Code with Chompers: Computing Outreach Program for K-6

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ABSTRACT

Insufficient K-12 computer science education remains a significant challenge in the United States, with only about half of high schools offering computer science courses and exposure to computing in K-6 severely lacking. This paper presents the groundwork for a systemic approach to K-6 computing education, leveraging partnerships between Allegheny College and Crawford Central School District. The "Code with Chompers" program aims to address gaps by providing consistent, hands-on computational learning experiences for elementary school students.

CCS CONCEPTS

• **Social and professional topics → Computing education programs**.

KEYWORDS

computational thinking, outreach, coding, K-6, elementary school

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1 INTRODUCTION AND BACKGROUND

Despite growing demand for computing skills, access to computer science education remains limited in U.S. K-6 schools. Early exposure is critical to dispelling misconceptions about the field and fostering interest, particularly before middle school when students often form long-lasting perceptions. Childhood experiences have also been shown to influence career choices later in life [3]. The National Research Council has emphasized that computational thinking skills are essential not just for programmers but for everyone [2], as they enhance problem-solving and cognitive abilities. Studies also demonstrate that lessons in computational thinking improve student response inhibition, planning, and coding skills [1].

Over the years, Allegheny College has collaborated with Crawford Central School District to deliver engaging computing events such as Robot Mania, Festival of Robots, Fall in Love with Computing, and outreach workshops. This effort has provided computing exposure to over 400 K-6 students annually through school visits and community events. It has also engaged over 300 middle and high school students through enrichment programs and classroom demonstrations. These events, though impactful, occurred sporadically, typically reaching students only a couple times per year. Building on this foundation, Allegheny College's Computer and Information Science (CIS) department established the "Code with Chompers" program to systematize and expand these efforts.

2 CODE WITH CHOMPERS

Starting with a feasibility study in May 2024, we examined Pennsylvania's elementary education standards and consulted with the curriculum office of our local school district to align our work with existing guidelines. Based on this research, we developed an initial set of computational activities, incorporating unplugged exercises, software-based coding lessons, and robotics-focused activities. These activities were piloted during a two-week summer coding camp in 2024, which attracted over 50 K-6 students. Feedback from the camp sessions informed iterative improvements, resulting in a revised and expanded set of hands-on, grade-appropriate activities aligned with the instructional materials used in local elementary schools.

During Fall 2024, we partnered with the local school district to identify two elementary schools for a semester-long pilot program. Weekly computational sessions were conducted during students' library periods, with selected activities balancing breadth and depth in computational thinking. This approach provided regular exposure to foundational skills, building enthusiasm for and basic competency in computing.

To prepare for broader implementation across all five local elementary schools starting in Spring 2025, we created training resources for the "Computing Outreach Fellows", a group of Allegheny College CIS students joining the program. These materials emphasized both technical and pedagogical skills, ensuring that the fellows could effectively engage young learners. A detailed schedule

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was established to support consistent weekly visits, promoting sustained engagement and fostering relationships with educators and students.

Additional project deliverables included the creation of a website (https://codewithchompers.com) to host resources such as activity guides and an interest form for teachers. These efforts, combined with logistical and curricular coordination with local schools, have established a foundation for the long-term growth and sustainability of computational education in the community.

2.1 Conclusion

By building on established partnerships and programs, the "Code with Chompers" initiative aims to transform sporadic engagement into a systemic, sustainable approach to K-6 computing education. This work not only addresses a critical gap in early computer science education but also serves as a model for other institutions seeking to create impactful community partnerships in computational outreach.

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