Integrating Lynx Coding and Mathematics

Team Members:
Sarah Clowes (TELT) , Lena Stahl (Math Learning Lead), and Peter Kutok (Math Facilitator)

School District: Superior North Catholic DSB

What We Did

The OTF Project Leads, Math and TELT Team, presented the OTF Coding project to all Grade 5 - 8 teachers through the spring 2020 Professional Learning Group Meetings. Classroom educators who were interested in participating in the project were asked to sign up. There were eight classrooms that signed up to work with the Math and TELT Team to learn text based coding through Lynx. The Math Team and TELT reached out to Lisa Anne Floyd to support the SNCDSB Educators learning Lynx coding. Lisa Anne guided the project team as to what resources to include in the educators' resources and what activities needed to be completed prior to delivering the synchronous, virtual coding lessons.

The Math and TELT Team created a Lynx Coding resource box for each classroom educator participating in the project. The boxes included all the **Lynx Activity Cards**, **The Art of the Lynx** challenges, Race Simulation Coders, Video Game Coders' and Story Coders' resources, a SNCDSB Teacher Project Guide, **Getting Started with Lynx Guide**, and a SNCDSB Student Lynx Coding duotang for each student in the classroom.

The SNCDSB Teacher Project Guide included the sequenced **Topic 'Activity Cards'**, Project Schedule, **Curriculum Connections**, and **Single Point Rubric** for each student for assessment. The student duotang included the **List of Lynx Primitives** and a **Lynx Coding Chart**.

The Math and TELT Team met with each classroom educator during their preparation time to set up their Lynx Club Member account and deliver two lead up lessons to each participating classroom. Each classroom educator participating in the project was provided with a ½ day release to watch the **Lisa Anne Floyd Coding in the Classroom Webinar**, review the Lynx Coding resource box and begin learning the Lynx Coding platform with the OTF project leads.

Lisa Anne Floyd created and delivered three learning sessions each day to the eight participating Grade 5 - 8 classrooms on November 19, December 10, December 17, 2020 and January 10, 2021. The sessions were delivered to students and educators via Zoom. Each session was recorded for future use. The lessons were scaffolded to students and integrated multiple mathematics strands in addition to the coding expectations. Lisa Anne also modeled how coding can be assessed by using tools such as Google Docs and Kahoot, and how to create paper based quizzes.

- **November 19** Making an Interactive Drawing Program with Buttons in Lynx
- **December 10** Drawing 2D Shapes and Cool Images with Lynx (Connecting Spatial Sense and Coding)
- **December 17** Holiday Designs - Spirals and Many Squares & Making an Interactive Christmas Card in Lynx
- **January 10** Debugging Shapes and Coordinate Grids in Lynx

A final reflection lesson will be delivered throughout the month of March to encourage students to consider their learning journey exploring text-based coding. Educators will be provided with a **Learnx.ca Math+Coding+Making subscription** and a copy of the **Invent to Learn resource** to support their learning and integration of coding into the classroom.

