

Early Childhood Curriculum-Based Recommendation

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Introduction

A high quality early childhood programs can make a difference in young children living in poverty (Schweinhart, 2013). To ensure the success of our young students (kindergarten - third grade, K-3), parents, early childhood educators and instructional leaders need to incorporate new guidelines and curriculum based recommendations that include technology and 21st century skills in the classroom and beyond the classroom. Utilizing current research findings and best practice models for educating the early childhood student, this document will provide guidelines with supporting examples for the inclusionary practices necessary to enhance critical thinking skills in the K-3 grade student in school and home settings.

Kindergarten: Kindergarten educational settings act as the basis for students core skill attainment as such this document is designed with guidelines that address learning activities from this starting point.

The National Association for the Education of Young Children (2009) note how “early experiences have profound effects, both cumulative and delayed, on a child’s development and learning; and optimal periods exist for certain types of development and learning to occur” (p. 12). The National Association for the Education of Young Children (2012) also state that “educators are now positioned to improve program quality by intentionally leveraging the potential of technology and media for the benefit of every child” (p. 1). Therefore, how technologies are implemented to children an early age can have a great effect in terms of benefiting them from a pedagogical perspective.

The New Jersey Department of Education Division of Early Childhood Education (2011) developed the New Jersey Kindergarten Implementation Guidelines (NJKIG) specifically mentions the use of computer technology for learning in the Science/Discovery and Literacy Centers of the kindergarten classroom. According to the NJKIG, all kindergarten classrooms “should be arranged around learning centers to support purposefully designed, play based activity as the main vehicle for children's learning” (New Jersey Department of Education, 2011, p. 5). The Literacy Center features an in class library, a listening center, a writing center and a computer center with the use of appropriate software and websites (New Jersey Department of Education, 2011, p. 52) .The guideline incorporates grade level appropriate technology use in the learning centers.

Guideline One: Students will be able to use appropriate technology to gather an understanding of the alphabet and to develop reading skills, to enhance critical thinking. Appropriate technology consists of a desktop, laptop, tablet, etc.. Students will work on this guideline in the home and school settings. Parental/Guardian support inclusion in this guideline will include a parent/guardian teacher guide for at-home activities and recommendations.

Example One: As part of guideline one, the first example, ‘Animal Alphabet’ will incorporate presentations to help kindergarten students develop letter identification and vocabulary (Learn NC, n.d.). Animal Alphabet enables students to use their knowledge of the alphabet and letter sounds to create an alphabet PowerPoint presentation which the student will share with his/her

parent/guardian; the parent/guardian will film the student presenting the content and will share the video with the instructor (Learn NC, n.d.). This guideline will support New Jersey Common Core Standard 8.1, Strands A, B, and C, NJKIG guidelines for Literacy centers in Kindergarten, and International Society for Technology in Education (ISTE) computing standards and the University of North Carolina (UNC) School of Education Curriculum Standards Information and Technology Skills for Kindergarten is a model for early childhood curriculum.

Example Two: As part of guideline one, “Letter and Pictures” will help students become familiar with the numeric keys on the keyboard to illustrate the concept of counting and the identification of numbers via stories found on pre-created worksheets. Students will use Microsoft Word to identify and enter numbers into pre-created worksheets in the learning center. Students will receive homework assignments that they will be completed with their parent/guardian. Students will identify and count the number of objects that are grouped together while reading the story together at home. This guideline will support New Jersey Common Core Standard 8.1, Strands A, B, and C, NJKIG guidelines for Literacy centers in Kindergarten, and International Society for Technology in Education (ISTE) computing standards.

Guideline Two: Students will be able to further develop their use of letters by enhancing their vocabulary via the use of in class and at home activities using appropriate technology.

Appropriate technology consists of a desktop, laptop, tablet, cell-phone, etc.. In-class and at-

home activities can consist of using Microsoft PowerPoint, Microsoft Word, search engines such as, Google, etc.. Students will work on this guideline in the home and school settings.

Parental/Guardian support inclusion in this guideline will include a parent/guardian teacher guide for at-home activities and recommendations.

