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Epistemological Beliefs and Values as Predictors of Preservice Science Teachers' Environmental Moral Reasoning

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OVERVIEW: In this study, we proposed a path model to predict environmental moral reasoning patterns of preservice science teachers (PSTs) by their epistemological beliefs and values.

AUDIENCE: District science coordinators, Doctoral advisors, Environmental educators, Formal educators, Instructional designers, K-12 science teachers, Parents, Researchers/Researcher supervisors, Science education leaders, Secondary science teachers, Students, Teacher educators, Elementary science teachers

KEY POINTS

- Four environmental moral dilemma scenarios were used to trigger and examine environmental moral reasoning of PSTs.
- Path analyses were used to test hypothesized relationships.
- Epistemological beliefs and values significantly predicted environmental moral reasoning patterns.
- Context of the scenarios were influential on the PSTs' environmental moral reasoning patterns and their relationships to epistemological beliefs and values.

INTRODUCTION: Environmental moral reasoning is used for explaining individuals' perceptions of ethics and morality with respect to human-environment relationships and is regarded among the significant components of environmental and scientific literacy. In this study we tailored two sub-research questions to address the overarching purpose of the study: 1) How are epistemological beliefs of preservice science teachers (PSTs) related to their environmental moral reasoning? 2) How are values of preservice science teachers related to their environmental moral reasoning? Four environmental moral dilemma scenarios taking place in four outdoor recreation contexts (i.e., hiking, picnicking, fishing, and camping) were used to trigger and examine environmental moral reasoning of our participants who were 1524 PSTs in Türkiye.

FINDINGS: Epistemological beliefs and values significantly predicted environmental moral reasoning of PSTs for each of the four environmental moral dilemma scenarios. Although environmental moral reasoning patterns showed differences depending on the recreational context of the scenarios, two environmental moral reasoning categories were obtained for each environmental moral dilemma scenario. One of these categories was anthropocentric (human-centered) and the other was ecocentric (nature-centered). Mean values calculated for ecocentric moral reasoning categories were higher when compared to anthropocentric moral reasoning categories. Amounts of variance explained in ecocentric environmental moral reasoning categories were comparatively higher. Statistical significance and direction of the relationships tested through path analyses showed changes depending on the moral dilemma scenario context and focus of environmental moral reasoning category. Nevertheless, relationships between environmental moral reasoning categories and epistemological beliefs in omniscient authority (epistemological beliefs regarding the source of knowledge) and self-transcendence and tradition values (which were factorized under a single value dimension) were consistently statistically significant and positive.

TAKEAWAYS: To promote environmental moral reasoning, educators should first carefully examine the processes that their students go through while trying to resolve moral issues related to the environment. Considering our study findings, we advocate that science educators give more explicit emphasis to epistemological beliefs and values in their science education programs, particularly in the context of facilitating socioscientific issue (SSI) related discourse and exploration. Similarly, the contextual-based nature of environmental moral reasoning patterns as well as the observed relationships among environmental moral reasoning, epistemological beliefs and values, imply the need for presenting a variety of contexts in students' coursework to examine and develop learners' environmental moral reasoning. The use of different dilemma case scenarios, such as the ones adapted and utilized in this study, is a promising instructional approach. Finally, we propose that explicit emphasis should be given to the development of epistemological beliefs and values in science education programs, which would contribute to the moral reasoning and ethical literacy of our students. We consider this issue critical because ethical literacy cannot be thought of as independent from scientific literacy, for that is what it means to be functionally scientific literate.