

UNIVERSITY OF
GEORGIA
Carl Vinson
Institute of Government

Technology Standards to Support 21st-Century Learning

December 2022

Commissioned by the Georgia Department of Education

To all who read this report,

Technology plays an essential role in our schools. We must ensure our schools have access to educational technology and supports that enhance teaching and learning experiences.

In February 2022, I convened a task force consisting of local superintendents, chief information officers, and technology experts to recommend technology learning standards that will ensure all educators and students in Georgia have access to a 21st-century learning environment.

The task force was charged with defining uniform standards for devices, networks, technology, structure, bandwidth, and more. I asked them to create a technology inventory aligned to standards that create a common set of metrics, and determine funding, resources, and support to minimize technology gaps.

This report contains the observations and recommendations of a diverse group of rural, urban, small, mid-size, and large school districts. Their dedication to improving technology access and support for teachers and students across the state is reflected in this report. I want to thank each member of the task force for their work.

I encourage policymakers, district and school leaders, community members, and parents to review these recommendations and consider how they can be enacted within their schools and communities.

We will do the same at the state level, continuing the work to support those who directly support students – our teachers.

Sincerely,

Richard Woods
State School Superintendent

Technology Standards to Support 21st-Century Learning

Introduction

In February 2022, Georgia State Superintendent of Schools Richard Woods convened a task force consisting of superintendents, chief information officers, and technology experts to recommend technology learning standards that would ensure all educators and students in Georgia have access to the following:

- a 21st-century learning environment;
- uniform standards for devices, networks, technology structure, bandwidth, and more;
- technology inventory aligned to standards that create a common set of metrics; and
- funding, resources, and support to minimize technology gaps.

The demographically diverse group represented rural, urban, small, mid-size, and large school systems. All geographic regions of Georgia were represented.

Technology Standards to Support 21st-Century Learning Task Force Members

Mike Afdahl
Emily Bell
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Dave Rutz
Kenneth Scott
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Ryan White
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Cheryl Youse

FEBRUARY 24, 2022 TASK FORCE MEETING

After viewing presentations regarding the purpose and mission of the task force and highlighting information from *A Roadmap to Reimagining K-12 Education*, task force members were organized into five groups representing five information technology topics:

- Technical Systems
- Networking Standards
- Interoperability Standards
- Device Management
- Data Management

Task force members were asked to develop a list of quality standards based on two guiding questions:

- How should technology support the educational environment for every student and teacher whether it is at home or in a school building?
- What is necessary to manage technology and support resources to outfit classrooms and media centers for 21st-century standard of learning?

MARCH 25, 2022 TASK FORCE MEETING

After viewing a presentation about the bandwidth dashboard being developed by the Georgia Department of Education, task force members reviewed quality standard statements generated during the February 24 meeting for each of the five technology topic areas. Each member was able to explore the rationale behind each statement as well as pose questions and offer suggestions for revision. Next, task force members were reunited into their assigned topic areas to edit statements and select the two most essential standards for each of three categories:

1. Ensure every teacher and student has access to technology to support a quality, 21st-century learning environment that provides opportunities for both synchronous and asynchronous learning, while allowing for anywhere, any space, anytime learning.
2. Adopt school-level technology practices to support a quality, 21st-century learning environment for all stakeholders.
3. Establish district-level technology practices to support a quality, 21st-century learning environment for all stakeholders.

This activity generated 17 standards and 62 quality statements labeled as "elements." Standard recommendations are intended to provide guidance while giving stakeholders maximum flexibility.

APRIL 27, 2022 TASK FORCE MEETING

Task force members reviewed standards and quality statements generated during the March 25 meeting and organized the information into a domain, standard, and element format.

Domain 1: Ensure every teacher and student has access to technology to support a quality, 21st-century learning environment that provides opportunities for both synchronous and asynchronous learning, while allowing for anywhere, any space, anytime learning.

- 4 Standards
- 14 Elements

Domain 2: Adopt school-level technology practices to support a quality, 21-st century learning environment for all stakeholders.

- 6 Standards
- 17 Elements

Domain 3: Establish district-level technology practices to support a quality, 21st-century learning environment for all stakeholders.

- 7 Standards
- 31 Elements

Standard and element language was crafted for each of the three domains. Institute faculty organized the information into a draft report.

TASK FORCE MEMBER OBSERVATIONS

"The standards developed through the 21st Century Technology Task Force provide a landscape for our technology leaders to have focused navigation."

"Working with state and local leaders was instrumental in establishing common technology standards for all districts in Georgia."

"As a district leader, I find that these standards help me better determine what best practice looks like related to our technical systems and infrastructure."

Technology Standards to Support 21st-Century Learning

Technology Standards to Support 21st-Century Learning

Domain 1: Ensure every teacher and student has access to technology to support a quality, 21st-century learning environment that provides opportunities for both synchronous and asynchronous learning, while allowing for anywhere, any space, anytime learning.

