



INVESTIGATING THE RELATIONSHIPS AMONG PRE-SERVICE TEACHERS' EPISTEMOLOGICAL BELIEFS, ENVIRONMENTAL CONCERNS, AND VALUES

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Abstract

Current study examined the relationships among epistemological beliefs, environmental concerns, and values. Hundred and three pre-service early childhood teachers completed the *Epistemological Belief Questionnaire*, the *Environmental Motives Scale* and the *Inventory of Values*. The results revealed significant associations among the dimensions of environmental motives and values. Significant interactions were also identified among the dimensions of epistemological beliefs and values. However, no relation was found between epistemological beliefs and environmental motives.

Keywords: epistemological beliefs, environmental concern, values, pre-service early childhood teachers

INTRODUCTION

Many of the national and international reform documents stated that the goal of science education is to develop scientifically as well as environmentally literate citizens with intellectual resources, values, attitudes and inquiry skills. Scientifically literate individuals possess several attributes one of which is having sophisticated understanding of the nature of knowledge and knowing (i.e. epistemological beliefs) (MoNE, 2004). A sizable body of research has focused on the interactions between students' epistemological beliefs and various learner related variables. These research studies reported that students' epistemological beliefs may shape their academic performance, learning approaches, self-regulated learning strategies, and construction of knowledge and conceptual change. Those beliefs were also shown to be associated with gender, age and education, culture, ability, and intelligence.

Epistemological beliefs are thought to be related with the environmental beliefs as well. It was suggested that epistemological beliefs may influence the interpretation of environmental

knowledge, serve as a tool for interpreting formal and informal knowledge for acting well on environmental problems, and have an impact on everyday life issues (Öztürk, 2009). At this point, it is worth to consider environmental concerns and values as components of environmental beliefs. According to Stern and Dietz (1994), attitudes of concern about environmental issues are based on a person's more general set of values. To put it more clearly, attitudes about environmental issues are based on the relative importance that a person places on themselves, other people, or the biosphere which Stern and Dietz (1994) labeled egoistic, altruistic, and biospheric. Environment friendly behavior is reported to be related to certain values as well (e.g., Schultz & Zelezny, 1999; Stern & Dietz, 1994; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Stern, Dietz, & Kalof, 1993). According to Schwartz (1994, p.21) "Values are desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity." It can be inferred from this definition that values are assumed to motivate action – giving it direction and emotional intensity. With this aspect, motivational function of values implies a values-to-behavior causality (Thøgersen & Ölander, 2002). The discovery of a parsimonious, well-defined, and cross-culturally stable structure of values (Schwartz, 1994) facilitates theorizing about the relationships among values, between values and other personality variables; and between values and social psychological variables such as attitudes, beliefs, and behavioral intentions (Stern, Dietz, & Guagnano, 1998). Value measures defined as in the Schwartz's work also have shown to be predictors of pro-environmental attitudes and behavior (Stern & Dietz, 1994; Stern et al., 1993; Stern, Dietz, Kalof, & Guagnano, 1993).

Although there are evidences indicating the possible link between epistemological and environmental beliefs, the interaction among them has not been widely acknowledged by the researchers. Consequently, this study intended to fill this gap in the literature by exploring the relationships among epistemological beliefs, environmental concerns, and values. One additional contribution of this research is that it focused on pre-service early childhood teachers who are thought to be responsible from rising up scientifically as well as environmentally literate generations.

METHOD

Participants

A total of 103 (95 females and 8 males with a mean age of 22) first, second, third, and fourth year pre-service early childhood teachers were enrolled in the study. The university from which the sample was chosen was selected by the convenience sampling method.

Measures

All the students responded to the *Epistemological Belief Questionnaire (EBQ)*, the *Environmental Motives Scale (EMS)*, and the *Inventory of Values (IV)*. The dimensionalities of the measures were examined by exploratory factor analysis (EFA) using varimax rotation. Descriptive statistics and number of items for the measures of the study were presented in Table 1.

