Cross-Curricular Technology Integration Curriculum

by

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Curriculum Development

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This curriculum development paper has been examined and approved.

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Abstract

This project reviews the study, development, and implementation of a cross-curricular technology curriculum for grade K-4 within the Pacific Northwest District of the WELS and District 12 of the ELS. The curriculum is designed to be implemented within the current curriculum of a school and not create an additional class. The curriculum aligns all of the ISTE Standards for Students (2016) within core subjects of a normal school's curriculum.

Acknowledgments

I would like to thank all those people and calling bodies that have supported me throughout this process. Thank you to everyone at Lakeside Lutheran High School and Evergreen Lutheran High School for their support and commitment to furthering my education. Thank you to my wife, Kirstie, my daughters, and my entire family for encouraging me and allowing me the time to complete my studies. Finally, and most importantly, I thank God that he has blessed me with the perseverance through this process. Sola Dei Gloria!

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Chapter I: Introduction

Problem/Purpose of the Study

Technology education is a key component of an education that prepares students for a highly technological world where they can serve their Savior. Some schools in the Pacific Northwest District of the Wisconsin Evangelical Lutheran Synod (WELS) struggle to integrate key technology components into the curriculum. This capstone project was an effort to design a cross-subject integration of technology into the regular curriculum of a school for kindergarten through 4th grades, with the intent to add grades 5-8 in subsequent years. It was designed for any teacher to integrate into their curriculum. Most importantly, it equips teachers to prepare their students to use their faith while leveraging technology in their lives.

Importance of the Study

There are K-8 technology curricula that have been created and integrated into schools around the WELS. Many of these curricula recommended an actual class where students are instructed. These curricula were often written to teach skills that are not up-to-date with current International Society of Technology in Education (ISTE) standards. Many WELS teachers do not have the background to update these curricula to meet the needs of students in today's world.

WELS schools have a deep need for a curriculum that is put into simple language for teachers to not only teach but also to keep current as technology changes. The curricular design created for this project will be able to be integrated into the normal core curriculum to instruct students in topics like digital citizenship, word processing,

spreadsheets, videography, digital presentations, computer programming, 3D modeling, and many more topics. This type of curriculum will allow teachers to enhance the learning in these core classes while using technology.

Students leave the WELS K-8 system schools with various levels of technology skills and practices. Integrating these various skill sets into a local WELS or public high school can be challenging. Also, some students are not being taught proper, Christ-centered digital citizenship during their K-8 years which may contribute to misuse of technology later in life. This curriculum will guide teachers in the Pacific Northwest K-8 WELS schools to prepare students effectively for high school and beyond.

Project Goal

This curriculum project provides schools in the Pacific Northwest District of the WELS with a K-4 technology curriculum designed to be integrated into the core curriculum of their schools. In addition, the curriculum aligns with the ISTE Standards as well as the Educational Technology Learning Standards of Washington State. This curriculum is written for schools in Washington, but could be used throughout the WELS in any of the K-8 schools.

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Chapter II: Literature Review

Literature Review

Integration Struggle to Teaching

Many teachers struggle to integrate technology into their classroom teaching. Rebora (2016) reported that teachers, as a whole, still face challenges in integrating technology into their teaching in transformative ways. Moeller (2011) stated that only 23 percent of teachers surveyed felt prepared to integrate technology into their instruction. Many of these ill-prepared teachers tried to use technology but ran into obstacles or did not have enough time to adequately find a tool that fit the learning needs and goals. Students got the brunt of the obstacles because they did not have an opportunity to utilize technology in their learning, not allowing teachers the many teachable moments that students need in their lives with technology (Moeller, 2011).

Tech Explosion

With the sudden onslaught of technology over the past few decades, teachers are failing to prepare both new teachers and students how to effectively teach digital citizenship within the school curriculum. Pusey & Sadera (2012) reported even teachers born during the 1990s and later do not innately possess digital citizenship knowledge. Many teachers cannot even protect their own information or cannot pinpoint clues of threats to their data. Teachers and administrators were overwhelmed by the digital revolution and failed to proactively create the curriculum necessary to train their teachers and students in digital citizenship. Wong (2015) stated that many administrators find it difficult to fit these important skills into their already packed curriculum.

Magic Bullet

Teachers are often looking for that technological magic bullet to increase student engagement. Dr. Lin Carver (2016) concluded that teachers were looking to increase student engagement, but as a result, failed to use technology to extend learning by evaluating information. This often was the fault of "barriers" that were in the way of the instructors. These barriers were most often equated to the technology knowledge level of the teacher. Once these barriers were torn down, Carver surmised that teachers would then more easily "expand technology usage in evaluating curricular content, increasing student engagement, and differentiating instruction" (p. 115).