Standard 1: Provide digital life skills training and activities on an ongoing basis to stakeholders.

- Element 1.1 – Provide annual digital citizenship awareness training.
- Element 1.2 – Provide digital citizenship training on demand.
- Element 1.3 – Provide stakeholder learning on digital safety, digital footprint, digital well-being, etc.

Standard 2: Enrich learning with a robust digital ecosystem aligned to Georgia's academic standards.

- Element 2.1 – Acquire digital curriculum resources that support interoperability standards[1] and content packing standards.[2]
- Element 2.2 – Provide best practices training for instructional implementation of digital resources.
- Element 2.3 – Utilize instructional software that provides timely data to guide instruction.
- Element 2.4 – Provide instructional software and best practices that supports the four "Cs": collaboration, critical-thinking, communication, and creativity.

Standard 3: Provide access to a modern and relevant device that supports collaboration in a variety of effective instructional models.

- Element 3.1 – Acquire end-user hardware that will be supported by software updates for no less than five years.
- Element 3.2 – Select device hardware and software that supports relevant instructional models when needed such as assistive technologies, touchscreen, cameras, headphones, etc.
- Element 3.3 – Select, purchase, and/or implement device repair and/or warranty programs to ensure device availability.

[1] Interoperability standards such as 1EdTech's Competency Academic Standards Exchange (CASE)
[2] Content packing standards such as Common Cartridge

Standard 4: Provide access to and ongoing training for a district-adopted learning management solution or additional digital learning ecosystem.

- Element 4.1 – Adopt a learning management solution that supports interoperability standards including rostering, LTI, single sign-on, content packaging, and digital badging.[3]
- Element 4.2 – Adopt an assessment tool that supports both formative and summative assessment gathering. This tool should support interoperability standards.[4]
- Element 4.3 – Adopt a data analytics solution or dashboard to gather, analyze, and report on formative learning data.
- Element 4.4 – Adopt a content management solution.

[3] When possible, leverage state pricing or partner with the Georgia Department of Education (GaDOE) to ensure local access, such as GaDOE's PartnerUp program.
[4] Interoperability standards such as QTI and APiP

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Domain 2: Adopt school-level technology practices to support a quality, 21st-century learning environment for all stakeholders.

Standard 1: Establish and maintain appropriate levels of access to digital resources based on position and job duties.

- Element 1.1 – Leverage learning pathways to ensure that professional learning can be measured over time.
- Element 1.2 -- Establish internal IT (information technology) controls to ensure that only necessary access is granted to sensitive network resources.
- Element 1.3 – Establish appropriate access control procedures for all users as part of the user provisioning process.

Standard 2: Utilize procurement procedures for digital resources requiring district technology leadership approval.

- Element 2.1 – Provide school-level guidance procedures regarding the acquisition of digital resources.
- Element 2.2 – Develop a "trusted source" clearinghouse for appropriate educational software.
- Element 2.3 – Develop a local software adoption policy utilizing boilerplate narrative requiring adherence to interoperability standards as a feature.
- Element 2.4 – Develop a consistent software/technology procurement process allowing staff to request solutions for adoption.
- Element 2.5 – Provide staff with approved digital resources that can be quickly and easily implemented within a district-approved digital ecosystem.

Standard 3: Educate all stakeholders on standards for data privacy and security as it relates to the purchase or use of digital tools.

- Element 3.1 – Provide ongoing training on applicable student data privacy laws such as FERPA, CIPA, COPPA, HIPAA, and copyright requirements.
- Element 3.2 – Provide guidance about student data privacy to staff, covering the implications of sharing student data or PII.

Standard 4: Support common (interoperable) rostering and single sign-on (SSO) solutions.

- Element 4.1 – Acquire software solutions that actively support and embrace interoperability standards.
- Element 4.2 – Adopt industry standard interoperability tools such as Rostering, LTI, or trusted APIs to ensure the seamless and transparent movement of data.

Standard 5: Provide access to space(s) with appropriate innovative technological devices that promote creation, partnership, and workforce development and that accommodate a variety of instructional models.

- Element 5.1 – Outfit with innovative technologies an instructional space such as a media center, makerspace, digital learning commons, or the like, and provide ongoing support (personnel and professional learning).
- Element 5.2 – Ensure the availability of innovative technologies, such as 3D printers, robotics, and other STEM/ STEAM-related activities.
- Element 5.3 – Allocate funds for extracurricular or enrichment use of technology.

Standard 6: Educate all users to effectively implement and integrate technology tools and devices to improve engagement and instruction to support school improvement plans.

- Element 6.1 – Establish and support ongoing, systemic professional development initiatives focused on 21st-century technologies.
- Element 6.2 – Leverage learning pathways to ensure that professional learning can be measured over time.

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Domain 3: Establish district-level technology practices to support a quality, 21st-century learning environment for all stakeholders.

Standard 1: Provide ubiquitous, reliable, resilient, secure, regulatory-compliant bandwidth.

