Computer Science and Literacy at Overton Public School:

A Scope and Sequence

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EDU 6740 – Capstone Project

The College of St. Scholastica

Full document

Scope and sequence

Project Overview

- Consider the current context of all technology instruction at Overton
  - Who teaches technology curricula? Which students receive it? How much instructional time is allotted at each level? What do students learn in these courses?
  - Evaluate whether this context can be optimized to include all of the same learning targets with the addition of a full computer science curriculum.
- To develop a rationale for proposed changes, conduct research of three technology learning domains: digital citizenship, computer literacy, and computer science.
  - Determine the importance of including each domain in the curriculum.
  - Show examples of successful implementation case studies.

Project Overview

- To aid the construction of a new, customized scope and sequence document, conduct research of representative learning targets (standards), learning materials, and teaching methods of each technology learning domain.
  - Settle on the specific learning targets to be assessed and suggest learning materials and teaching methods that promote an equitable and well-rounded technology education.
- Using the research findings, build a scope and sequence document that clearly shows which learning targets should be achieved and when.
  - For a scaffolded progression, utilize the Introduce, Reinforce, Master methodology.
  - Denote which learning targets may be integrated in the general curriculum, and can thus receive a relaxed focus in the technology courses themselves.

Context

- Local
  - Overton is a small, rural community in central Nebraska.
  - Overton Public School is a one-building district; 300+ K-12 students and 30 teachers.
- Infrastructure
  - 1:1 iPad Initiative, Chromebook cart, Apple MacBook cart, Windows PC classroom, Apple iMac classroom
  - Teachers use MacBooks, PCs, and iPads for instruction

Context

- Technology faculty

Teacher A: K-4 Technology	Teacher B: 5-6 Computers	Teacher C: 7-9 Computers

- Current course sequence includes 500 hours of technology instruction.
  - K-4 focuses on digital citizenship and computer science with some touch-typing.
  - 5-9 focus on touch-typing and Microsoft Office desktop applications.
  - 5-9 courses do not include any computer science, and struggle to engage students or inspire them to pursue technology-related studies or careers.

Rationale

- A program of study that spans an entire decade should do the following:
  - Increase in rigor as students progress through it, deepening the learning of previously-encountered concepts while probing new aspects of the content area at each level.
  - Pique interest at key points in development to effectuate engagement and self-esteem in the content area.
  - Culminate in a learned body of knowledge and skills that prepares well and encourages students to pursue a career in a field related to the content area if desired.

Rationale

- These guiding resolutions are set forth after analyzing the context through the lens of the research rationale.

