceptions Questionnaire Based on Class Levels.

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Square</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constructivist Between Groups</td>
<td>1,882</td>
<td>4</td>
<td>.471</td>
<td>1,303</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>88,128</td>
<td>244</td>
<td>.361</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90,011</td>
<td>248</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traditional Between Groups</td>
<td>10,308</td>
<td>4</td>
<td>2,577</td>
<td>7,844</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>80,162</td>
<td>244</td>
<td>.329</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90,471</td>
<td>248</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The post-hoc Scheffée test indicated that there was a significant difference between freshman level (First year) and graduate level, between sophomore (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 X̄=2.92; Sophomore X̄=2.94; Junior X̄=2.80; Senior X̄=2.46; and graduate X̄=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, Certainty Knowledge) and Teaching and Learning Conceptions Questionnaire’s conception factors (Constructivist Conception, Traditional Conception).

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

Table 3. Correlations among EBQ ve TLCQ Factors.

<table>
<thead>
<tr>
<th>Conceptions</th>
<th>Learning Process/Expert Knowledge</th>
<th>Innate/Fixed Ability</th>
<th>Learning Effort</th>
<th>Certainty Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructivist</td>
<td>.539**</td>
<td>.267**</td>
<td>-.116*</td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>.437**</td>
<td>.218**</td>
<td>.441**</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.001

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 increased.

4. Discussion

The data in this study supported a two-factorial structure like Chan ve 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 ve 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, Chan, Tang, and Cheng’s (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 belived that learning depends on effort rather than ability than males. These findings together indicates 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 was 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 was 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.

References