- Element 1.1 – Procure internet access that allows for continued connectivity at all times.
- Element 1.2 – Acquire a secondary and/or tertiary firewall to ensure that load-balancing/round-robin/high-availability functionality exists.
- Element 1.3 – Provide a suite of tools and solutions to actively monitor network traffic to proactively identify and mitigate potential issues.

Standard 2: Build awareness of cyber threats and implement best practices and resources to promote cybersecurity.

- Element 2.1 – Participate, annually, in training initiatives made available via GaDOE and the Georgia Cyber Center partnership.
- Element 2.2 – Utilize partnership resources to implement and improve response plans and other cybersecurity-related policies.
- Element 2.3 – Leverage the Georgia Cyber Center, GEMA/DHS, GTA, CISA, and other agencies in collaboration with GaDOE.
- Element 2.4 – Provide industry-standard cybersecurity support hardware and software to technology personnel.
- Element 2.5 – Provide ongoing cybersecurity training for all technology staff.
- Element 2.6 – Ensure funding to support cybersecurity services or personnel and cybersecurity insurance.
- Element 2.7 – Conduct periodic phishing campaigns and establish an internal standard for conducting independent security assessments with appropriate remediation training.
- Element 2.8 – Conduct ongoing third-party risk and vulnerability assessments and implement mitigation strategies based on assessment results.

Standard 3: Maintain technology procedures and guidelines annually and communicate on an ongoing basis.

- Element 3.1 – Develop a business continuity plan.
- Element 3.2 – Develop a disaster recovery plan.
- Element 3.3 – Develop an incident response plan.
- Element 3.4 – Develop an acceptable use policy.

Standard 4: To the greatest extent possible, technical systems will be cloud-based.

- Element 4.1 – Plan for systematic migration of on-premise systems and services to a secure cloud-hosted solution.
- Element 4.2 – Utilize cloud vendor relationships, including their skills and practices, to help strengthen the district's digital ecosystem and build capacity.
- Element 4.3 – Select software solutions that prioritize cloud architecture.

Standard 5: Increase the number of technical and instructional staff, such as media specialists and/or academic specialists, to meet the exponential demand of 21st-century learning environments.

- Element 5.1 – Modernize the K-12 funding formula (QBE) to ensure adequate resources and support.[5]
- Element 5.2 – Change the ratio from technology staff per student to technology staff per user to count teachers, administrators, and other staff.

Standard 6: Implement a comprehensive secure infrastructure that encompasses software, hardware, and technical resources; that is simple to use and accessible; and that contains appropriate safeguards.

- Element 6.1 – Communicate and adhere to life cycles for all devices.
- Element 6.2 – Establish and publish hardware-refresh cycles for district technologies to allow for maintenance of a 1:1 student-to-device ratio, utilizing devices that are current and receiving software support.
- Element 6.3 – Provide fiber connectivity from the school to the point of internet connectivity.
- Element 6.4 – Utilize fiber optic technologies as the medium for all WAN connectivity.
- Element 6.5 – Deploy content filtering on and off campus for district-provided devices.
- Element 6.6 – Establish software management procedures.
- Element 6.7 – Establish device management procedures.

Standard 7: Implement industry standards–based wired and wireless connectivity.

- Element 7.1 – Connect all classrooms to the school's local area network (LAN) with fiber optic or with Cat6 or better to a main distribution frame (MDF) or intermediate distribution frame (IDF) at a network speed that meets current industry standards.
- Element 7.2 – Connect all classrooms to the school's LAN with enterprise wireless access points encrypted with a minimum of enterprise standards.
- Element 7.3 – Provide available connectivity to all school grounds and facilities capable of supporting the instructional technology needs of that facility or area.
- Element 7.4 – Leverage cellular and/or satellite resources, when appropriate.

[5] With time, proper ratios of service personnel to users should be determined.

Glossary of Acronyms

TECHNOLOGY REFERENCE SHEET

Acronym	Terminology
APIP	Accessible portable item protocol
API	Application programming interface
CASE	Competency and Academic Standards Exchange
CAT 6	Category 6 cabling
CIPA	Children's Internet Protection Act
CISA	Cybersecurity and Infrastructure Security Agency
COPPA	Children Online Privacy Protection Rule
DHS	Department of Homeland Security
FERPA	Federal Education Right to Privacy Act
GaDOE	Georgia Department of Education
GEMA	Georgia Emergency Management Agency
GTA	Georgia Technology Authority
HIPAA	Health Insurance Portability and Accountability Act
IDF	Intermediate distribution frame
IT	Informational technology
LAN	Local area network
LTI	Learning tools interoperability
MDF	Main distribution frame
PII	Personally identifiable information
QBE	Quality Basic Education
QTI	Question and test interoperability
SSO	Single sign-on
STEAM	Science, technology, engineering, arts, mathematics
STEM	Science, technology, engineering, mathematics
WAN	Wide area network