NORTH CAROLINA
State Board of Education
Department of Public Instruction

Report to the North Carolina General Assembly

Impact of the Coding and Mobile App Development Program

SL 2017-57(SB 257)

Date Due: September 15
DPI Chronological Schedule, 2023–2024

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REPORTING REQUIREMENT
This document reports the impact of the Coding and Mobile App Development Program to the General Assembly pursuant to Session Law 2017-57 (SB 257), which called for the following:

SECTION 7.23.(d) Reporting Requirements. – By August 1 of each year of the Program, grant recipients shall submit a report to the Department of Public Instruction, beginning with an initial report by August 1, 2018, for the preceding year in which grant funds were expended that provides at least the following information on the partnership initiative:
1) The use of grant funds.
2) The number of students by grade level participating in the partnership initiative.
3) The number of students who subsequently participated in work-based opportunities, internships, or apprenticeship programs and a description of the types of opportunities for those students.
4) Student outcome data regarding job attainment and postsecondary opportunities as a result of the partnership initiative.
5) Any other information the Superintendent of Public Instruction deems necessary.

By September 15 of each year of the Program, the Department shall report to the Joint Legislative Education Oversight Committee and the Fiscal Research Division, beginning with an initial report by September 15, 2018, on grant recipients and implementation of the program, including the information required to be reported to the Department pursuant to this subsection and any legislative recommendations for modifications or expansion of the Program.

COMPUTER SCIENCE, IT, AND TECHNOLOGY EDUCATION
The Office of Career and Technical Education (CTE) at the North Carolina Department of Public Instruction serves as lead for the Coding and Mobile App Development Program that is delivered through the Computer Sciences Standards and Computer Science, IT, and Technology (CSITT) Education. Computer Science is a content area focused on the understanding and creation of information and technological systems to be a digital age learner. As part of the Computer Science pathway of study, students can experience:
- Artificial Intelligence and Robotics
- Computing Systems and Applications
- Cybersecurity and Privacy
- Data Analytics
- Design Thinking
- Engineering and Advanced Manufacturing
- Impacts of Technology
- Information Processing
- Networks and the Internet
- Programming and Algorithms
- STEM

Students experience Computer Science, IT, and Technology Education through the NC Computer Science K–12 Standards administered at the elementary level through the North Carolina Standard of Study and through individual Computer Science, IT, and Technology Education courses on the middle grades and high school level.

IMPACT OF THE CODING AND MOBILE APP DEVELOPMENT PROGRAM

The Coding and Mobile App Development Grant Program finished its seventh year of engaging and impactful programs for North Carolina. The grant program afforded the opportunity for more than 10,924 students and their educators, administrators, and other staff to experience coding or mobile app development as well as exposure to Computer Science, IT, and Technology related careers. These experiences included classroom integration activities, work-based learning opportunities, professional development experiences, and immersion experiences. The twelve Public School Unit (PSU) grant recipients were awarded grant funds to implement activities to add new or expand coding and Computer Science courses or supporting activities for elementary, middle, or high school students. The table below summarizes the amount each grant recipient received.

Table 1: Participating Public School Units Grant Recipients for 2023–2024

PSU Code	PSU Name	Grant Amount
020	Alexander County Schools	$80,000.00
040	Anson County Schools	$58,500.00
080	Bertie County Schools	$61,420.00
120	Burke County Schools	$80,000.00
130	Cabarrus County Schools	$80,000.00
270	Currituck County Schools	$27,738.00
420	Halifax County Schools	$55,560.00
490	Iredell-Statesville Schools	$70,000.00
510	Johnston County Public Schools	$76,400.00
862	Mount Airy City Schools	$56,322.00
730	Person County Schools	$74,060.00
340	Winston-Salem Forsyth County Schools	$80,000.00

Eleven PSU grant recipients provided a report by August 1, 2024, on the grant initiative activities completed, with Winston-Salem Forsyth County Schools not submitting a report. As a result, data reported only includes grant recipients that provided a report.

It is important to note that coding and Computer Science curriculum is significantly expanding with increasing demand for students to be digital literate upon graduation. Students from a miscellany of demographics readily exposed to the curriculum as an increasing number of educators and administrators are receiving professional development and training to help expand course offerings. This expansion of curriculum and technology with the younger generations has the potential to positively impact the economy in the state of North Carolina as more students are being exposed to and developing the skills necessary to meet workforce demands. PSU grant recipients have overwhelmingly expressed their desire to continue along this path of Computer Science expansion and exposure to move into the future.