Lack of Leadership

One of the largest barriers is that many school leaders are not equipped to encourage technology within their schools in its proper usage. Machado and Chung (2015) highlighted the important role of the principal in the integration of technology in the classroom. Although they felt the topic needs more research, they were able to conclude that the principal oversees the school's mission and vision. Thus, principals deeply impact the correct use of technology in the school's curriculum and classrooms. If the principal is not knowledgeable about technology, then the school will be at a disadvantage for proper integration of technology in the curriculum.

With numerous barriers facing teachers and various ill-equipped principals, many schools fail to intentionally cover the ISTE Standards within their curriculum. The ISTE Standards for Students and the ISTE Standards for Teachers are sets of standards created by the International Society of Technology in Education, updated most recently in 2016. These standards were created to encourage and highlight digital citizenship and raise to

light the fact that students are living in both the physical and digital world. These standards were meant to increase the productivity in teaching and make education better (ISTE, 2016).

Creating curricula to equip teachers and administrators is a solution. However, Wong (2015) reminds us that technology is constantly changing and that curricula need to be living and dynamic. Once teachers incorporate technology effectively, materials and technologies need to "keep up" with the times.

Chapter III: Implementation

Introduction

The curriculum project was designed to fill a lack of technology integration within the associated grade schools of Evergreen Lutheran High School. This section describes how this curriculum was created, the content of the curriculum and the field testing of the curriculum in one of the area schools. The curriculum was specifically designed for the K-4 grade levels to be used within the Pacific Northwest District of the WELS. At Lakewood Lutheran School, where the Kindergarten curriculum was field tested, the teacher and each student had access to an iPad, a SmartBoard, and various other materials in the classroom. An on-going discussion concerning the content of the curriculum as it related to the ISTE standards was held with the implementing teacher throughout the year. In addition, the teacher's lesson plans were periodically reviewed to ensure technology was being integrated into the curriculum.

Procedures

Creating the cross-curricular technology curriculum was a lengthy process. The process was begun by studying different materials, which included a close look into the Washington State Educational Technology Learning Standards to analyze the different standards and resources identified. These standards were cross-referenced with the National ISTE Standards for Students. Based upon the fact that the Washington State Educational Technology Standards were already dated in places because they were written in 2008, and that they were based on the ISTE Standards, the 2016 ISTE Standards for Students were selected as the base point for creating the curriculum. Information gathering continued by speaking with primary-grade teachers in the

association to see what they were currently doing in their classrooms. From this point, substandards were created for each of the ISTE Standards for Students. These substandards focused in on aspects of the ISTE Standards in understandable language to be met within the classroom. A scope and sequence was constructed to lay out when each of these substandards should be introduced, reinforced, and finally met. Finally, examples were constructed of subject areas where each of the substandards could be applied. Each of these examples included a brief explanation and a hyperlink to information or an example from the Internet. The scope and sequence can be found in Appendix A, and the curriculum can be found in Appendix B.

The Kindergarten portion of the curriculum was completed first and was field tested within the kindergarten classroom at Lakewood Lutheran School. Examples were provided of how the curriculum could be integrated within the teacher's current courses. Discussions happened with the teacher throughout the school year as they were needed.

At the end of the school year, an extensive interview (Appendix C) was conducted with the teacher evaluate the Kindergarten portion of the curriculum.

Artifacts

The curriculum was constructed into three levels: Kindergarten, 1-2, and 3-4. These grade level combinations are the prevalent groupings within the Evergreen Lutheran High School association schools. The curriculum was constructed and placed on a website for ease-of-use by teachers. It was also placed onto a website to allow for the content to be easily updated from year to year as teachers utilize the curriculum.

To assess the curriculum, an interview was done with the field testing classroom teacher. This was done instead of a questionnaire to allow for open-ended discussion of

the curriculum. The discussion with the teacher led to some changes and improvements to the curriculum, mostly in the area of better ideas for implementation.

The curriculum is also assessed when students enter the 9th grade at Evergreen Lutheran High School. A high school entrance exam (Appendix D) will be conducted to assess the complete K-8 curriculum and its effectiveness within the Evergreen Lutheran High School association students.

Throughout the use of the curriculum, teachers will be able to react to the effectiveness of the curriculum and submit ideas for future innovative methods of using the standards within their classrooms.

Results

Overall, the field test of the Kindergarten portion of the curriculum went well. There were some needed improvements made, especially in content area implementation. The structure and the design of the curriculum were modified from a Google Document to a Google Site for easier accessibility. A scope and sequence were added to give teachers an understanding of when certain substandards are introduced, reinforced, or mastered.