Example One: The second activity, which will also be located in the literacy center of the kindergarten classroom, will be “Keys to Computing the Alphabet” (Learn NC, n.d.). This lesson gives the students practice in locating the alphabet on the computer keyboard across multiple devices, where they will use the spacebar, printing their product, and finally, using these printed letters to make words. Parents can also reinforce the concepts of the location of the letters via homework, where parents side by side and ask their child to identify five letters per night for five days. Critical thinking will be developed by the students to identify each letter and pressing the correct keys, regardless of the keyboard type used. This guideline will support New Jersey Common Core Standard 8.1, Strands A, B, and C, NJKIG guidelines for Literacy centers in Kindergarten, and International Society for Technology in Education (ISTE) computing standards.

Example Two: As part of guideline two, “Numbers and MS Word” will help students engage in activities where they can type numbers using Microsoft Word features to customize the numbers in terms of fonts, size, and color. The students will then produce a document at the end of the lesson. Students will share their completed documents with their parent/guardian while

enhancing their knowledge of Microsoft Word. This guideline will support New Jersey Common Core Standard 8.1, Strands A, B, and C, NJKIG guidelines for Literacy centers in Kindergarten, and International Society for Technology in Education (ISTE) computing standards.

First Grade: First Grade educational settings act as the foundation to comprehension and inclusion of technology to learn to support basic skills as such this document is designed with guidelines that address learning activities from this starting point.

According to Wang, Kinzie, McGuire and Pan (2010), the twenty-first century learner comes equipped with technology awareness that students in 2000 were uncomfortable with learning. In 2001, American Academy of Pediatrics (AAP) recommended the appropriate amount of media use for children, and in 2015, AAP emphasized the importance of modeling media behavior based on quality and shared time. Caregivers might also find the use of approved quality sites such as EarthBrowser and Teacher Tube useful to promote appropriate use of online content.

There is an increase in schools utilizing blended learning as reported by the International Association for K-12 Online Learning (iNACOL, 2015). The International Society for Technology in Education (ISTE, 2016) established guidelines for technology use for students included the categories creativity and innovation, communication and collaboration, and critical thinking, problem solving and decision making. An educator attempting to enhance their instructional activities through the use of technology to meet the New Jersey Core Curriculum Content Standards (NJCCCS) 8.1 2B.1 which addresses educational technology may choose to engage these students in best practices that support learning through a school home connection.

The following guidelines with supportive examples are being recommended to schools and families of first grade students developing activities that are transferable in a school to home connection in the 21st century classroom.

Guideline One: Students will produce original works to demonstrate the ability to analyze and expand on a topic of interest either individually or within a group. Students will utilize available technology to collaborate, communicate, research, design, and produce a final project.

This guideline will support New Jersey Core Curriculum Content Standards (NJCCCS) 8.1 2B.1.

Example One: Student will produce group weather reports from around the world using green screen, camera, and application. Students will complete research from home, select a region and gather weather data using Earthbrowser or similar application to gain information on weather patterns for one week. Parents/Guardians will assist students in the production process with the use of the technology. Students will collaborate within their assigned weather report group to complete production of weather segment using the iPad, green screen and DoInk app, and each student's assigned weather report group will publish a video to the class' Youtube channel and share the video with their parent/guardian.

Example Two: Students will review current event topics at home with parent/guardian and use the Tellagami or similar application to explain the cause and effect relationship involved in the assigned topic. Students will identify the appropriate use of technology to demonstrate an important part of the critical thinking process. After sharing and discussing the current event

topic with a parent/guardian, the students will design a reporter avatar. Students will record a ninety second report describing the cause and effect relationships involving the assigned topic and will share the report with the class.

Guideline Two: Students will be given opportunities to experiment with a variety of technology tools to facilitate the adoption of a concrete skill base. Students will be provided with access to computers and the supporting components (keyboard, mouse, monitor, and) in order to gain an understanding of how equipment (technology) can support the production process. Students will utilize hands-on activities to facilitate the learning process.

Example One: Students will utilize the computer workshop center in the classroom to engage in hands-on technology activities that will encourage interaction with the hardware components such as monitor, keyboard, etc. Students will be assigned groups to solve a real life problem such as, what would happen if one key component was unavailable for example, a mouse has stopped working. Students will explore other options of inputting information into the computer such as touch screen, voice recognition etc. Students will take the problem home, will discuss with a parent/guardian to expand on the use of access options on a computer or mobile devices.