The Epistemological Belief Questionnaire

The Turkish version of the EBQ (Özkan, 2008), originally developed by Conley, Pintrich, Vekiri, and Harrison (2004), was used to assess the pre-service teachers' epistemological beliefs. The questionnaire consists of four dimensions (Source, Certainty, Justification, and Development) with a total of 26 items representing the two general areas that Hofer and Pintrich (1997) argued at the core of the individuals' epistemological theories: the beliefs about the nature of knowing and the beliefs about the nature of knowledge. It is a self-report measure that requires responding to the items on a 5-point Likert scale. Contrary to the original questionnaire, the Turkish version included three dimensions, namely Justification, Development, and Source/Certainty (for more information see Özkan, 2008).

The Environmental Motives Scale (EMS)

The EMS (Schultz, 2001) was used to distinguish between different environmental attitudes that are oriented around three sets of valued objects: self (my health, my future, my life style, me), other people (people in my community, all people, children, my children), and the biosphere (plants, animals, marine life, birds). These three environmental attitudes represent egoistic, altruistic, and biospheric concerns. Specifically, if the valued objects are organized around the self, one is called to be egoistic. If the person places relative importance on other people, s/he is said to be altruistic. Emphasis on the biosphere, on the other hand, represents biospheric concern. The scale is a self-report measure that requires rating of the 12 items from 1(not important) to 7 (supreme importance) in response to the question "I am concerned about environmental problems because of the consequences for"

The Inventory of Values (IV)

The IV (Stern, Dietz, & Guagnano, 1998) was utilized to measure the structure and content of human values through four dimensions called Self-Transcendence (consisting of universalism and benevolence value types), Self-Enhancement (consisting of power and achievement), Openness to Change (consisting of self-direction and stimulation), and Conservation (consisting of tradition, conformity, and security). It is a self-report measure that requires responding to a total of 15 items on a 5-point Likert scale.

Data analysis

The data analysis included two main parts. In the first part of the data analysis, the descriptive statistics were utilized to determine the characteristics of the epistemological beliefs, environmental motives and values held by the pre-service teachers. The second part of the data analysis investigated the relationships between the epistemological beliefs, environmental motives and values.

FINDINGS

Descriptive statistics regarding epistemological beliefs, environmental motives, and values were presented in Table 1. As depicted in the table, the pre-service early childhood teachers (PSECTs) had fairly sophisticated epistemological beliefs as indicated by the item mean scores ranging from 4.03 to 4.18 on a five-point scale. For the Development dimension the mean score was 4.18 ($SD = 0.35$), suggesting that students tended to believe that science is an evolving and changing subject. For the Justification dimension, the mean score was 4.11 ($SD = 0.50$) which implies that students most of the time believed that knowledge is constructed through critical examination of the evidence and the opinions of experts. The mean value for the Source/Certainty dimension was 4.03 ($SD = 0.503$) which implies that students tended to be closer to the view that knowledge is constructed by the knower and there may be more than one right answer than to the belief in single right knowledge residing in external authorities.

Table 1. Descriptive statistics and number of items for the measures of the study

Measures	Mean	SD	# of items
EBQ			23
Source/Certainty	4.03	0.50	11
Development ^a	4.18	0.35	4
Justification ^a	4.11	0.50	8
EMS			12
Biospheric ^b	5.77	1.23	4
Egoistic ^b	6.33	0.91	4
Altruistic ^b	6.07	0.80	4
IV			12
Self-Transcendence ^a	4.59	0.51	3
Conservation ^a	4.31	0.51	3
Self-Enhancement ^a	2.61	0.69	3
Openness to Change ^a	3.86	0.68	3

Note: SD = Standard deviation

^a 1 – 5 point scale

^b Mean scores range between 1 – 7

Descriptive statistics results regarding environmental motives showed that the participants had an obvious preference for environmental attitudes oriented around the self. That is, attitudes about environmental issues were based on the relative importance that a person places on themselves, rather than other people, or plants and animals. Students' responses to IV revealed that PSECTs had the highest mean score on Self-Transcendence consisting of universalism and benevolence

value types. According to the results, the lowest mean score was obtained for the Self-Enhancement subscale consisting of power and achievement values.

