



STEM Learning in the Elementary Classroom

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Introduction

Education in itself is an ever-changing field focusing on prioritizing student and teacher methods of growth. This change happens in the classrooms, making education research an essential component of improving academia. In the recent decade, the rise and widespread implementation of S.T.E.M. across American classrooms has contributed to a whole new and generalized skillset for students and educators alike. However, S.T.E.M. education fails to root itself in the most impressionable of environments, the elementary classroom. Our study aims to begin the discussion on the impact of early S.T.E.M. education on both elementary students and preservice teachers. In an effort to realize the significance S.T.E.M. instruction plays in developing early academic skills and advocating for its widespread implementation, our team approaches the starting stages of research in order to assess the benefits of science and mathematics instruction during key developmental stages in students' lives.

Methods

- Using a meta-analysis, we examine peer-reviewed articles and academic journals.
- Our study consists of a literature review in which we researched articles and journals to narrow down the results.
- The emphasis of our research was elementary students and preservice teachers with a focus on STEM learning.
- We explored the benefits of STEM learning, preparation to teach STEM learning effectively, and the limitations imposed on the teachers and students.

Primary Findings

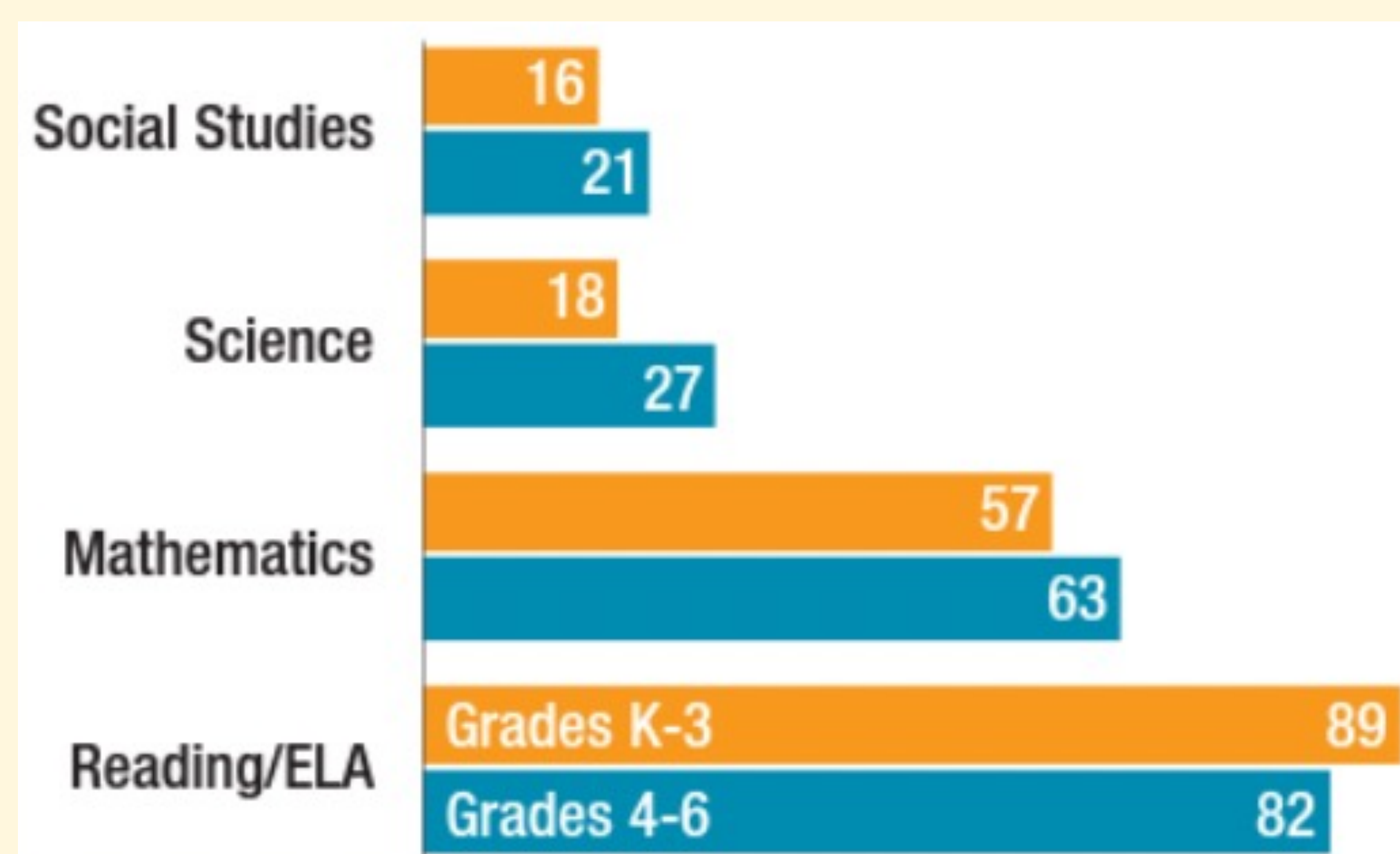


Figure 1. The average number of minutes per day spent teaching each subject. Orange corresponds with grades K-3 while Blue corresponds with grades 4-6 (South Regional Education Board, 2020)