Example Two: Students will simulate a model (a drawing, physical representation, etc.) of a technology device (computer, tablet, phone) and will explain the role of each component and how they function as a unit. Parent/guardian will provide the material to facilitate the design process and will help locate legal use images to reflect their vision. Students will bring the product to school to share with the class and will be prepared to describe their experience in designing their product. The products are then displayed as artifacts in the center.

Second Grade: Second Grade educational settings prepare students to think analytically in various situations and become aware of Internet safety when utilizing technology in the production of artifacts to support learning as such this document is designed with guidelines that address learning activities from this starting point.

Based upon the Protecting Children in the 21st Century Act Amendment (2008), Internet Keep Safe Coalition (2016), and North Carolina Department of Public Instruction (2016), the organizations and amendment emphasize that elementary school age children need to be educated on Internet safety, appropriate online behavior, and keeping safe personal information. A guideline needs to reflect those safety and ethical issues. The following is a guideline and two examples for developing activities that are transferable in a school to home connection in the twenty-first century classroom.

Guideline One: A student will demonstrate the ability to analyze circumstances to determine safe use of electronic resources. Safe use encompasses Internet safety, appropriate online behavior, keeping safe personal information and appropriate use of an electronic device. A student will explain the importance of safe usage on electronic resources. Electronic resources include a cell phone, laptop, desktop, tablet, Chromebook, etc., which can access the Internet, applications, social networking sites, etc.

Example One: Students will watch the following videos on safe use on electronic resources.

After each video from the following sources, [Tell a Trusted Adult](#), [Internet Safety](#), [Faux Paw the Techno Cat](#)), the teacher will guide a discussion pinpointing important aspects such as time spent playing online. The teacher will create a vocabulary activity sheet for the students to learn technology terms such as Internet safety, social networking, cyberspace, virus, etc. Students will share their new knowledge with their parents/guardians, and both will take a technology pledge

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such as the Faux Paw Pledge through Internet Keep Safe Coalition or Digital Citizenship Pledge through Common Sense Education

Example Two: The teacher will demonstrate to the class the safe and responsible steps used in turning on and off, carrying, storing, etc. variety of information technology tools. Students will role-play individually or in groups the safe and unsafe uses of information technology tools such as telephones, computers, television sets and other technologies. After the role-play, the teacher will have a guided discussion on safe and responsible steps using information technology tools.

Based upon the North Carolina Department of Public Instruction and studies depicting laptop use in elementary classrooms (Kember, Barron, & Harmes, 2007), learning vocabulary through technology (Huang, 2015), effect of technology-based programs on second-grade reading achievement (Knezek & Christensen, 2007), Webquest usage (Henning & Bell, 2011), email usage (P. Curtiss & K. Curtiss, 2002), they emphasize that elementary school age children need to be educated on technology tools to increase their comprehension on the technology tool, reading, communication skills, and critical thinking. A guideline needs to reflect those content creation tools and skills. The following is a guideline and two examples for developing activities that are transferable in a school to home connection in the twenty-first century classroom.

Guideline Two: A student will use technology tools to strengthen his/her reading comprehension, communication skills and critical thinking. The student will learn the technology tools to gather, organize, and present data/information. The technology tools encompasses Microsoft Word, Microsoft Excel, Microsoft PowerPoint, the Internet, and email access.

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Example One: The teacher will explain to the students how to use their school's email account or personal email account to create/document artifacts that showcase what the student will learn in a given topic. Each student will be given a pen pal (example, elementary education college student). The elementary student and their pen pal will communicate through emails throughout the school year discussing the elementary student's novel. This process implies that both pen pals will practice their formal communication skills using email; therefore, they will utilize this opportunity to develop their reading, writing and communication skills.

Example Two: Each week, the teacher will provide objects for estimation. The estimation would consist of a jar of marshmallows, M&M's, jelly beans, etc., and the student will predict how many jelly beans are in the jar, how many jelly beans are red, etc.,. During each estimation, the student will record his/her prediction within a Microsoft Excel sheet and create bar graphs of his/her prediction. At the end of the school year, the teacher will have a guided discussion on the outcomes, possible math patterns and technology use.

Third Grade: Third Grade educational settings prepare students to become critical and analytical thinkers in various situations through the utilization of creative activities by designing project based problem solving artifacts as such this document is designed with guidelines that address learning activities from this starting point.