To explore the relationships that might exist among the variables of the study, the Pearson product-moment correlations were calculated. The correlation coefficients and the levels of significance were reported in Table 2. The results revealed significant associations among the dimensions of environmental motives and values. As shown in the table, biospheric concerns correlated positively with Conservation ($r = .31, p < .01$) and Openness to Change ($r = .29, p < .01$). These results imply that PSECTs concerning more about plants, animals, marine life, and birds were more like to have traditional values like honoring parents and elders, showing respect, family security, and self-discipline. These participants seemed also interested more in a varied and exciting life and exploring. Like biospheric concerns, altruistic concerns correlated positively with Conservation ($r = .27, p < .01$) and Openness to Change ($r = .20, p < .01$). The results suggested that PSECTs concerning more about other people in the world share the same values with the biospheric PSECTs. The results of the correlational analysis also revealed positive associations among egoistic concerns and Conservation ($r = .35, p < .01$) and Self-Enhancement ($r = .24, p < .05$). This implies that PSECTs concerning more about themselves were more likely to have egoistic values like the right to lead and command, wealth and material possessions, and being influential on people and events.

Table 2. Zero-order correlations for epistemological beliefs, environmental concerns, and values.

Variable	1	2	3	4	5	6	7	8	9	10
1. Source/Certainty	-									
2. Development	-.29**	-								
3. Justification	.02	.32**	-							
4. Biospheric	-.15	-.04	.10	-						
5. Egoistic	.02	.02	-.02	.11	-					
6. Altruistic	-.16	-.03	.05	.48**	.36**	-				
7. Self-Transcendence	-.12	.11	.32**	.17	.15	.06	-			
8. Conservation	-.09	.03	.06	.31**	.35**	.27**	.29**	-		
9. Self-Enhancement	.14	-.20*	.02	.03	.24*	-.04	-.13	-.31**	-	
10. Openness to Change	-.04	.04	.11	.29**	.10	.20*	.20*	.19	-.29**	-

** $p < .01$

* $p < .05$

Significant interactions were also identified among the dimensions of epistemological beliefs and values. However, no relation was found between epistemological beliefs and environmental motives. According to the results PSECTs having more sophisticated beliefs in the Justification dimension tended to score higher in Self-Transcendence. This finding suggests that as PSECTs' beliefs in the Justification dimension gets sophisticated, that is as they believe more in the

knowledge constructed through critical examination of the evidence and the opinions of experts, their values related with social justice, equality, and a world at peace increases. Table 2 also reveals that PSECTs who scored higher in the Self-Enhancement tended to have naïve epistemological beliefs, at least for the Development dimension. This negative relationship indicates that PSECTs having more egoistic values like the right to lead and command, wealth and material possessions, and being influential on people and events tended to believe less in the evolving and changing nature of science.

Findings have important implications for early childhood curricula and practices. It is worth to note that PSECTs concerned about adverse effects of environmental problems for themselves, but not for all living things or for other people. In other words, they are egoistic individuals who concerned about the environment at only a personal level. Preschools, in addition to home, are the one of the important place where young children experienced with friendly environmental practices. Considering the crucial role that PSECTs play in development of the young children's environmental attitudes, awareness, as well as concerns, incorporation of environmental related topics into curricula is an urgent need. In addition, PSECTs who hold egoistic value orientation tended to have naïve epistemological beliefs. It can be inferred that PSECTs' environmental concerns may be influential in the development of their various other beliefs, including epistemological beliefs. It is probable that the beliefs, concerns, and motives that the PSECTs hold may influence the development of the young child's beliefs, concerns, and motives. Therefore, it is worth to reconsider the early childhood curricula and practices by incorporating environmental and epistemological related issues.

There are some limitations of the current study that should be recognized in order to avoid any interpretation beyond the data or scope of this investigation. The first limitation is the reliance on the self-reported questionnaires and trusting in the self-reported levels of the related constructs as indicated by the PSECTs. A fruitful next step will be to make use of multiple methods and measures in order to verify the accuracy of the findings of this study. The second limitation is related to the sample of the current study. Future studies using the same measures with larger samples are needed to illuminate the findings of this investigation.

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