Chapter IV: Reflective Essay

Introduction

This project was designed to integrate technology into the curriculum of the associated grade schools of Evergreen Lutheran High School. At this stage, the K-4 portion of the curriculum has been completed. It was a long and difficult process to research, gather and create materials useful for the K-4 classroom. The final chapter reflects on the project and the steps to making the curriculum more effective in the future.

Conclusions

The first field test could have gone better. The teacher could have been more adequately trained on the integration of the curriculum into subjects. Often, the teacher would take the recommendation, but then place the content into a technology class. The curriculum will flow more naturally if intentionally placed within preexisting courses.

The Kindergarten curriculum flowed well, but was very difficult to complete all standards in a one-year period. In the 1-4 grade curriculum, a teacher essentially has two years to completely teach and integrate the topic. No new substandards are introduced in the second and fourth grade years, allowing the same teacher to introduce and reinforce the topic during the 1-2 grade years and the 3-4 grade years. The Kindergarten level was difficult to integrate with only one year to fit in all the standards. Perhaps, adding a pre-school curriculum with the Kindergarten level might be a way to make it easier to integrate at the next iteration of this project.

Overall, students were introduced and interacted more with technology within their classroom because of the use of the curriculum. The students were more proficient at using the technology according to the teacher.

Recommendations

Several improvements will need to be made as this curriculum continues evolving. Teacher training is the first recommendation. Since teachers' schedules are full and unpredictable, a series of videos online that correspond with the materials would be helpful and encouraging for teachers who are struggling with the content.

Another recommendation will be to continue updating this curriculum as teachers teach the content. This curriculum will only be as dynamic as the content. As teachers come up with ways to reach standards, they will be encouraged to share the content and grow the curriculum. The curriculum was built with a top-down approach, but it needs to be maintained by the people in the trenches. The curriculum will continue to be modified on the website throughout its use by the teachers of the Evergreen Lutheran High School association.

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Appendix A: Scope and Sequence

Organized below is the Scope and Sequence for the Cross Curricular Technology Integration Curriculum. It is currently completed from grades K-4. This document can also be found at https://tinyurl.com/crosscurricularscopesequence

Empowered Learner							
Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.			Introduced= I Reinforced= R Mastered= M				
1a	***Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.***		K	1	2	3	4
		Articulate and set personal learning goals and a path to meet them including using technology in their personal learning.	I	R	R	R	M
1b	***Students build networks and customize their learning environments in ways that support the learning process.***		K	1	2	3	4
		Build networks to enrich learning.	I	R	R	R	R
		Use speech to text commands to customize learning.			I	R	R
		Create a personal learning network via digital tools with peers.				I	R
1c	***Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.***		K	1	2	3	4
		Engage experts to provide authentic feedback to solve problems.	I	R	R	R	M
		Seek and give collaborative feedback using technology tools.		I	R	R	M
		Create an artifact to showcase learning goals that have been met.	I	R	R	R	R
1d	***Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.***		K	1	2	3	4
		Demonstrate proper use and care of technology equipment.	I	R	R	R	M
		Understand and recognize basic technology terms, symbols and icons.	I	R	R	R	R
		Identify appropriate technology programs or applications for a given activity or project.	I	R	R	R	R
		Demonstrate primary steps to usage of available hardware and software (e.g., turn on and off a device, launch a program or application).	I	R	R	R	R
		Demonstrate proper usage of built-in and peripheral input devices (e.g., keyboard, mouse, touchscreen and touchpad).	I	R	R	R	R
		Demonstrate basic troubleshooting on hardware or software applications.		I	R	R	R
		Interact with an interactive presentation system as part of classroom discussion or work.	I	R	R	R	R
		Identify and use the common navigational elements of a web page (scrolling bar, address bar or Omnibox, favorites).		I	R	R	R

Digital Citizen							
Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.					Introduced= I Reinforced= R Mastered= M		
2a	***Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.***		K	1	2	3	4
		Understand that a digital footprint is permanent. (2a)				I	R
		Demonstrate the creation of a Christ-centered digital identity while living in a sinful world. (2a)				I	R
2b	***Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.***		K	1	2	3	4
		Explain and demonstrate compliance with classroom, school rules (Acceptable Use Policy) regarding responsible use of computers and networks. (2b)	I	R	R	R	R
		Communicate and articulate basic principles of online safety. (2b)	I	R	R	R	R
		Recognize and understand why there are rules at home and school concerning technology. (2b)	I	R	R	R	R
		Identify and explain how technology impacts their daily lives to do things better or easier (e.g., cell phones, microwave, television, cameras, computers.) (2b)	I	R	R	R	R
		Identify examples of how technology impacts the environment. (2b)	I	R	R	R	R
		Identify proper balance of time commitments between educational technology usage and social use of technology. (2b)		I	R	R	R
		Understand plagiarism, copyright and fair use of all information. (2b)				I	R
		Demonstrate effective Christ-centered techniques to combat cyberbullying. (2b)				I	R
2c	***Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.***		K	1	2	3	4
		Understand the difference between copying with permission and without. (2c)	I	R	R	R	R
		Cite sources when using others' intellectual property. (2c)		I	R	R	R
2d	***Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.***		K	1	2	3	4
		Understand safe and correct security procedures (e.g., password protection, privacy.) (2d)	I	R	R	R	R
		Identify methods to protect students personal data online. (2d)				I	R
		Identify positive and negative data-collection technology. (2d)				I	R