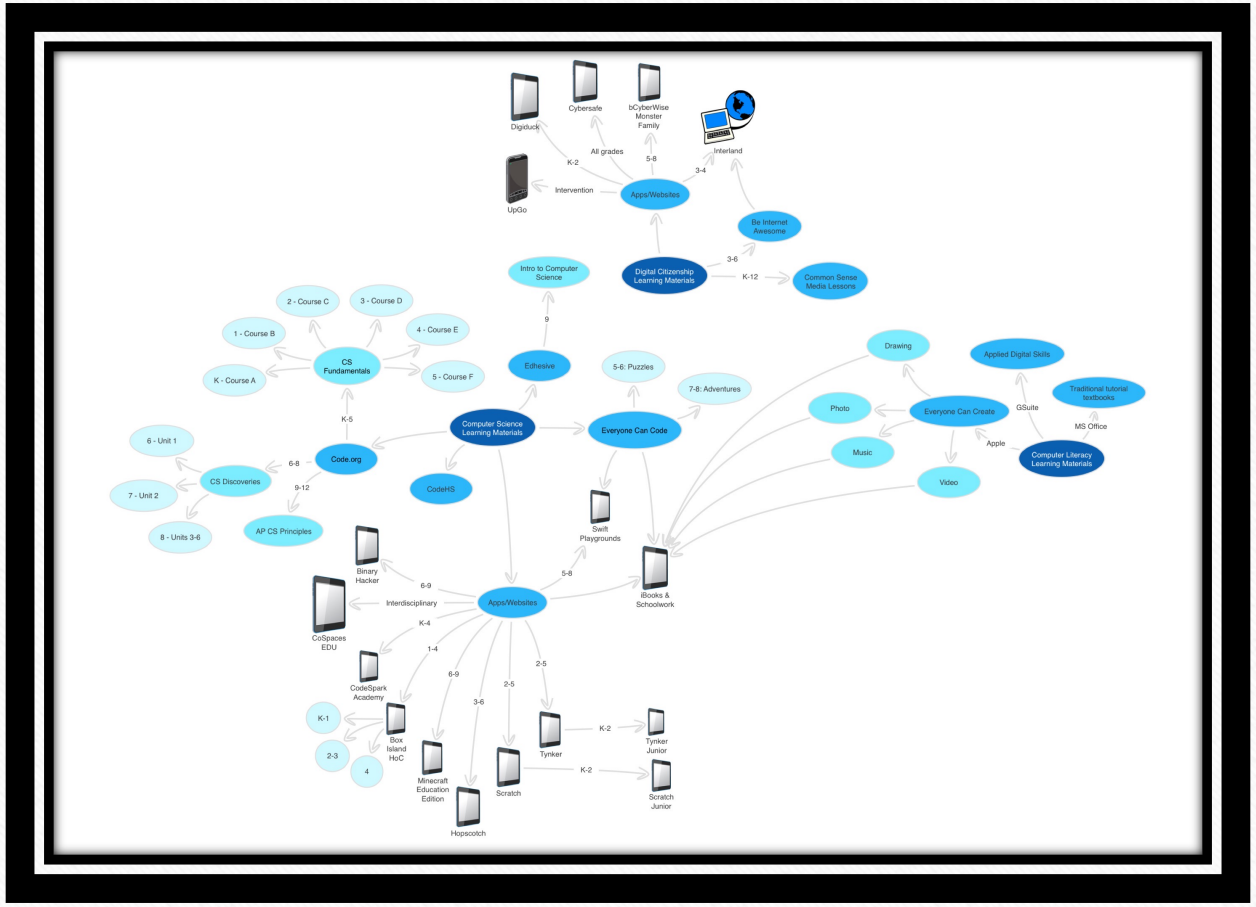
- The technology education program at Overton Public School shall be comprised of lessons, activities, assessments, and experiences in the technology learning domains of digital citizenship, computer literacy, and computer science, as defined herein.
- This program shall be delivered to all students in grades Kindergarten through 9, and shall be compulsory. At all grade levels, students shall receive some combination of instruction in all three learning domains.
- Learning targets shall be derived from a combination of standards documents from both state and national educational organizations as described below.
- The freedom of teachers to design learning programs that enrich or extend these standards, or to select or create their own learning materials to support the same in accordance with good teaching practice, shall not be infringed.
- At all times, in all technology classes, teachers shall be mindful of their own implicit biases that have a tendency to create a less-equitable learning environment for female students and students of color. All learning materials shall be evaluated by the teacher for a propensity to induce stereotype threat or exhibit bias.
- Teachers shall make a good-faith effort to seek out and eliminate reasons that any student might feel unprepared or unwelcome to contribute to the digital society in which they live.

Learning Targets

- Digital citizenship
  - Nebraska K-12 Technology Scope and Sequence
  - ISTE Student Standards (strand 2)
- Computer literacy
  - Nebraska K-12 Technology Scope and Sequence
- Computer science
  - Nebraska K-12 Technology Scope and Sequence (computational thinking)
  - CSTA K-12 Computer Science Standards

