Secondary Pre-service Teachers’ Understanding of the Concept of Inverse Function

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Research Apprenticeship Report Abstract

The importance of the concept of function in the school curriculum has gained considerable attention from mathematics education researchers. Evidence shows that there is limited research in the area of how secondary pre-service teachers understand the concept of inverse function. This research study reports the findings obtained in a qualitative study that examined the content knowledge of 10 secondary pre-service teachers regarding the concept of inverse function. The 10 pre-service teachers (four at the master’s level and six at the undergraduate level) who participated in this study were enrolled in a secondary teacher education program. All of the 10 participants completed five questionnaire tasks and eight of these participants participated in task-based interviews. The data were analyzed using Even’s (1990) theoretical framework and Hiebert’s (1986) notion of procedural and conceptual knowledge. The findings showed that these secondary pre-service teachers had misconceptions of the inverse function. They showed strong procedural approaches to the concept of inverse function coupled with serious misconceptions between the one-to-one and onto properties on one hand, and the vertical and horizontal line tests on the other hand. Further analysis of the data showed that inverse function representation was not well understood, and this was complicated by limited understanding of restriction of the domain and finding the inverse function of constant functions. Overall, these pre-service teachers’ conceptual and procedural knowledge of the concept of inverse function were disjointed.