MISSISSIPPI DEPARTMENT OF EDUCATION

Ensuring a bright future for every child

Office of Technology and Strategic Services
Statewide Educational Technology Guide

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Mississippi Department of Education

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INTRODUCTION

Introduction

The Mississippi Department of Education (MDE) is dedicated to improving the educational opportunities for all students and ensuring a bright future for every child throughout Mississippi.

The Mississippi Board of Education 5-Year Strategic Plan aims to ensure that:

- all students proficient and showing growth in all assessed areas
- every student graduates from high school and is ready for college and career
- every child has access to a high-quality early childhood program
- every school has effective teachers and leaders
- every community effectively using a world-class data system to improve student outcomes

The goal of MDE Statewide Education Technology Guide (SETG) is to provide insight, direction and best practices for districts and schools that will allow them to evaluate, create and execute their own technology plans. These plans encourage student success through personalized learning, promoting equity and access for students and ensure a robust infrastructure for future development. Successful production and implementation of standards does not happen in isolation. Districts, schools and private organizations must work together to develop and refine standards and frameworks to ensure learning environments are filled with opportunity and agency for students.

About

In 2016, MDE and the Office of Technology and Strategic Services (OTSS) created the Technology Advisory Committee (TAC) to assess technology use in districts, review current technology planning and funding, develop a statewide technology strategy and discuss the implementation of that strategy. The SETG is the first deliverable of the TAC.

The SETG includes guidance from state, national and international organizations including:

- Mississippi Education Technology Leaders Association - http://www.metla.org
- Mississippi Educational Computing Association - http://www.ms-meca.org
- Partnership for 21st Century Learning - http://www.p21.org
- International Society for Technology in Education - http://www.iste.org
- Consortium for School Networking - http://www.cosn.org
- U.S. Department of Education - http://www.ed.gov

For more information on these organizations and their guidance, see the Further Reading section.

Document Organization

The SETG addresses ways that education technology can benefit districts, schools, parents and students by highlighting specific needs of the 21st century classroom:

- Equity and Accessibility - bridging the digital divide
- Digital Citizenship - safety and responsibility in the digital age
- Teaching with Technology - giving educators the tools to develop a modern curriculum
- Learning with Technology - enabling personalized learning
- Leadership - helping leadership foster a digital culture
- Infrastructure - guidance on the technical infrastructure required to support modern technology

How to Use

Education stakeholders will find relevant information and guidance aligned with their perspective and responsibilities:

Administration

Ensure policies and procedures address Equity and Accessibility (Section 1) and Digital Citizenship (Section 2) through innovative Leadership (Section 5) and adequate Infrastructure Development and Support (Section 6).

Teachers

Use guidance in Teaching with Technology (Section 3) to ensure that students are Learning with Technology (Section 4).

Technology Planners and Coordinators

Ensure Infrastructure Development and Support is adequate to support Leadership and Teaching with Technology.

Education Policy Makers

Ensure Leadership has the necessary tools and freedom to promote a culture of technology that enables Equity and Accessibility.

Parents and Students

Learning with Technology can ensure that students are college and career ready.

1. Equity and Accessibility

Concepts

Great inequalities exist between school districts, within school districts and even within schools. Many students grow up surrounded by technology and internet at home, while others only have access to the internet at school (or limited access at home) and this leads to a digital use divide in our student population. Schools must also be aware of equity and accessibility considerations. Technology can be used to help bridge the gap in our districts and schools.

Why Equity and Accessibility Matters

Stanford University's report, " (Darling-Hammond, Zielezinski, & Goldman, 2014)" made the digital divide and its effect on student achievement apparent. Students of color and low-income students were less likely to own computers at home. According to teachers, this lack of access and technology skills affected their ability to perform in the classroom. The lack of internet or internet enabled devices at home also kept many students from being able to complete homework assignments. Teachers in low-income schools were also less likely to receive the professional development necessary to implement education technology programs in the classrooms. (Darling-Hammond, Zielezinski, & Goldman, 2014)

Digital Use Divide

Digital use divide is the gap between students who have access to the internet and devices at school and home and those who do not. Significant progress is being made to increase internet access in schools, libraries and homes across the country. However, a digital use divide separates many students who use technology in ways that transform their learning from those

who use the tools to complete the same activities but now with an electronic device (e.g., digital worksheets, online multiple-choice tests).

The digital use divide is present in both formal and informal learning settings and across high- and low-poverty schools and communities.