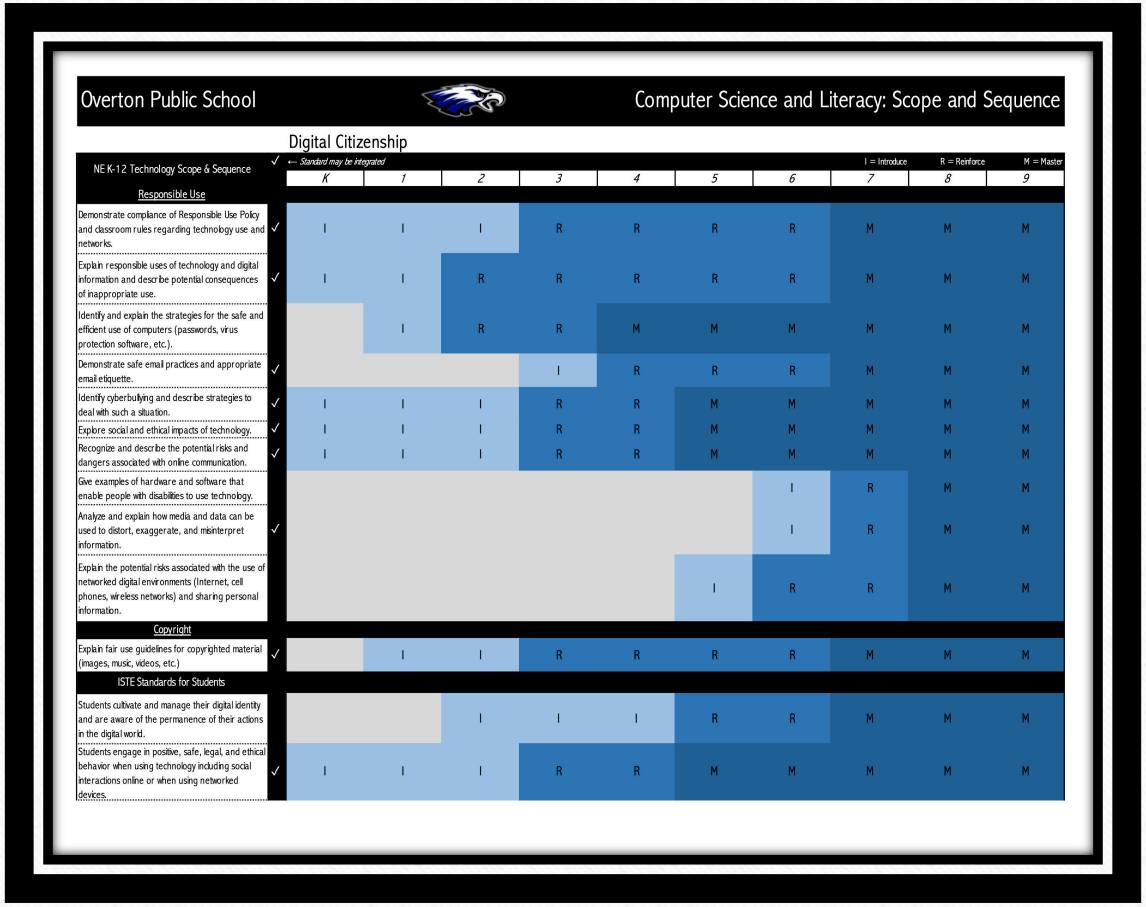
Learning Materials

- This map was a tool used in the rough draft phase to research learning materials for the three domains. The final project contains more learning materials than are shown here.
- This map was created using the Inspiration app for iPad.



Scope and Sequence

- The final scope and sequence is a ten-page document that shows all standards in the new learning program, and maps them to each grade level using the I/R/M methodology.
- The document features check marks to indicate which standards may be integrated in other content areas.



Overton Public School — Computer Science and Literacy: Scope and Sequence

Digital Citizenship

NE K-12 Technology Scope & Sequence	✓	← Standard may be integrated	K	1	2	3	4	5	6	7	8	9
										I = Introduce	R = Reinforce	M = Master
Responsible Use												
Demonstrate compliance of Responsible Use Policy and classroom rules regarding technology use and networks.	✓		I	I	I	R	R	R	R	M	M	M
Explain responsible uses of technology and digital information and describe potential consequences of inappropriate use.	✓		I	I	R	R	R	R	R	M	M	M
Identify and explain the strategies for the safe and efficient use of computers (passwords, virus protection software, etc.).				I	R	R	M	M	M	M	M	M
Demonstrate safe email practices and appropriate email etiquette.	✓					I	R	R	R	M	M	M
Identify cyberbullying and describe strategies to deal with such a situation.	✓		I	I	I	R	R	M	M	M	M	M
Explore social and ethical impacts of technology.	✓		I	I	I	R	R	M	M	M	M	M
Recognize and describe the potential risks and dangers associated with online communication.	✓		I	I	I	R	R	M	M	M	M	M
Give examples of hardware and software that enable people with disabilities to use technology.									I	R	M	M
Analyze and explain how media and data can be used to distort, exaggerate, and misinterpret information.	✓								I	R	M	M
Explain the potential risks associated with the use of networked digital environments (Internet, cell phones, wireless networks) and sharing personal information.								I	R	R	M	M
Copyright												
Explain fair use guidelines for copyrighted material (images, music, videos, etc.)	✓			I	I	R	R	R	R	M	M	M
ISTE Standards for Students												
Students cultivate and manage their digital identity and are aware of the permanence of their actions in the digital world.					I	I	I	R	R	M	M	M
Students engage in positive, safe, legal, and ethical behavior when using technology including social interactions online or when using networked devices.	✓		I	I	I	R	R	M	M	M	M	M

Next Steps

- Solicit feedback from administration and other technology faculty.
  - Should this learning program be phased in, rather than fully adopted immediately?
- Work with technology faculty to decide on which specific learning materials will be selected for use in which courses.
  - Is any professional development to implement new standards, learning materials, or teaching methods?
- Implement and revise as necessary.