Knowledge Constructor							
Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.							Introduced= I Reinforced= R Mastered= M
3a	***Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.***		K	1	2	3	4
		Be exposed to a variety of informational research using digital tools. (3a)	I	R	R	R	R
		Use digital information from a variety of pre-selected sources. (3a)	I	R	R	R	R
		Organize researched information using online bookmarking and notetaking tools. (3a)				I	R
		Research information using multiple sources and evaluate for accuracy, credibility and relevance. (3a, 3b)				I	R
3b	***Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.***		K	1	2	3	4
		Research information using multiple sources and evaluate for accuracy, credibility and relevance. (3a, 3b)				I	R
3c	***Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.***		K	1	2	3	4
		Participate in a group learning project using a variety of tools including digital tools to solve a problem. (3c)	I	R	R	R	R
		Create a collection of artifacts using multiple platforms such as paper, project, presentation, video, or verbal demonstration. (3c)	I	R	R	R	R
3d	***Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.***		K	1	2	3	4
		Explore a real-world issue or problem and develop solutions to the issue or problem. (3d)	I	R	R	R	R

Innovative Designer						
Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.			Introduced= I Reinforced= R Mastered= M			
4a	***Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.***		K	1	2	3	4
	Understand and identify appropriate situations when and where to use personal devices. (4a- dealing with a social issue)		I	R	R	R	R
	Develop, test and refine a prototype of a new product or an improvement to a current product. (4a, 4c, 6c)			I	R	R	R
4b	***Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.***		K	1	2	3	4
	Create an original work based upon a story, activity or event using a variety of digital tools and resources. (4b)		I	R	R	R	R
	Explore 2D and 3D software to create products. (4b)					I	R
	Use brainstorming software to plan the design process of a product. (4b)					I	R
4c	***Students develop, test and refine prototypes as part of a cyclical design process.***		K	1	2	3	4
	Use technology to express original ideas in various formats (e.g., text, drawing, digital images, videos, sounds.) (4c)		I	R	R	R	R
	Develop, test and refine a prototype of a new product or an improvement to a current product. (4a, 4c, 6c)		I	R	R	R	R
4d	***Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.***		K	1	2	3	4
	Develop the solution to an open-ended problem. (4d)		I	R	R	R	R

