

## Chapter 15

# Supporting Education in Marginalized Communities With Workshops Combining Music and Mathematics

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### ABSTRACT

*In this chapter, the authors present the experience of a series of workshops given in a marginalized community in Mexico during the COVID pandemic as a mean to mitigate the educational gap lockdowns provoked. The whole intervention consisted of 12 workshop sessions plus a closing activity. The workshops aimed to jointly promote learners' conceptual and procedural knowledge of basic mathematics and develop musical rhythmic awareness and sensitivity in a collaborative problem-solving manner. Seventy children, ranging from 8 to 12 years old, participated in the workshops facilitated by an educational game, namely Musical Monkeys, consisting of a board game and an app. Using an initial evaluation, the authors mapped students' profiles in terms of background knowledge (procedural and conceptual) to form balanced playing teams, including low and high achievers, and to adjust the workshops according to students' needs and levels. The setting, challenges encountered during the intervention, and future research directions are discussed.*

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## INTRODUCTION

Non-traditional mathematical curricula learning activities can contribute towards reducing mathematical anxiety and the achievement gap among students (Tobias & Weissbrod, 1980). Instructional designs that combine music and mathematics for creativity-driven learning experiences could elicit the aforementioned benefits. MusicMath (Roldan et al., 2020) (<https://musicmath.mx/en/home>) is an educational research project that explores how to combine music and mathematics to support learning in basic school contexts.

During summer 2021, in partnership with the Social Responsibility department of HP Inc Mexico, the MusicMath team conducted a series of workshops intending to support elementary students with conceptual and procedural knowledge of basic mathematics and musical rhythmic awareness and sensitivity in a collaborative-problem solving manner. On this occasion, workshops were given in the community of Mezcala de Asunción (Hereafter referred to as Mezcala). Mezcala is a marginalized community in the state of Jalisco facing challenges such as internet connectivity, infrastructure, and economic barriers. COVID-19 pandemic emphasized the latter difficulties due to the forced lockdowns. In response, this series of workshops aimed to support students to better cope with the beginning of the new academic year.

A special edition of the educational game “Musical Monkeys”<sup>1</sup> was designed to facilitate the workshops targeting basic algebraic thinking, geometric literacy, and musical rhythm awareness. Additionally, tuned tube instruments to motivate and engage students while promoting their musicality were used. Regarding collaboration, the Musical monkeys game requires students to play in small teams, and it is an example of a setting where technology facilitates and scaffolds the learning processes (Stahl et al., 2005). As part of the pedagogical strategies in the game, instructors prompt the students to use (or become aware of) collaborative problem-solving skills. It is essential to mention that measuring students’ collaborative skills was not the aim of the intervention and requires further studies.

Since it was the first time the MusicMath team ran a workshop with a marginalized community, this chapter discusses the challenges and eventualities that could not be foreseen in the initial planning. Therefore, the researchers elaborate on the following:

1. Educational workshop setting.
2. What challenges can be expected and linked when carrying out educational workshops combining music and mathematics in marginalized communities like Mezcala?
3. Solutions, recommendations, and future research directions.

The rest of the chapter is structured as follows. First, in the theoretical background, the authors present literature from which the educational game draws its pedagogical design and related literature on marginalized communities. Then, the setting of the educational workshop is described, including participants’ general demographics, workshop materials, and protocol. Next, the authors discuss the faced challenges and recommended solutions. Finally, the authors elaborate on the limitations of this educational intervention, propose future work and research directions, and present the concluding remark of the chapter.

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