Equity

Equity refers to the equal access to education opportunities for all students, regardless of their:

- race, ethnicity or national origin
- gender
- sexual orientation
- disability
- English language ability
- religion
- socio-economic status
- geographical location

While aggressive strides have been made to limit the digital use divide nationally, locally schools still struggle to bridge the disparity in equity highlighted by the number/quality of available technology resources, internet access and speed at home and the ongoing professional development for teachers in districts and schools attended primarily by students of color. (Office of Education Technology, 2016)

Accessibility

Accessibility refers to the design of apps, devices, materials, and environments that support and enable access to content and education activities for all learners. In addition to enabling students with disabilities to use content and participate in activities, the concepts also apply to accommodating the individual learning needs of students, such as English language learners, students in rural communities or students from economically disadvantaged homes. Technology can support accessibility through embedded assistance—for example, text-to-speech, audio and digital text formats of instructional materials, programs that differentiate instruction, adaptive testing, built-in accommodations and other assistive technology tools.

Technology's Role

Just as reading and writing are necessary skills for students, technology readiness will define student success when they join the workforce. Mississippi's College and Career Ready Standards ensure that students have the required technical proficiency to meet future challenges. When students have access to appropriate and useful technologies, all students are

capable of improving academic achievement and technology skills. (International Association for K-12 Online Learning, 2015) Some recommendations include:

- Improve access through initiatives such as "1:1"
- provide stable internet access and have enough bandwidth to support modern media
- provide technology at high levels of interactivity, engagement and collaboration
- ensure teachers help students consume material through technology and actively create it as well
- provide blended learning environments that improve student interaction
- engage the community to discuss "bring your own device" programs

Recommendations

Provide technology enabled learning to all students, regardless of socio-economic status, physical limitations, culture or gender.

Strategies

- Develop and implement learning resources that use technology to make learning possible anywhere and at all times for every student
- Align learning technology resources to learning pathways in order to achieve desired learning outcomes
- Ensure accessibility through software and hardware enabled technologies
- Develop creative solutions to provide students with broadband access to the internet and adequate wireless connectivity, with a special focus on equity of access outside of school
- Ensure adequate network bandwidth throughout schools and among schools within districts
- Provide robust Wi-Fi connectivity to ensure access for all students
- Create a plan to meet Americans with Disabilities Act (ADA) standards for technology accessibility
- Consider alternative funding sources such as local community initiatives, Title 2 and Title 4 initiatives to fund programs
- Provide appropriate funding for sustainability of technology

2. Digital Citizenship

The idea of citizenship, i.e. acting in a civil and responsible manner, are skillsets that are taught to students daily in homes and schools across Mississippi. The 9 Elements of Digital Citizenship (Nine Themes of Digital Citizenship, 2016) are the evolution of these ideals applied to the modern information age.

- Digital Access - full electronic participation in society
  - not everyone has access to technology opportunities
  - equal digital rights and supporting electronic access is at the core of digital citizenship
- Digital Commerce - electronic buying and selling of goods
  - be aware of issues associated with legitimate and legal online exchanges
  - ensure online actions are not in conflict with laws or morals
- Digital Communication - electronic exchange of information
  - make appropriate decisions when faced with various communication mediums
- Digital Literacy - teaching and learning about technology and the use of technology
  - ensure students, teachers, administrators and parents are aware of, and taught how to use, technology
- Digital Etiquette - electronic standards of conduct
  - ensure appropriate conduct and actions online
- Digital Law - electronic responsibility for actions
  - ensuring that students don't damage people's work, identity or property online
- Digital Rights & Responsibilities - freedoms extended to everyone in a digital world
  - define how technology interfaces with users' rights to privacy and free speech
- Digital Health & Wellness - physical and psychological well-being
  - address wellness including eye safety, repetitive stress syndrome and internet addiction
- Digital Security - electronic precautions to guarantee safety
  - understand digital security including virus protection, backups, networking safety and any other forces that might cause harm

Media and Digital Literacy

Digital literacy is the ability of students to use a range of technology and online tools in order to analyze, evaluate and communicate in an always-connected world. Just as important is the ability to understand and use this information from multiple sources and source types (i.e. online textbooks, video, web). The key to digital literacy is a student's ability to find and evaluate information and media and use that knowledge to complete tasks.

Daily student activities will include writing, creating and communicating online through various forms of technology. The technologies used change almost daily, and the considerations students must have for the legal, social and community aspects of a digital life must update as quickly.

With the ability to cut and paste almost any information on the internet, students and teachers must consider digital responsibility to ensure their own safety as well as the safety of others when online.

