


Chapter 8

Use of the SEE–SEP Model in Preservice Science Teacher Education: The Case of Genetics Dilemmas

Dilek Karisan

 <https://orcid.org/0000-0002-1791-9633>
Adnan Menderes University, Turkey

Umran Betul Cebesoy

 <https://orcid.org/0000-0001-7753-1203>
Usak University, Turkey

ABSTRACT

This study aims to assess how preservice teachers' supporting reasons vary in relation to six subject areas, namely, sociology/culture (S), environment (E), economy (E), science (S), ethics/morality (E), and policy (P), in different socioscientific issues (SSI) and how preservice teachers' decisions regarding these issues interact with the aspects of value, knowledge, and personal experience. Exploratory sequential design was utilized in this study and 47 third-grade preservice science teachers. Data were collected via written reports in two different SSI scenarios, namely, gene therapy and preimplantation genetic diagnosis. Preservice teachers' written reports were analyzed using the SEE–SEP model. The results showed that preservice teachers' supporting reasons mainly stemmed from the subject areas of ethics/morality (41%) and science (32%). The results also revealed little use of justifications from the subject areas of policy and sociology/culture (11% and 10%, respectively), and subject area of economy (6%) was the least referred.

DOI: 10.4018/978-1-7998-4558-4.ch008

INTRODUCTION

To date, the science education committee has affirmed numerous “*Science Education Standards*” aimed at describing essential components of science education (Bybee, 2014). The ultimate goals of these standards are to enhance students’ knowledge and understanding of scientific concepts, engage them in decision-making activities, and let them participate in cultural events. These ultimate goals are referred to as required skills for a scientifically literate person. Due to its complex nature, there is no clear-cut formula to raise scientifically literate individuals; however, educators have explicitly integrated relevant subjects (i.e. technology, society, environment, ethics) to enhance scientific literacy and tried to describe the characteristics of a scientifically literate person (Bybee, 1995). A scientifically literate person is someone who would have an understanding of Nature of Science (Halbrook & Rannikmae, 2007), Scientific Inquiry (Lederman, Antink & Bartos, 2014), who would be able to evaluate the quality of scientific information, engage in moral-ethical issues, and understand the complexity of socioscientific issues (hereafter SSI) (Zeidler, 2014).

One of the alternative ways used to enhance scientific literacy is known as the Science, Technology, and Society (STS) movement (Solomon & Aikenhead, 1994) which has been enhanced by the inclusion of the Environment component and converted to a more extensive term known as the Science, Technology, Society, and Environment (STSE) movement (Pedretti, 2003). Although the STSE movement addressed the connections and interdependency of the four components and supported achieving scientific literacy, it still has missing parts to be defined as it is a well-articulated approach to science education (Pedretti, 2003). Researchers have argued that STSE has such limitations as not including ethical issues nor does it aim to enhance moral or character development (Zeidler, Sadler, Simons & Howes, 2005) and that it lacks a theoretical framework (Sadler, 2004b). Thus, it is suggested that STSE be remodeled and improved by focusing on one important component -- each student’s moral and ethical development -- to increase students’ ethical, individual, and social responsibility (Zeidler et al., 2005). SSI covers the issues all that STSE includes as well as its missing parts such as considering the ethical dimensions of science and the moral reasoning of the student (Zeidler Walker, Ackett, & Simmons, 2002, p. 344).

The integration of SSI in formal or informal learning environments is emphasized as an important concept in numerous studies across the world (Chang, Wu, & Hsu, 2013; Eggert & Bögeholz, 2010; Sadler, 2004a; Powell, 2014). The role of SSI in the science classroom is highlighted as:

[Socioscientific issues] are usually controversial in nature but have the added element of requiring a degree of moral reasoning or the evaluation of ethical concerns in

30 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/use-of-the-see-sep-model-in-preservice-science-teacher-education/261679

Related Content

Peer Assessment as a Facilitating and Assessment Strategy in Online and Face-to-Face Classes

Sang Joon Lee and Kyunghin Kwon (2021). *International Journal of Online Pedagogy and Course Design* (pp. 36-48).

www.irma-international.org/article/peer-assessment-as-a-facilitating-and-assessment-strategy-in-online-and-face-to-face-classes/279100

Online Education: Influencing Teachers' Perception of Professionalism

Roofia Galeshi and Hamid Reza Taimoory (2019). *International Journal of Online Pedagogy and Course Design* (pp. 1-17).

www.irma-international.org/article/online-education/236165

Raising Conscious Kids: A Community-Based Approach to Anti-Bias Education

Ronda Taylor Bullock (2019). *Creating Caring and Supportive Educational Environments for Meaningful Learning* (pp. 222-229).

www.irma-international.org/chapter/raising-conscious-kids/212258

A Technology-Acceptance-Model-Based Study of the Attitudes Towards Learning Management Systems Among Teachers During the COVID-19 Pandemic

Tahani I. Aldosemani (2023). *International Journal of Online Pedagogy and Course Design* (pp. 1-22).

www.irma-international.org/article/a-technology-acceptance-model-based-study-of-the-attitudes-towards-learning-management-systems-among-teachers-during-the-covid-19-pandemic/325240

Developing Asynchronous Online Discussion Boards to Increase Student Engagement and Learning

Marla J. Lohmann and Kathleen A. Boothe (2020). *Handbook of Research on Developing Engaging Online Courses* (pp. 134-151).

www.irma-international.org/chapter/developing-asynchronous-online-discussion-boards-to-increase-student-engagement-and-learning/247824