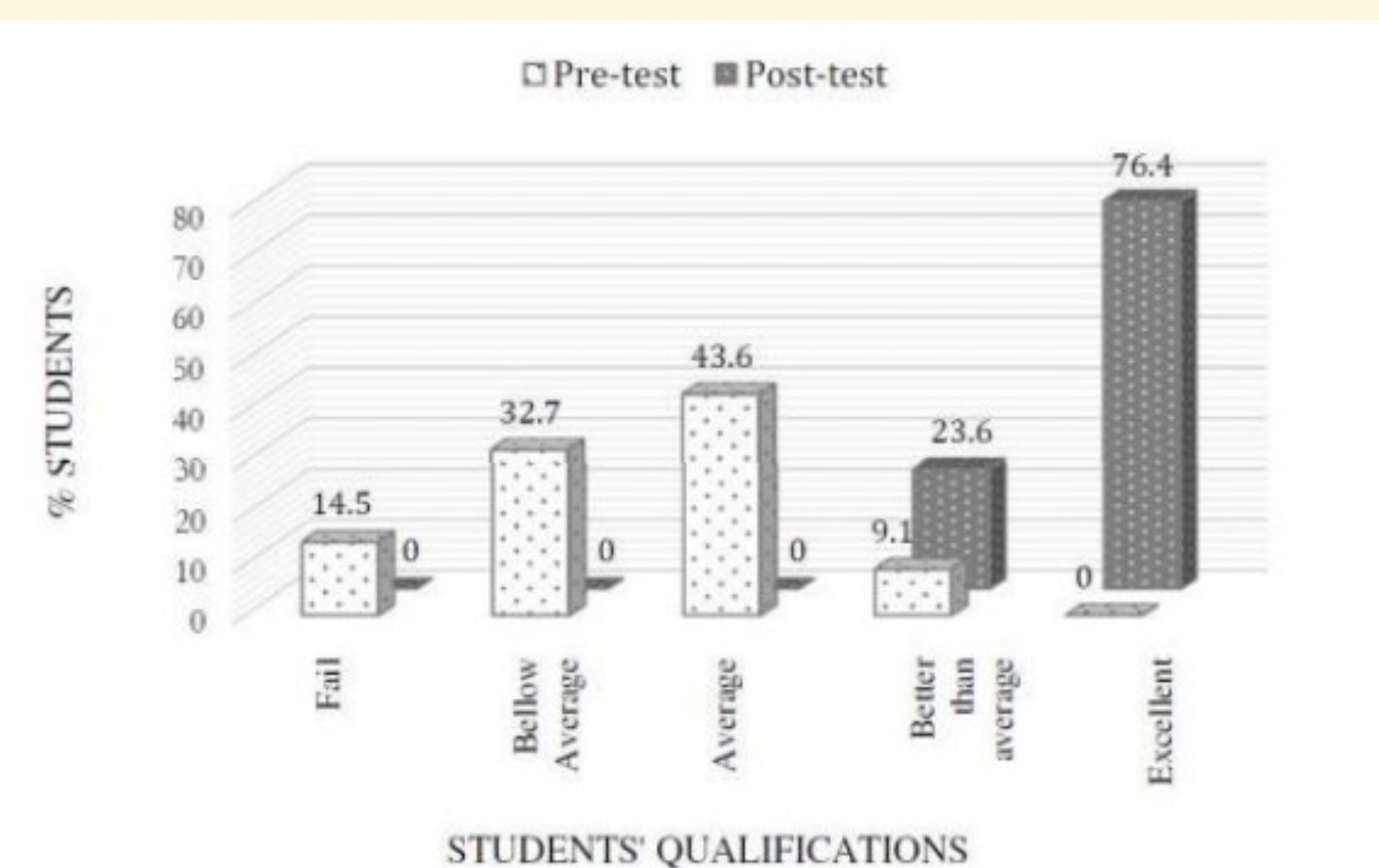


Figure 2. Pre-Test results of traditional science instruction and Post-test results implementing an integrative science model of instruction (Toma et al, 2018)

Primary Findings

Our project continues to be an ongoing research development, but through a literature review we can identify preliminary findings. As of recent and thorough analysis of research already conducted in the field, it is evident that allocating more time to S.T.E.M. instruction in elementary schools consequently broadens scientific topics in order to drive science achievements in elementary schoolers. Research also indicated a correlation between choosing classroom topics based on student interest and cultural relevance (Bell et al., 2017), as this approach was more likely to engage students in the work. Similarly, allocating more classroom time to teaching science and math reportedly drove science achievement in elementary-aged students (Curran & Kitchen, 2019). Adjustments as simple as raising math instruction by 100 minutes a week grew the standard deviation of student achievement in the subject by 0.017 (Curran & Kitchen, 2019). Teacher content knowledge was also deemed a key component of successfully conveying S.T.E.M. instruction to younger classrooms of students (Durrance, 2020). Of surveyed teachers, only a reported 31% felt comfortable and knowledgeable enough in science as a subject, compared to a 77% comfort rate for ELA (Durrance, 2020).

Discussion

- Benefits of STEM learning include curiosity about the natural world, preparation for STEM-related careers, and the development of foundational literacy and numeracy skills
- Limitations of STEM learning in
- STEM learning should be daily interactive instruction that builds interest in the students as well as incorporates inquiry-based learning
- include inadequate time for instruction, teachers feeling heavily unprepared to instruct STEM teaching, and outdated resources for the students.
- Implications of the study involve teaching programs to help prepare preservice teachers to implement inquiry-based learning.

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