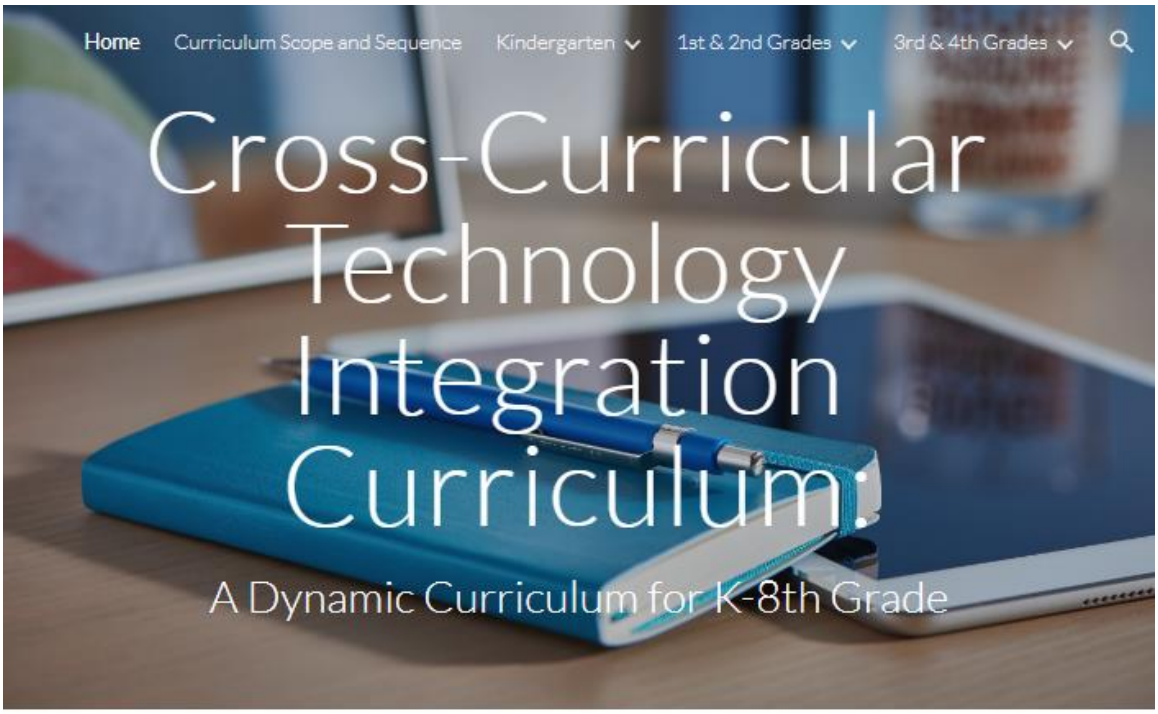
Computational Thinker							
Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.				Introduced= I Reinforced= R Mastered= M			
5a	***Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.***		K	1	2	3	4
		Create precise instructions or sequences that form a basis for a solution. (5a)	I	R	R	R	R
5b	***Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.***		K	1	2	3	4
		Collect, organize and analyze data using digital tools. (5b)	I	R	R	R	R
5c	***Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.***		K	1	2	3	4
		Break down a problem into parts and methods to solve the problem. (5c)	I	R	R	R	R
5d	***Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.***		K	1	2	3	4
		Use coding to create and test automated solutions to a task. (5d)	I	R	R	R	R
		Create a series of ordered steps using programming code. (5d)	I	R	R	R	R

Creative Communicator							
Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.						Introduced= I Reinforced= R Mastered= M	
6a	***Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.***		K	1	2	3	4
		Explore video editing tools and techniques. (6a)				I	R
		Organize ideas, design, and produce a multimedia presentation. (6a)	I	R	R	R	R
		Practice skills using word processing and spreadsheets. (6a)				I	R
		Maintain a blog. (6a)				I	R
6b	***Students create original works or responsibly repurpose or remix digital resources into new creations.***		K	1	2	3	4
		Create original or remix a Christ-centered song or hymn. (6b)				I	R
6c	***Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.***		K	1	2	3	4
		(6c- see Innovative Designer)					
6d	***Students publish or present content that customizes the message and medium for their intended audiences.***		K	1	2	3	4
		Prepare and present portfolio of created materials. (6d)	I	R	R	R	R

Global Communicator							
Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.							
				Introduced= I Reinforced= R Mastered= M			
7a	***Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.***		K	1	2	3	4
		Explore various cultures through digital resources. (7a)	I	R	R	R	R
		Engage in multi-player video games to connect with other students. (7a)				I	R
7b	***Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.***		K	1	2	3	4
		Engage in digital communication with others in a classroom setting (e.g. Google Hangout, Skype) (7b)	I	R	R	R	R
		Communicate with students from other cultures to broaden learning and understanding. (7b)	I	R	R	R	R
7c	***Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.***		K	1	2	3	4
		Participate in a classroom project using collaborative tools and resources. (7c)	I	R	R	R	R
		Explore and use technology in an instructional setting to encourage collaboration. (7c)	I	R	R	R	R
		Act as a project manager for a collaborative project. (7c)	I	R	R	R	R
7d	***Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.***		K	1	2	3	4
		Participate in a virtual field trip. (7d)	I	R	R	R	R
		Plan and carry out a action project using digital tools. (7d)	I	R	R	R	R

Appendix B: Curriculum

Organized below are screenshots of example pages of the Cross-Curricular Technology Integration Curriculum. It is currently completed from grades K-4. The complete curriculum website can be found at https://sites.google.com/llhs.org/welstechnologycurriculum/home



This technology curriculum has been created to lead the schools of the Evergreen Lutheran School System to integrate technology across the curriculum to prepare students for their future at Evergreen Lutheran High School. The curriculum is aligned with the ISTE Standards for Students published in 2016 by ISTE.

Currently, the curriculum has been completed through grade 4. The 5-8 grade curriculum is slated to be completed by 2020.

If you have questions or lesson submissions in specific standard areas, please email at principal@elhs.org

THE EVERGREEN LUTHERAN SCHOOL SYSTEM

Standard 1A:

Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.

Articulate and set personal learning goals and a path to meet them including using technology in their personal learning. (1a)

Example:

Create a set of personal learning goals and then update them on a monthly basis.

