BRANDON UNIVERSITY

RESEARCH CONNECTION

Students teaching students coding with Scratch

By Mike Nantais, Ph.D., Matteo Di Muro, Ph.D. Student, & Eleni Galatsanou-Tellidis, M.Sc.

What you need to know

Coding and computational thinking (CT) are making strides into K-12 education; many jurisdictions around the world and across Canada now include coding in the curriculum. One Brandon high school teacher decided to have his Computer Science students create and deliver lessons in coding to area middle school classes. This project looked at some of the results.

Why this research is important

Coding and CT have gained prominence over the past several years not only for its career potential but also for the development of thinking skills and for a deeper understanding of the digital devices that have become so common. Aspects of CT have been mandated in several countries and provinces, including B.C., Nova Scotia, New Brunswick, and recently, Ontario. Initiatives such as the *Hour of Code* have also become popular, and Manitoba Education has been promoting the implementation of CT. One challenge in implementing coding and CT is that many teachers lack the background to do so.

This project is one attempt to introduce coding to young students and their teachers.

How the research was conducted

Middle school teachers were approached by the high school teacher and asked if they wished to take part in the coding lessons. Over one and a half years, five different grade 7 and/or 8 classes took part. For each teaching cycle, five to eight high school students formed the teaching cadre. These students met to discuss and develop the Scratch lessons, which were then delivered in approximately eight, one-hour lessons spread over several weeks. Scratch, a visual, block-based programming language developed at

MIT, was used due to its popularity and ease of use. The data for this study was collected in order to obtain the perspectives of the various groups involved. Data was gathered through pre and post instruction surveys of both high school students and middle school students via focus groups held with both groups of students after the lessons were completed, interviews with middle school teachers, and classroom observations by the researchers.

What the researchers found

One key takeaway was that this project provided a way to introduce teachers without a computer science background to coding and CT. Indeed, this was one reason why some teachers took part. Based on the data collected, this project was a successful way to introduce younger students to coding and CT in a fun, non-threatening environment. It has led, in some cases, to further or continued interest in coding.

Other benefits included student engagement, developing collaborative skills, algorithmic thinking, communication skills, and critical thinking. In some cases, the project helped high school students solidify an understanding of Computer Science concepts and helped them develop skills in planning, problem-solving, and communication. A future study that utilizes some form of pre and post assessment of CT skills would help build and further clarify these findings.

How this research can be used

This project, from our review of the literature, is unique and can be easily adapted for use in other jurisdictions as a way to introduce young students, and their teachers, to the concepts of coding in a friendly environment.

About the researchers

Mike Nantais is an Associate Professor in the Department of Curriculum and Pedagogy in the Faculty of Education.   NantaisM@BrandonU.CA

Matteo Di Muro is a doctoral student at the University of Regina and works for Brandon School Division as the Education Technology Specialist.

Eleni Galatsanou-Tellidis is a high school Mathematics and Computer Science teacher in Brandon. Eleni obtained her B.Ed. at Brandon University and has an M.Sc. in Mathematics.

Keywords

Coding, computational thinking, K-12 education, computer science, Scratch

Publications based on this research

Nantais, M., DiMuro, M., & Galatsanou-Tellidis, E. (2020). *Students teaching students: Introductory coding using Scratch*. Manuscript submitted for publication.

Acknowledgements