Digital Responsibility

Educators and students have a responsibility to practice appropriate behavior while participating in learning activities that include accessing the internet and other shared resources. Sites such as Common Sense Media (http://www.commonsensemedia.org) can help teachers, students and parents identify appropriate content. Teachers must demonstrate responsibility and guide their students in order to be good stewards of modern technology. Students must also enjoy safe access to digital resources; one such way is internet filtering provided by hardware, software or even an outside vendor.

Another consideration of digital responsibility is the distraction caused by technology in the classroom. According to Professor Rosen of Psychology Today, students in classrooms had an average continuous attention span of about 3 minutes. Teachers must ensure that that technology enhances learning instead of providing a constant distraction for students.

Academic Honesty and Plagiarism

The internet is a way for students to learn from others and share their own content. Teachers and students must understand the use and implications of using copyrighted content. The Fair Use Act generally permits the use of copyrighted material for educational and non-commercial purposes, but is important to ensure that students understand the difference between Fair Use and plagiarism.

Internet Safety and Cyberbullying

Social media and the internet have created an entirely new kind of bully. Cyberbullying is the use of technology (e.g. Internet, phones) to bully, harass and victimize through social media. Students, teachers and parents must be mindful of pictures, comments or sensitive personal information that are posted to the internet. Teachers, parents and students can work together in order to combat cyberbullying by following a few simple steps:

Teachers

- Don't ignore it; discuss cyberbullying even before it becomes a problem
- Don't assume students understand cyberbullying; give examples
- Encourage students to report cyberbullying to teachers, counselors, administrators and parents
- When using social media, be sure to follow the Mississippi Educator Code of Ethics

Parents

- Keep home computer in a common area
- Monitor social media accounts as needed
- Be familiar with internet shorthand and acronyms to spot cyberbullying
- Discuss cyberbullying before it becomes a problem

Students

- Keep personal information PERSONAL
- Don't give out social media or other passwords
- Don't engage bullies; inform an adult
- Never post anything online that you wouldn't want your parents, teachers or the authorities to see
- Consider your electronic footprint and how social media posts can affect your future, including scholarships and future employment
- Consider the "Mom Rule"; if you wouldn't want your mother seeing your post, it probably isn't appropriate to share

See http://www.edutopia.org/article/digital-citizenship-resources for more information on digital citizenship.

Recommendations

Understand appropriate online behavior and understand how their digital safety, citizenship and footprint have implications.

Strategies

- Create policies that align good digital citizenship with accepted codes of conduct
- Use resources such as commonsensemedia.org, teachers and parents to create a culture of acceptable behavior
- Teach and implement the 9 Elements of Digital Citizenship
- Create acceptable use policies that encourage safe and acceptable information exchange
- Help students understand their digital footprints and how it can affect their lives outside of the internet
- Ensure parents help students understand the potential repercussions of social media use

3. Teaching with Technology

Technology will never replace the effect of a quality teacher. Technology can improve a teacher's ability to lead the classroom. Using appropriate technologies, teachers can create blended classroom experiences that keep students engaged and present material in a way that is relevant to students.

In order for teachers to properly utilize technology in their classrooms, teacher preparation must focus on technology as a core curriculum delivery method as opposed to simply a method to convey lesson plans. Appropriate integration of technology can provide a wealth of opportunities otherwise unavailable such as:

- access to high-quality curriculum content over the internet
- professional development and instructional courses using digital and distance learning
- extensive contact with leading experts
- current, reliable information
- technology that enables students to create and publish content such as online publishing and media creation

Technology offers the opportunity for teachers to become more collaborative and extend learning beyond the classroom. Educators can create learning communities that include:

- students
- other educators
- museums and libraries
- other schools
- subject matter experts
- community organizations
- friends and family
- real-time feedback for personalized learning

This enhanced collaboration, enabled by technology, offers access to instructional materials as well as the resources and tools to create, manage, and assess their quality and usefulness.

International Society for Technology in Education (ISTE) Standards for Teachers (ISTE Standards, 2016)

Educators are in a unique position to promote innovative learning environments. Teachers should:

- Facilitate and Inspire Student Learning and Creativity – use subject matter knowledge to facilitate student learning
- Design and Develop Digital Age Learning Experiences and Assessments – use contemporary tools to ensure contextual learning and to develop the ISTE standards for students
- Model Digital Age Work and Learning – use professional development and skills to be a role model to students
- Promote and Model Digital Citizenship and Responsibility – exhibit legal and ethical behavior in professional practice
- Engage In Professional Growth and Leadership –lifelong learners create students that are lifelong learners

Personalized Instruction

Student learning is nonlinear; educators must have a way to teach students that respond to different instruction methods, speeds and content. A key benefit to teaching with technology is the ability to develop a blended learning environment that customizes pedagogy, curriculum and learning environments that address differentiated learners inside and outside of the classroom.