What We Learned

- **Enlisting Expert Help:** The beginning of our learning journey was enlisting the services of Coding Expert, Lisa Anne Flyod. She was vital in helping us break down the project into manageable chunks and see how we could integrate the various strands of the new Ontario Mathematics Curriculum. Lisa Anne modelled how to scaffold the project in a way that would meet our learning needs and that of the educators and students. She did this by demonstrating new code multiple times while building in high ceiling opportunities for learners ready to expand on what they learned. Lisa Anne also connected us to additional resources and experts to support our learning with Lynx as facilitators (i.e. connected us to the Lynx creator, shared the Lynx activity cards, shared books like Learnx.ca's Math+Coding+Making).
- **Boardwide Project Facilitation:** As a team, we learned a lot about how to facilitate a boardwide project that would impact five schools at once, with multiple classrooms and teachers. In the fall, the pandemic required us to pivot the project from in person learning with the Lynx platform to a virtual set up for most sessions. We had to find creative ways to overcome challenges like being able to see student Lynx programs live-time by setting up Google Docs for students to share code to be viewed by others. Troubleshooting played a key role in assisting all participants with technology and the Lynx platform. The skills we learned from facilitating this project have been applied to other opportunities within our board since (i.e. Math PD Days, Experiential Learning Projects).
- **Coding with Lynx (text based coding) & Transferable Skills:** As facilitators with different ranges of coding experience, there were transferable skills that emerged for each of us in using Lynx Coding. Sarah Clowes had previous knowledge of the program as part of Hacker Gals whereas Peter Kutok and Lena Stahl had little to no experience with any coding platforms, especially Lynx coding. The coding skills we acquired allowed us to see connections to other coding platforms being used within our board such as Scratch / Scratch Junior, Micro:bits, Hour of Code resources and CS First resources.
- As a Project Team, we decided to further recruit Lisa Anne to present in a series of grade-targeted Professional Development days on the New Mathematics Curriculum. She developed half-day presentations specifically on the coding expectations for each grade and how they can be addressed using various Coding Platforms including Lynx (junior/ intermediate only). These were a great success in helping all our educators understand how to engage with and teach using various coding platforms and how the knowledge from one platform can transfer to that of another. The wealth of knowledge we have acquired as professionals and as a system support team is huge! We are significantly more aware of the coding expectations in the curriculum and how to integrate them in an impactful and meaningful way in the classroom across the board. In the process we have also given this learning opportunity to each of our teachers (K-8 and Special Education), as well as our Principals and Superintendents. All of these opportunities and learning has stemmed from this project and the learning journey it gave us.
- **Coding Integration Between Math Strands:** A large part of the Lynx Coding journey was its ability to integrate so many of the other strands of math. Lisa Anne helped us make connections to SEL Skills, Number Sense (i.e. operations), Algebra (i.e. patterning, coding, mathematical modelling), Spatial Sense (i.e. 2D shapes, angels, area, perimeter, measurement) and Data (i.e. probability). Lynx showed its capabilities in being a vessel for many curriculum expectations using an open-ended learning model. As a team, we also liked the connections it had to other curriculum areas such as language, science, social studies, and the arts.
- **Co-learning:** We were very blessed to have the opportunity to be the facilitators of this project while also being co-learners. Recruiting Lisa Anne to teach us as a board allowed us to follow along during lessons and work on the Lynx Coding platform alongside our teachers and students. We shared their experience of successes, challenges and frustrations as we also navigated how to interact with Lynx Coding. We think this was the most powerful part of the experience as it always allowed us to reflect and debrief as a team to better serve us all as learners. We built and redesigned lessons and components of the learning with Lisa Anne to ensure that everyone's needs were being met. If we would not have had the opportunity to learn alongside all of the participants, our understanding of Lynx and it's integration into the mathematics classroom would have been significantly limited to a narrow lens.

How We Shared Our Learning With Others

- **Virtual and In Class:** The delivering of our lessons was a combination of both virtual and, when possible, in class. Because our Board is so large geographically and Covid restrictions curtailed our travel, the virtual lessons allowed us to deliver coding to all our school communities. It also allowed members of the team to be able to support the virtual lessons in person when they were delivered in our homeschools. By being able to support the same lesson more than once, it improved our approach to troubleshooting when students hit roadblocks.
- **Supporting Teachers in their Lessons:** Because the idea of teaching coding is new to teachers, being able to work alongside staff in planning and delivering lessons allowed for a less stressful experience for teachers who may not understand how to go about teaching the expectations around the area of coding using platforms such as Lynx. By taking the guesswork out of interpreting these expectations, teachers were better able to engage in these lessons without the anxiety of thinking that they are not teaching what they are supposed to.
- **Professional Development Days:** As well as supporting teachers "at the elbow", a series of professional development days were organized for teachers specifically targeted to their grade levels. In this way, teachers could delve deeper into their specific expectations with respect to coding and gain a greater understanding of how these expectations can be understood and taught. An expert was brought in to guide intermediate teachers through the Lynx coding platform and how they could be used to address the coding curriculum.
- **Preparation of Coding Kits:** The team also met in October and prepared Lynx coding kits for the teachers involved in the project. These kits consisted of all the materials they would need to deliver the coding activities. By preparing the kits, it was hoped that teachers would have a more positive experience when it came to teaching the lessons as a lot of the prep work was already done for them.
- **Resource Suggestions / Sharing:** The team also made sure that the teachers had access to resource materials that would aid them in their exploration of coding. Digital files were set up containing links to various sites that could support the teaching of coding. Licenses and books were also purchased and professional reading documents were also suggested to teachers to help them improve their understanding of coding. The team also reminded teachers that they were available at any time to help support them in their planning and delivering of future coding lessons.

Links to Our Work

Lesson Plans

SNCDSB **Lesson A** - Coding and Careers
SNCDSB **Lesson B** - Creating a Student Lynx Account & Getting Started
SNCDSB **Lesson C** - Final Student Reflection

Blog Posts

SNCDSB receives Coding Connections Grant from Ontario Teachers Federation
Canada Learning Code Week
Math and Coding Professional Development for SNCDSB Educators
Small but Mighty Superior North supporting Northern Ontario Rural Students