According to Burn (2009), many students do not want to think critically because they have not been taught how to think critically. To teach critical thinking skills at the third grade level, kids need to be encouraged to analyze and evaluate issues and form a judgment about the issue. In order to accomplish this goal, teachers, instructional leaders and parents need to provide

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young learners with opportunities to learn critical thinking skills through enhanced activities that extend from the classroom and into the home. Coding is a powerful tool to teach young learners to think logically and critically to solve problems (Gow, 2015). Students will be engaged and empowered through accomplishing the assigned puzzles and games (National Association for the Education of Young Children, 2012). Teaching critical thinking is effective at all grade levels (Lawson, 1993). As recommended by the NJCCCS Technology (2014), Standard 8.2 Strand A., the following guideline can be used by educators and parents/guardians for children in third grade.

Guideline One: Student will learn coding through a variety of hands-on activities, puzzles and games that teach computer programming in a fun and inquiry-based environment. Students will learn coding by solving a variety of challenges. Challenges are designed to demonstrate logical and critical thinking skills, ie. understanding algorithms.

Example One: Student will use Code.org, which is a free website, to learn programming skills. Once the parent/guardian or teacher enrolls the in Code.org, the student will complete courses based on puzzles and interactive games using logical and critical thinking skills. Students will be engaged in activities such as programming relay, binary bracelets, and paper airplane. Parents and educators can encourage kids' progress by assigning challenging games and puzzles, and student can progress at their own pace.

Example Two: Students will be enrolled in various competitions such as the Junior First Lego League competition using NXT Mindstorm and Lego EV3 robots. Participation in robotic competitions provide children an engaging inquiry-based learning environment where they are actively involved in building models and objects out of Legos and program them to accomplish

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tasks and missions by writing code. Students will use the robotics competition standards and use critical thinking to solve problems in a cooperative and collaborative learning environment.

Teachers and parents can become coaches and help students achieve their goals by promoting critical thinking skills and problem solving.

As recommended by Next Generation Science Standards (2016) 3-5-ETS1 Engineering Design for grades 3, (3-5-ETS1-1, ETS1-2 ,ETS1-3), The National Science Foundation (2010) and National Research Council (2012), they recommend the integration of STEM curriculum in formal and informal settings where all students should have the opportunity to experience inquiry-based learning through the through open-ended real-world problem solving. Engineering design will teach youth to become critical thinkers and rigorous problem solvers but also become aware of science-related issues and future innovators (NSF, 2010).

Guideline Two: Students will learn engineering design. Student will engage in real-life problems that promote critical thinking (NSF, 2010) by developing skills and framework to create artifacts to solve a problem. The design principles consist of defining a problem, conducting investigations and considering possible solutions. Engineering design consists of trial and error aspects such as designing, learning, modifying and building prototypes/models.

Example One: Students will learn about engineering design through three-dimensional (3D) technology by utilizing kid friendly and age appropriate applications and programs such as Paint, Google Drawing and Sketchup in and out-of-the-classroom. Students will be engaged in a project based learning environment that teaches engineering design through hands-on and fun projects that involve critical thinking skills and problem solving. Parents and educators will help and guide young learners to visualize models and objects and utilize friendly drawing programs

such as Google Drawing, Sketchup and Paint to produce artifacts such as bridges, houses and even toys. Other exciting hands-on projects involve making holograms, watching a three dimensional movie or making Google Cardboard glasses using a cardboard kit to watch three dimensional videos.

Example Two: Student will learn three dimensional printing. Students will develop critical thinking skills by designing models using various engineering applications and programs.

Three-dimensional printing will allow students to demonstrate their understanding of engineering design concepts. Parents can reinforce the design process at home by using the various design programs and tools such as, designing toys, school supplies, logos, and

Conclusion

The inclusion of critical thinking guidelines will support the usage of relevant and appropriate technology integration for K-3 classrooms in New Jersey and North Carolina curriculum. The guidelines have profound implications on young learners. As recommended by organizations such as, National Science Foundation, National Association Next Generation Science Standards and Core Curriculum Content Standards and peer reviewed journal articles, all students need opportunities to acquire critical thinking and problem solving skill by engaging in experiences using a variety of technology tools. Via these guidelines and recommendations, students will be provided with key knowledge and skills that will be needed in the twenty-first century and beyond.

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