Resources:

Learning Goals Resource Page: https://www.teachstarter.com/teaching-resource-collection/learning-goals/

Goal Setting for Grades K-2 and 3-8: https://sites.google.com/a/d64.org/mr-shaffer/studentlearning/student-goal-setting/goal-setting-tools

How to Encourage Goal Setting for Students: https://www.weareteachers.com/goal-setting-for-students/

Standard 1B:

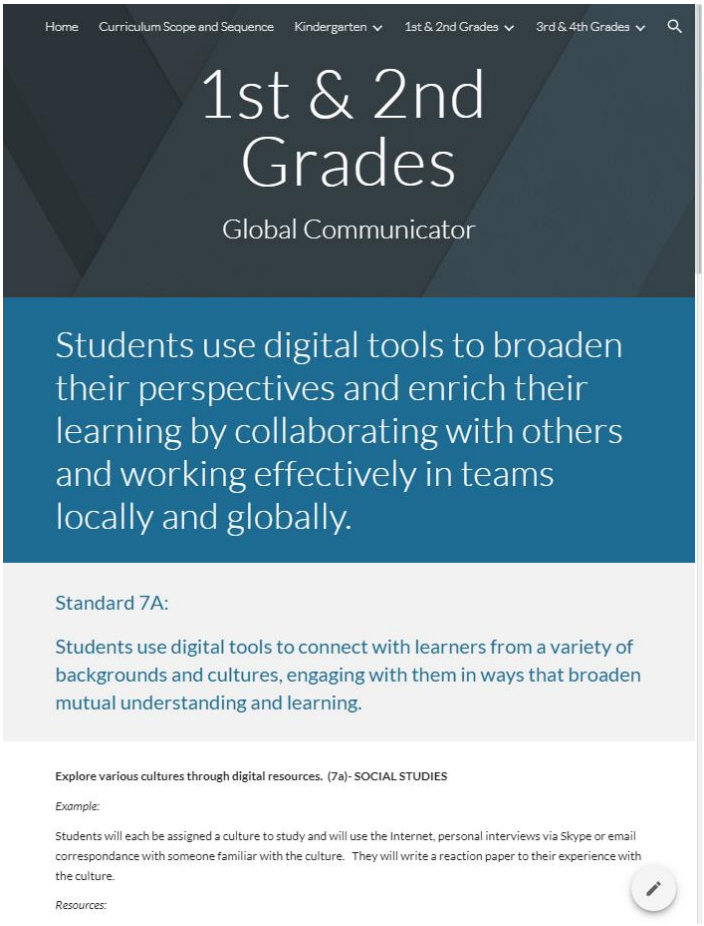
Students build networks and customize their learning environments in ways that support the learning process.

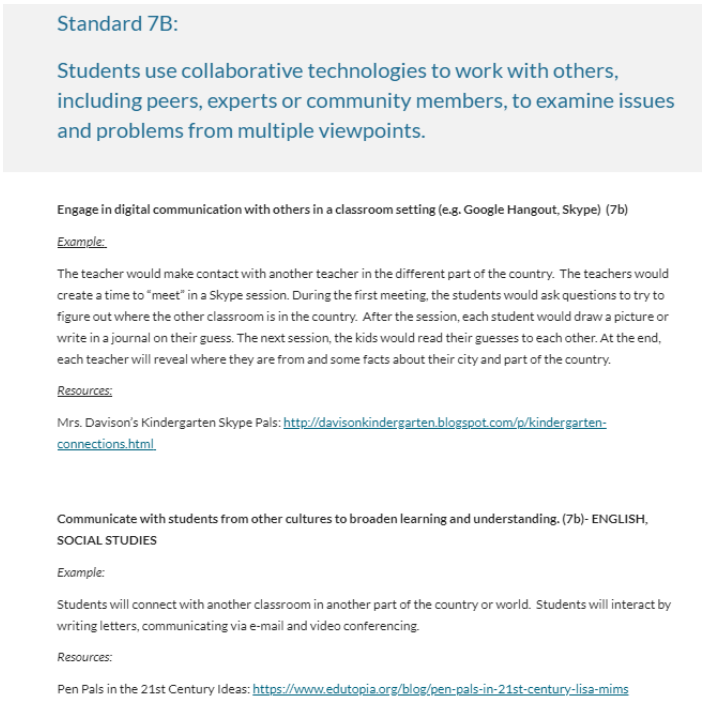
Build networks to enrich learning. (1b)- MULTIPLE SUBJECTS

