

Mathematics Preservice Teachers' Responsiveness in Microteaching Using 21st Century Skills

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EXECUTIVE SUMMARY

The development of 21st century abilities necessitates satisfying students' needs. Preservice teachers may find it difficult to meet the criteria. Responsive teaching needs to take precedence to effectively meet student needs. As a result, it is essential to consider how preservice teachers view this issue. This chapter first sets to highlight some of the issues preservice teachers face during microteaching in a mathematics classroom. Next, it looks at possible ways to promote responsiveness by using 21st century skills. It further discusses some solutions, suggestions, and recommendations based on the highlighted issues. Specifically, this chapter aims to identify ways for preservice teachers to contribute to teaching mathematics in a more creative way based on their responsiveness in microteaching. Finally, input is provided to educators on how to meet the output of responsive teaching by applying classroom microteaching strategies.

INTRODUCTION

Responsiveness in teaching is a skill that should be made more common for preservice teachers (PSTs). Responsive teaching can be defined as deliberate instruction which prioritises the needs of their students (Burns & Botzakis, 2016). Responsive teaching centralises students' thinking / ideas, elicits and notices students' ideas, listens to their ideas, and uses those ideas to inform adjustment to teachings and even to the curriculum (Gouvea & Appleby, 2022). The instructional goal of responsive teaching is to get the students immersed in the material or content which is being taught. The science, technology, engineering, and mathematics (STEM) education in the twenty-first-century era has necessitated a great deal of feedbacks and responsiveness from preservice teachers. STEM education serves as the foundation for science and technological advancement.

Classroom discussions are commonly engaged in mathematical facts or information only. However, responsive teaching has the potential of engaging discussions to achieve higher levels of intellectuality for both teachers and students such as mathematical reasoning, asking or probing questions, providing justifications, and revoicing students' thinking. Responsive teaching is applicable in mathematics classrooms since it simply means, making students think in the foreground of STEM learning (Gouvea & Appleby, 2022), and making it more common in STEM classes.

Preparing PSTs for microteaching that helps them to gain active and responsive teaching experience, ought to be all-rounded, considering not just the thinking aspect, but also the supportive environment (namely the classroom) for optimum learning. Hence, when preparing lesson plans, PSTs should consider the whole aspect of learning support for students which includes contents, curriculum, pedagogy, environment, and infrastructure.

Objectives of the Chapter

The current chapter focuses mainly on the discussions of mathematics teaching amongst PSTs. The main objective of this chapter is to discuss some key features of responsive teaching by employing thematic analysis in the context of microteaching in mathematics classroom. The chapter also highlights some of the gaps in responsive teaching among preservice teachers in a case study during microteaching in a mathematics classroom. Next, it looks at possible ways to promote responsiveness by using 21st century skills. It further discusses some solutions, suggestions, and recommendations.

RESPONSIVE TEACHING IN TWENTY-FIRST-CENTURY MATHEMATICS EDUCATION

There is a growing demand to strengthen teacher training programmes to adapt in embracing the changing scenario of twenty-first-century education. In this regard, skill development in teacher preparation is a cornerstone for overcoming the current educational challenges (Alahmad et al., 2021; O'Sullivan & Dallas, 2010). Responsive teaching should be made more common in STEM education (Gouvea & Appleby, 2022) in the 21st century education.

The report "21st Century Knowledge and Skills in educator preparation" by Grenhill (2010) calls for educators to incorporate the four Cs of the 21st Century skills into their teaching and learning processes. The 4Cs of the 21st century skills are critical thinking and problem solving, communication, collabora-

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