



Rethinking Circle Time: Development of K-2 CT Literacy Integrated Curriculum

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ABSTRACT

Students can begin to lose interest in CS as early as 2nd grade, indicating the importance of engaging students in CS as early as possible. This study examined the integration of computational thinking (CT) into literacy activities in early childhood education (K-2). We describe the co-design process of developing computational thinking literacy integrated curriculum for K-2, and preliminary results of K-2 student engagement in CT and literacy activities.

1 INTRODUCTION

Stakeholders have expressed the importance of integrating CT into K-2. There is a lack of information on which content and methods are most effective in engaging early elementary school students in CT. Early childhood teachers especially struggle with teaching CT due to lack of content knowledge, ready-made curriculum, and the overburdened mandated requirements of math and literacy. K-2 education focuses heavily on literacy. Most states require 90 minutes of literacy work daily. K-2 teachers have suggested literacy as an ideal area to integrate CT, as they are confident in teaching literacy. When teachers are confident in a subject area, they tend to be more likely to try innovative approaches. Many CT concepts align with literacy standards (e.g., retelling, pattern recognition of words). There have been a few studies showing that when CT was integrated into K-2 literacy instruction, students showed higher achievement gains in both literacy skills and programming practices.

2 DESCRIPTION OF RECT CURRICULUM

This design-based research project sought to understand models of integrating computational thinking and literacy in K-2 classrooms. In this project, we deconstructed CT into several concepts. One CT concept was sequencing, which has a clear beginning and end, and

follows specific logic. There are eight primary tasks developed by the project team to elicit student understanding of sequencing. Each primary task is coupled with a secondary task that covers the same concepts but is contextualized within a literacy context. Each task has multiple versions (e.g., unplugged, embodied, computational toys, and ScratchJr). While developing tasks, the co-design team piloted tasks with nine K-2 students and shared feedback. Teachers' feedback was actively reflected in improving tasks.

3 RESULTS

Findings from pilot task interviews showed that K-2 students used numerous strategies and approaches to complete computational thinking tasks. Results showed that contextualized literacy activities assisted students with the sequencing task; younger students were able to accomplish more advanced sequencing due to the literacy context. In addition, the literacy elements seemed to engage students more and led to self-correction and debugging without prompting or scaffolding from the researchers. In terms of co-design, as teachers saw their feedback positively impacted the curriculum design through several meetings. The teachers also described the curriculum as engaging and made suggestions such as utilizing stations to increase student choice and engagement.

4 CONCLUSION

CT literacy integrated curriculum offers significant promise for K-2 students to engage in CT early, as well as an effective mechanism for teachers to integrate CT into an already over-scheduled school day. This poster will present our co-design process for developing CT literacy curriculum, as well as lessons learned as we explored integration CT into K-2 literacy classrooms.

ACKNOWLEDGMENTS

This project was funded through the National Science Foundation, Award Numbers: (IU) 2122785, (PU) 2122736, (IAS) 2122742

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SIGCSE 2023, March 15–18, 2023, Toronto, ON, Canada

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ACM ISBN 978-1-4503-9433-8/23/03.

<https://doi.org/10.1145/3545947.3576338>