Highlight of Initiatives of PSU Grant Recipients

PSU grant recipients completed innovative initiatives to build local capacity and Computer Science, IT, and Technology pathways as part of the K–12 Computer Science Standards. The following is a highlight of the initiatives completed by PSU grant recipients:
- Built educator capacity and leadership in integrating the K–12 Computer Science Standards
- Built and promoted Computer Science, IT, and Technology career pathways
- Exposed elementary and middle school students to Computer Science, coding, computational thinking, STEM, and robotics
- Facilitated collaborative interdistrict professional development on Computer Science concepts, including coding and programming, data analytics, artificial intelligence, augmented reality, and technology tool integration
- Built Computer Science integration capacity in the K–12 English Language Arts, Mathematics, Science, and Social Studies course of studies
- Designed intentional alignment between high school Computer Science, IT, and Technology CTE career pathway courses and the elementary and middle school course of study
- Hosted career and skill development fairs to expose students to careers and future opportunities
- Provided industry immersion experiences for students to see Computer Science, IT, and Technology in a real-world context

USE OF GRANT FUNDS

The grant funds were used to purchase equipment, curricular materials, and cover the costs associated with educator professional development activities to build capacity in coding, Computer Science, robotics, and mobile application development initiatives. Students across the state were exposed to various topics and concepts related to coding, Computer Science, and robotics. The exposure expanded beyond the classroom and included interactions with business and industry members, participation in community coding activities, increased course offerings, and additional skill building activities which can increase employability. The sections below provide more details on the specific use of funds among the PSU grant recipients.

Professional Development Activities

The professional development activities varied in nature and content, but all with the common goal of expanding educator and administrator capacity to deliver Computer Science concepts to students within their PSU. As a result of multiple hours of training, learning and exposure, students have the benefit of being instructed by educators who have participated in the following experiences:

- CTE Summer Conference professional development sessions
- CodeJoy professional development sessions
- North Carolina Technology in Education Society (NCTIES) Conference sessions
- Interdistrict training on the integration of the NC Computer Science Standards
- District vertical alignment professional development on Python programming
- TechSmart Learning Platform professional development and coaching sessions
- The Friday Institute Computer Science professional developments sessions
- Augmented Reality professional development sessions
- Industry immersion experiences at local Computer Science related businesses
- Multiple PSU regional Computer Science integration best practices sharing sessions
- ACTE Career Tech Vision sessions

Computer Science Integration Activities

PSU grant recipients focused on building educator capacity on integrating the North Carolina Computer Science Standards into educational experiences for students through in classroom experiences or outside of school activities. Besides Computer Science courses, integration activities were implemented in the K–12 English Language Arts, Mathematics, Science, and Social Studies course of studies. The primary concepts of focus for integration were coding and programming, cybersecurity, artificial intelligence, computational thinking and problem-solving, data analysis, computer systems, and using various software and hardware. The following is a summary of the intentional integration activities implemented by PSU grant recipients:

- Built high-tech design spaces and pods for students to create with various technology
- Hosted student STEM shows showcasing students python programming skills through real-world challenges
- Hosted
- Provided stipends to educators to create integrative lesson plans and activities
- Developed integration lessons for middle school English Language Arts, Math, Science and Social Studies courses
- Equipped media centers with innovative technologies
- Facilitated business and industry field trips for students
- Provided transportation for work-based learning opportunities for students
- Provided transportation for students to attend Technology Student Association and robotic leadership development conferences

Educators and students accessed computer labs, equipment, and software as integral and enhanced components of the grant program. The following is a summary of the equipment and curricular materials purchased or used:

- Finch 2.0 Robots
- Finch Bird Brain Robots
- LEGO Spike Prime Kits
- TechSmart Learning Platform

STUDENT PARTICIPATION DATA
Students at the various PSU grant recipient sites were exposed to Coding and Computer Science concepts in a variety of ways. Representation in this grant cycle comprised of a diversity of backgrounds and capabilities; adding to the affluence of program experience and impact throughout the state of North Carolina. The table below include demographics specifically related to sex, ethnicity, and grade for participating students. The following information is self-reported by grantees.

Student Participation Demographics
The table below summarizes the total student participation in grantee initiatives by sex, race/ethnicity, and grade level. Total student participation for the 2023–2024 grant cycle was 10,924.

Table 2: Student Participation Demographics

Characteristic	Participation Total	% of Reported	Mode of Reported
Sex			Male
Female	3,344	43.3	
Male	4,372	56.7	
Not Reported	3,208	—	
Race/Ethnicity			White
American Indian/Alaskan Native	16	0.2	
Asian	288	4.2	
Black/African American	1,025	14.9	
Hispanic/Latino	1,533	22.3	
Native Hawaiian/Pacific Islander	12	0.2	
Two or More	427	6.2	
White	3,566	51.9	
Not Reported	4,057	—	
Grade Level			Grade 8
K–5	1,901	17.4	
6	2,582	23.6	
7	2,515	23.0	
8	2,911	26.6	
9	284	2.6	
10	256	2.3	
11	254	2.3	
12	221	2.0	

Note. Some PSU grant recipients did not report full enrollment data and totals may not reflect comprehensive enrollment or engagement totals.