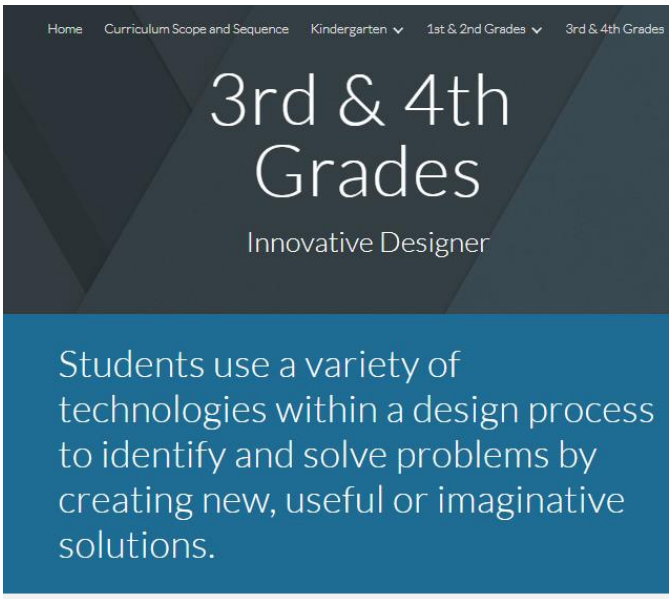
Example: Teacher will create expert contacts within the neighborhood that the teacher can Skype, Facetime or Google Hangout into the classroom for certain portions of the class. For instance, a firefighter might Skype in and show the kids around the fire station when the students are discussing the letter F in the classroom.

Resources:

None


Home
Curriculum Scope and Sequence
Kindergarten
1st & 2nd Grades
3rd & 4th Grades
1st & 2nd Grades
Global Communicator
Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.
Standard 7A:
Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
Explore various cultures through digital resources. (7a)- SOCIAL STUDIES
Example:
Students will each be assigned a culture to study and will use the Internet, personal interviews via Skype or email correspondance with someone familiar with the culture. They will write a reaction paper to their experience with the culture.
Resources:


Standard 7B:
Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
Engage in digital communication with others in a classroom setting (e.g. Google Hangout, Skype) (7b)
Example:
The teacher would make contact with another teacher in the different part of the country. The teachers would create a time to "meet" in a Skype session. During the first meeting, the students would ask questions to try to figure out where the other classroom is in the country. After the session, each student would draw a picture or write in a journal on their guess. The next session, the kids would read their guesses to each other. At the end, each teacher will reveal where they are from and some facts about their city and part of the country.
Resources:
Mrs. Davison's Kindergarten Skype Pals: http://davisonkindergarten.blogspot.com/p/kindergarten-connections.html
Communicate with students from other cultures to broaden learning and understanding. (7b)- ENGLISH, SOCIAL STUDIES
Example:
Students will connect with another classroom in another part of the country or world. Students will interact by writing letters, communicating via e-mail and video conferencing.
Resources:
Pen Pals in the 21st Century Ideas: https://www.edutopia.org/blog/pen-pals-in-21st-century-lisa-mims



Standard 4A:

Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

Understand and identify appropriate situations when and where to use personal devices. (4a)

Example:

At the beginning of the year, the teacher would discuss not only the types of situations where the classroom technology can be used, but also why this is the case.

Resources:

None

Develop, test and refine a prototype of a new product or an improvement to a current product. (4a, 4c, 6c)- READING, SCIENCE

Example:

Read the book "Junk Re-Thunk" with the students. The students should then "rethunk" how they can use junk by creating a toy out of recycled junk that is thrown away at home. The students should plan, test and create a prototype of a "rethunk toy". Students will present their "new" toys to the class.

Resources:

Scrapkins website: http://www.thescrapkins.com/

Standard 4B:

Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

Create an original work based upon a story, activity or event using a variety of digital tools and resources.

Example:

Using the Shutterfly Photo Story app, students would be guided over a few weeks to create a story. The story would consist of the student identifying a problem and then writing the story of how the problem was resolved. The students would either draw or take digital photographs to illustrate their book. Once the book is completed, it would be sent to Shutterfly to be published. The students would then invite their parents and family into the classroom where they would read their story to their family and classmates. The students would then be presented with their own copy of the book. The teacher would place a copy of their book into the classroom library.

