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Mathematics education philosophies of mathematics teacher educators

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Introduction

The philosophy of a field is its rationale or purpose. Thus, the simplest expression of the philosophy of mathematics education is concerned with the underlying purposes and justifications for the process of mathematics education (Ernest, 1991). Following three questions to reveal the theoretical components and conceptual structure of the philosophy of mathematics education: Is it the application of philosophy to mathematics education? Is it the application of philosophy of mathematics to mathematics education or to education in general? Is it the application of philosophy of education to mathematics education? (Brown, 1985; Cochran, 2010; Ernest, 1991; Jankvist & Iversen, 2014)

In this sense, this study aims to determine the mathematics education philosophies of Turkish mathematics teacher educators. One of the main aims is to define mathematics educators' philosophies of mathematics education based on variables such as their beliefs, attitudes, and ideologies about mathematics, education, and mathematics education. So, the study also aims to provide an overview of the philosophy of mathematics education. In this context, the results of this study, from the perspective of mathematics teacher educators, the theoretical background of the philosophy of mathematics education/philosophies, its components, its meaning, which questions it seeks to answer, how it answers them in theory and classroom practices, etc. It targets to create awareness about the subject and bring a new approach to teaching environments and processes.

Method

Grounded theory design was used to reveal the theoretical structure of mathematics education philosophies of mathematics teacher educators (Bryant & Charmaz, 2019). The educators in the participant group were determined using the theoretical sampling method, one of the purposive sampling methods. The current research participants are 11 mathematics education educators working in different universities in Turkey. The number of participants was based on the saturation of the data.

Data were collected from the educators by semi-structured interview method. The form used in the interviews consists of open-ended questions within the scope of the philosophy of mathematics, philosophy of education, and mathematics education (learning-teaching) based on the literature on the philosophy of mathematics education. Data analysis begins after the grounded theory design collects the first data. The current study analysed the interview data with the constant comparative analysis method. In this grounded theory, data is open, axial, and selective coded through a systematic design process. It thus emphasizes the development of a logic paradigm or a visual picture of the generated theory.

Results

A theoretical structure of the participants' philosophy of mathematics education was formed by three main elements: education, mathematics, and mathematics education. The statements of the educators, who are the current study's participants, about the education axis, are explained with the categories of nature of education, individual development, and social development. Mathematics was explained with the categories of objective knowledge and subjective experience knowledge. The axis of mathematics education was explained with the categories of learning mathematics and teaching mathematics. Results of all analyses revealed that Turkish mathematics teacher educators' mathematics education philosophies were categorized into four different groups: progressive mathematics educators, existentialist mathematics educators, pragmatist mathematics educators, and humanist mathematics educators.

Discussion

The mathematics education philosophies of the instructors were examined on three axes: mathematics (philosophy, nature), education (nature), mathematics education (process), and embedded theory was revealed. These axes show parallelism with the conceptual frameworks developed by researchers on the philosophy of mathematics education in the literature without being based on data (Blair, 1981; Brown, 1985; Ernest, 1991). In the present study, different from the previous social groups, the existentialist mathematics educator social group emerged.

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