PSU grant recipients implemented initiatives through the following middle and high school courses and school-based programming:
- Elementary School Level
  - Kindergarten Math lessons
  - 3rd grade Computer Science, English Language Arts, Science lessons
  - 5th grade Computer Science, English Language Arts, Math, and Science lessons
- Middle School Level Courses
  - 1056 ELA Grade 6
  - 1057 ELA Grade 7
  - 1058 ELA Grade 8
  - 2006 Math Grade 6
  - 2007 Math Grade 7
  - 2008 Math Grade 8
  - 3006 Science Grade 6
  - 3007 Science Grade 7
  - 3008 Science Grade 8
  - 4006 Social Studies Grade 6
  - 4007 Social Studies Grade 7

- 4008 Social Studies Grade 8
- CY20 Computer Science Discoveries I
- CY21 Computer Science Discoveries II
- CY22 Computer Science Discoveries III
- CY90 Exploring Computer Science
- EY10 Exploring Personal Character and Careers
- EY11 Exploring Careers and Employment
- STEM Grade 6
- STEM Grade 7
- STEM Grade 8
- TY00 Engineering: Exploring Technology I
- TY01 Engineering: Exploring Technology II
- TY21 PLTW Gateway: Automation and Robotics
- High School Level Courses
  - 0A02 AP Computer Science Principles
  - 2A02 AP Computer Science A
  - 3420 Chemistry
  - BL65 Data Analytics
  - BP14 Python Programming I
  - BP16 Python Programming II
  - BP41 Computer Science I
  - BP42 Computer Science II
  - TP12 PLTW Principle of Engineering
  - TP25 PLTW Aerospace Engineering
  - TP11 PLTW Intro to Engineering Design
  - TS31 Game Art Design
- School-based Programming
  - Hour of Code by Code.org
  - Media Center lessons
  - Robotics Clubs
  - STEM Enrichment Time

Impacted Educator Data

The table below summarizes the total impact and engagement of educators through initiative activities.

Table 3: Impacted Educator Data

Engagement Category	Number of Educators
Taught Computer Science Related Courses	93
Added Computer Science Content to Courses	120
Hosted Computer Science Related After School Activities	124
Engagement in Industry Partner Activities	103
Total Impacted Teachers	137

WORK-BASED LEARNING OPPORTUNITIES

Work-based learning (WBL) is an instructional strategy that enhances classroom learning by intentionally connecting students to the workplace. WBL activities are categorized into four settings: Career Exposure in grades K–5, Career Awareness in grades 6–8, Career Exploration in grades 9–10, and Career Preparation in grades 11–12 and postsecondary opportunities. PSU grant recipients provided the following WBL activities for students through grant initiatives:
- Career Exposure Activities
  - Computer Science concepts integrated into K-5 English Language Arts, Math, and Science lessons
  - Implemented robotics clubs
  - Increased participation in elementary STEM and robotics competitions
  - Facilitated business and industry guest speakers from local companies to discuss basic Computer Science, IT, and Technology careers
  - Facilitated Hour of Code projects and presentations

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- Career Awareness Activities
  - Facilitated business and industry guest speakers from local companies to provide information about careers pathways
  - Implemented middle school robotics clubs
  - Increased participation in middle school robotics competitions
  - Promoted participation in Technology Student Association and SkillsUSA student association
  - Hosted a middle school job and career skills fair
- Career Exploration Activities
  - Facilitated business and industry guest speakers from local companies and the community college to demonstrate specific career pathway skills
  - Hosted field trips to at local Computer Science, IT, and Technology related businesses
  - Promoted participation in Technology Student Association and SkillsUSA student association
  - Facilitated job shadow opportunities for students at local Computer Science related businesses
  - Facilitated immersion activities for National Engineering Week, National STEM Day, and Computer Science week
  - Developed a mentorship model of high school students mentoring middle and elementary school students
  - Hosted career and skill development fair with local businesses and universities
- Career Preparation Activities
  - Built pre-apprenticeship opportunities for students in coding and programming
  - Participated in Technology Student Association and SkillsUSA student association competitive events
  - Facilitated internships opportunities for students at local Computer Science, IT, and Technology related businesses
  - Facilitated activities at the PSU Summer Career Accelerator Camp

STUDENT JOB ATTAINMENT AND POSTSECONDARY OPPORTUNITY OUTCOME DATA
PSU grant recipients did not report any student job attainment or postsecondary opportunity outcome data for this grant cycle. Initiative activities primarily focused on elementary and middle school students and building capacity for educators to deliver high quality Computer Science content across multiple grade levels and academic disciplines.