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## The examination of pre-service teachers' epistemological beliefs in terms of Hofer's and Hammer & Elby's view

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### Abstract

The purpose of the study is to investigate elementary preservice teachers' epistemological beliefs in terms of Hofer (2001) and Hammer & Elby (2002) views. Hofer defines epistemological beliefs as beliefs about knowledge and knowing, while Hammer & Elby (2002) proposes that epistemological beliefs include nature of knowing and learning. In this study, quantitative and qualitative research methods were conducted. The sample of this study consisted of 152 elementary preservice teachers. Preservice teachers' epistemological beliefs were determined by using "Epistemic Belief Inventory" (EBAPS) developed by Hammer & Elby (2002) and "context specific epistemological beliefs questionnaire" (CSEBPQ) was developed by Hofer (2001). According to the result of the study, some dimensions of CSEBPQ are related to the EBAPS.

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### 1. Introduction

The research related to epistemological beliefs was increased for the past decade (Chen & Pajares, 2010). The reasons of the increase in epistemological beliefs studies are that this construct is interacting with cognitive and metacognitive operations (Chai, Khine & Teo, 2006). Thus, studying students' epistemological beliefs is important in order to make them higher achievers. Accordingly, studying pre-service teachers' epistemological beliefs is also

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important because their beliefs about knowledge and knowing affect their teaching method implementation in the real class. Therefore, pre-service teachers' implementation of teaching method is one of the factors that affect their future students' achievement. There are several models for explaining the epistemological beliefs.

Perry (1970) was the pioneer for studying epistemological beliefs and then Belenky, Clichy, Goldberger and Tarule (1986) worked the women's way of knowledge, Baxter-Magolda (1992) studied the epistemological reflection, King and Kitchener (1994) studied the reflective justice, after that Kuhn, Cheney and Weinstock (2000) studied the epistemological understanding of the model. All of these researchers assumed that epistemological beliefs were unidimensional and epistemological beliefs developed longitudinally from simple to complex thinking process. Then, Schommer (1990) proposed that epistemological beliefs were consisted of more than one independent dimension. For example, a student could think that knowledge is acquired gradually, but at the same time he or she could think that knowledge is organized as isolated bits and pieces. Thus, she defined epistemological beliefs as personal and implicit beliefs' systems or students' assumptions about nature of knowledge and learning (Schommer, 1990). These dimensions were as follow: certainty of knowledge, simple knowledge, quick learning, source of learning, and innate ability. She explains these dimensions as follow: *Source* dimension includes the "beliefs about knowledge residing in external authorities", *Certainty* dimension includes the "beliefs in a right answer", *Development* dimension includes the "beliefs about science as an evolving and changing subject", *Justification* dimension includes the "the roles of experiments and how individuals justify knowledge".

Hofer and Pintrich (1997) also proposed that epistemological beliefs are consisted of more than one dimension and at the same time they focused on the domain specificity of the epistemological beliefs. They defined epistemological beliefs as beliefs about knowledge and knowing. They proposed the following dimensions: *certainty of knowledge*, *simplicity of knowledge*, *source of knowing* and *justification for knowing*. On the contrary to epistemological beliefs dimension view, Hammer and Elby (2002) proposed that people have many epistemological resources and they stated that when they need something, the specific resource was activated. They suggested some resources such as *knowledge as transmitted stuff* and *knowledge as fabricated stuff*. People could active different resources in different situations. They also proposed the importance of domain specificity of the beliefs about knowledge. For example, people could have different beliefs related to source of knowledge depending on the situation. According to the above information related to the development of epistemological beliefs, there is no consensus among the development of epistemological beliefs (Sandoval, 2014). Thus, the purpose of the present study is to understand the relation between two domain specific frameworks (Hofer & Pintrich (1997) and Hammer & Elby (2002)). The research question of this study is as follow: Was there a significant relation of preservice teachers' epistemological beliefs in terms of Hofer (2001) and Hammer & Elby (2002) views?

## 2. Method

### 2.1. Sample

The sample of this study consisted of third grade pre-service science and elementary teachers. The total numbers of pre-service teachers were 154 (116 female, 39 male). The mean age of them was 21. All of the pre-service teachers took General Chemistry, General Biology, General Physics courses and also they took science teaching methods courses. The study was conducted one of the rural universities in Turkey (the population of this city about 80,000). Generally, students were instructed with constructivist approaches in their classroom. When they complete the program, pre-service science teachers are going to be certified to teach science to 5<sup>th</sup> through 8<sup>th</sup> grade students. When pre-service elementary teachers complete the program, they are going to be certified to teach basic science, mathematics, the properties of native language, art, music and physics to 1<sup>st</sup> through 4<sup>th</sup> grade students. In Turkey, elementary school curriculums were revised and accordingly educational faculty programs were revised in order to make pre-service teachers scientifically literate.

### 2.2. Materials

In this study, two different questionnaires were administered in order to determine pre-service teachers' epistemological beliefs in terms of two different framework. The following instruments were used in the present

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