A Longitudinal Study Exploring Autistic High Schoolers' Interests in CS

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Abstract

Soon, there will be a global deficit of technology workers. We aim to increase the number of technology workers by motivating and helping autistic high school students prepare to build their own unique paths in the field of computer science through a summer game coding camp. In this idea paper, we propose a longitudinal study to evaluate autistic students' interests in computer science over time. With this information, we will be able to update our summer game coding camp's curriculum to reflect and teach aspects interesting to autistic students to prolong their interest in computer science.

Introduction & Background

By the year 2030, it is expected that there will be a global deficit of 85 million tech workers [1]. The main goal of this research proposal is to address this upcoming struggle of ICT firms to meet their talent needs by broadening participation in computer science (CS) to those with autism spectrum disorder (ASD). ASD is a lifelong neurodevelopmental condition that has a significant impact on an autistic person's daily life.[1] It can be characterized by cognitive styles, communication behaviors, social interactions, and repetitive behaviors. Though these styles vary widely across autistic people, they are often conspicuously different than those of non-autistic people [2]. As of 2021, the CDC reported that 1 in 44 children in the United States are diagnosed with ASD [3], an increase from 2020 where 1 in 54 children in the USA were diagnosed [4] [5]. Only 17% of them enroll in four-year colleges and only 39% of those graduate [6], leaving over 5.5 million autistic individuals out of the educational opportunities required to obtain tech jobs in the future. As an indicator of the poor situation, recent studies estimate that only 14% of autistic adults work for pay [7]. If we could prepare those left behind for careers in STEM, we could make a significant improvement in the future supply of tech workers.

Research Design

The main vehicles of our educational pedagogy are informal learning opportunities in coding camps, hackathons, or game jams. Over the last 10-15 years, many organizations have offered summer coding camps for children and teenagers [8] which provides volunteer opportunities for students to explore domain-specific programming activities [9] [10]. They also offer a great deal of autonomy for students to engage as deeply with the material as they wish [11]. This kind of informal learning is opportunistic, unstructured, and self-directed, and can be incredibly motivating due to its strong connection to a student's interests and activities [8].

With this knowledge, we ask the following research questions (*RQs)*:

[1] It is important to note that in the autism community, some people prefer people-first language. However, others have embraced the term "autistic" as their preferred label. In this proposal, we use this latter terminology [13].

RQ_1: How can a summer game coding camp for autistic high schoolers impact student interest in CS throughout the next few years of their lives?

RQ_2: Can a summer game coding camp influence autistic high school students' future career goals?

Following our *RQs,* we propose a longitudinal study to identify autistic individuals' interest in CS over time. Currently, we provide autistic high schoolers with the opportunity to learn the basics of game design and programming in our summer camp [8] [12]. Through this camp, we aim to improve autistic high schoolers' self-efficacy through designing and implementing their own videogames. An additional goal of this camp is to help autistic high schoolers gain interest in CS by giving them the tools they need to create their own videogame.

For this research study, we plan to conduct a longitudinal study with our summer campers to identify if their interest in CS is maintained after they leave our camp. By CS interest, we mean that students' future intentions and plans, i.e., college plans and predicted future careers, continue to be CS-focused. We plan to conduct this study by surveying our students about their CS interests – if they have any plans to pursue CS in college or careers – before our camp starts, after our camp concludes, and for up to 10 years afterwards until they obtain their first job outside of school.

With this information, we will be able to tailor our camp to incorporate aspects of CS that former students missed, such as instructional or conceptual holes in our curriculum. Through this study and subsequently modifying our camp's curriculum, we will be better able to understand why students leave the CS field and determine what aspects of CS curriculum need to be updated to be more inclusive; this will, hopefully, provide future students with the tools and interests necessary to maintain an interest in a CS career, increasing our supply of tech workers.

Conclusion

We expect that through this proposed longitudinal study, we will be able to identify where autistic high school students gain and lose interest in CS. With this knowledge, we will be able to update our summer camp curriculum to help increase students' confidence in CS skills and to retain students' interest in CS after our camp and throughout high school. With this prolonged interest, students will be motivated and able to carve a path for themselves in the CS industry, which, in turn, will increase our supply of tech workers.

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