Resources:

Shutterfly Photo Story: http://www.shutterfly.com/photostoryclassroom/

Appendix C: Interview with Field Test Teacher

Interview with Kindergarten Classroom Teacher:

Previous to the curriculum:

1. What would you rate your overall technology level before using the curriculum on a scale of 1-10 with 1 being the lowest? Why would you rate yourself at this level?
   I would rate my previous experience a 3. I had some experience but not a whole lot. I mostly knew Office and Google.
2. What was your previous work with technology curriculum in your classroom?
   I used a Smart Board and lap top. That was about it. I did not incorporate technology much.
3. What amount of technology did you have in your classroom prior to using this curriculum?

   a. If minimal or small, what were the reasons that you did not use technology as much in your teaching and curriculum?
      I did not have much. I had a smart Board, laptop, and a couple of iPads. Lack of funding was the main reason I did not have much. A close second was the lack of experience.
4. What was the feeling of students in previous years concerning technology?
   They were excited when ever technology was used. They had fun using it.
5. Did you feel that your students were prepared for technology in the 1st grade after leaving your classroom in previous years?
   yes

Using the Cross Curricular Technology Curriculum:

1. Did you feel that the curriculum was easy to interact with and understand? If so, how?
   Yes. It was written in an organized way that flowed. The examples of projects to do were very helpful in guiding my planning on making sure the standards were met.
2. Did you feel that you were supported when you had questions concerning the curriculum? If so, how?
   Yes. When I emailed, phoned, or texted a question, I was given a response in an acceptable time frame. The answer was guidance in explaining the way to work through the problem so next time I had the same problem, I knew how to tackle it on my own.
3. Did you find the classroom examples of completing standards according to the curriculum useful? If so, how?
   Very useful. It was the guidance I needed to plan the appropriate activity to

accomplish the standard. Without the examples, I would have understood the standard in a much different way. It was a spring board to other ideas I could do.

4. Which areas of the curriculum could use more work or attention?
   Behind or under the standards, a footnote explaining the language of the standard for those teachers unfamiliar with any technology wording. Having worked with many teachers who do not like technology, are afraid to use it, and/or have no knowledge, they will not use it unless it is spelled out for them.
5. What type of technology level would a teacher need to be to use this curriculum in their classroom?
   A teacher with little experience could use this curriculum. I was at a very basic level of technology when I began. I gained in my experience through the guidance of this curriculum. The teacher would have to put in the effort to plan and carry through the activities and explore the ways to carry out the curriculum. This curriculum spells out what needs to be done. As much information as possible is given in the curriculum.
6. What could be added to the curriculum to help you to use it?
   In order to help the teachers that have no technology experience whatsoever, a plan of ready-to-use activities with a script.
7. Do you feel that your students are better prepared for the next level because of the curriculum? Why?
   Yes. My students definitely have more experience through this curriculum. Some activities that the students have done have been shown at parent nights or in the hallways at school and the parents make comments about how impressed they are.
8. Do you feel you would recommend the curriculum to others? Why?
   Most definitely. It is a very thorough curriculum with clear expectations and specific examples of how to accomplish the goals.

Appendix D: High School Entrance Exam

High School Technology Entrance Exam example questions

Question 1
Not yet answered
Marked out of 1.00
Flag question
Edit question

The operating system and programs like spreadsheets, word processors and internet browsers are known as _____.

Select one:
- a. peripherals
- b. software
- c. hardware
- d. RAM

Question 2
Not yet answered
Marked out of 1.00
Flag question
Edit question

What is phishing?

Select one:
- a. a scheme by bad people to slow or stop your computer with a virus.
- b. A method of gathering food by placing bait into a body of water.
- c. an Internet-connected computer that has been infected my malicious software that gives someone else control over the computer.
- d. A way for bad people to get your private details.

Question 3
Not yet answered
Marked out of 1.00
Flag question
Edit question

What is cramming?

Select one:
- a. Someone steals or otherwise obtains and uses a student's personal information.
- b. The unauthorized e-mail correspondence sent to a user's e-mail without permission to trick them into send money or giving vital information.
- c. The unauthorized charges to someone's telephone bill for services which were neither ordered nor desired.
- d. An Internet-connected computer that has been infected my malicious software that gives someone else control over the computer.

Question 4
Not yet answered
Marked out of 1.00
Flag question
Edit question

You should guard your cell phone number to avoid people cramming your bill.

Select one:
- True
- False

Question 5
Not yet answered
Marked out of 1.00
Flag question
Edit question

The three most common places for teens to meet people is through Internet-accessible gaming consoles, through friends of friends online, or in person.

Select one:
- True
- False

Question 6
Not yet answered
Marked out of 1.00
Flag question
Edit question

The top reason why teens cyberbully is because _____.

Select one:
- a. they think that it is fun and entertaining.
- b. they want to be mean.
- c. they want to get back at someone.
- d. they want to embarass someone.

Question 7
Not yet answered
Marked out of 1.00
Flag question
Edit question

You should be OK with adding new people or following new people in your social media accounts if your friends follow them. This means that they can be trusted.

Select one:
- True
- False

Question 8
Not yet answered
Marked out of 1.00
Flag question
Edit question

If there is an uncomfortable situation online, you should not add to it. Instead, you should stay involved and be supportive and encouraging. You should never leave the conversation.

Select one:
- True
- False