The Convergence Center for Policy Resolution's Education Reimagined program proposes a learner centered paradigm shift from the current school-centric model of education to a more learner-centric model. This new instructional model highlights a learner-centric model that eschews the focus on educational delivery efficiency and replaces it with a learner-centric model that adapts to the needs and potential of each learner. (A Transformational Vision for Education in America, 2016)

School-Centric Model	***Learner Centric Model***
Standardized age cohorts	Competency based learning environments
Linear curricula divided by subjects	Relevant and contextualized learning
Learning experiences designed to 'feed' knowledge to students	Students practice self-directed discovery with their peers and guided by instructors

Modern teachers have the ability to redefine the role of a teacher in the classroom. With access to the appropriate technology, teachers can provide personalized learning independent of time, space and instructional modalities.

Professional Development

Institutions should be encouraged to develop programs and training for educators that ensures that all teachers are capable of selecting, evaluating and using technology appropriately in the classroom. This technology must provide for a safe, secure method of engaging students in learning through technology.

A primary resource for information on selecting and evaluating technologies is a school or district's technology leaders. Technology leaders can help develop frameworks that help teachers understand the cost, compatibility and impact that new technologies have on the classroom and associated infrastructure. Teachers can use learning communities that give feedback on the use and effectiveness of new technologies in the classroom. A robust professional development environment also allows busy teachers to learn outside of the traditional classroom or workshop and at a time that suits their busy schedules. Modern professional development frameworks allow teachers to learn by:

- Identifying relevant material and skill gaps through information and student feedback
- Engaging and sharing resources through websites, blogs and social media
- Providing personalized learning environments that address relevant capabilities of the technology
- Providing and receiving feedback to vendors and communities
- Implementing new skills and methodologies with immediate access to support
- Implementing changes in instructional models

Recommendations

Educators should be trained and motivated to use technology to implement the Mississippi College and Career Ready Standards (MCCRS) in a relevant and engaging way.

Strategies

- Students and staff will have expanded access to curricula and support related to MCCRS
- Develop and offer remediation modules for subject area tests
- Develop and implement learning resources that embody the flexibility and power of technology to create equitable and accessible learning ecosystems
- Provide student courses, staff development, and enrichment
- Expand and revise MDE's online approved lesson plan resources that are aligned with state curriculum frameworks

4. Learning with Technology

Administrators and teachers in Mississippi have worked together with MDE to provide students with access to digital tools and resources while in school. No longer limited by the walls of their own schools, students can expand learning opportunities that assist in providing students with a broader perspective in order to create a generation of students that will be successful in the global knowledge economy.

Mississippi College and Career Ready Standards

The Mississippi College and Career Ready (MCCRS) Standards is a single set of clear education standards for kindergarten through 12th grade in English language arts and mathematics. The standards are designed to ensure that students graduating from high school are prepared to enter credit-bearing entry courses in two-year or four-year college programs or enter the workforce. The standards ensure that parents, teachers, and students have a clear understanding of the expectations in reading, writing, speaking and listening, language and mathematics in school, and they put students on a level playing field regardless of their location.

Engaged and Empowered Learning

Educational technology is often used to enhance or present old information in an alternate way. Mississippi's educators must develop a wider scope of use for resources in order to increase student engagement and allow students to work beyond common constraints of traditional education. These changes have led states, districts and schools to slowly move away from traditional methods of educating towards more student focused, engaging and relevant processes led by teachers and facilitated through modern technology to meet the goals of the **MCCRS**.

This collaboration among students, teachers and parents has led to an increase in participation and involvement of students in the delivery of their education. No longer simply students, Mississippi's children can often function as experts (with their teachers as mentors) in the delivery of curriculum and education resources as they have increased access to resources and subject matter experts through modern technology.

ISTE Standards for Students (ISTE Standards, 2016) (Partnership for 21st Century Learning, 2016)

Teachers and administrators can use the ISTE Standards for Students to help define and implement the skills and knowledge that students need to learn effectively:

- Empowered Learner – leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
- Digital Citizen – 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.
- Knowledge Constructor – critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- Innovative Designer – use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
- Computational Thinker – develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- Creative Communicator – communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
- Global Collaborator – use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

For more information, see the related resources appendix.

21st Century Skills

P21's Framework for 21st Century Learning (Partnership for 21st Century Learning, 2016) was developed with input from teachers, education experts and business leaders to define and illustrate the skills and knowledge students need to succeed in work, life and citizenship, as well as the support systems necessary for 21st century learning outcomes.

The 21st Century Learning Framework includes key skills needed to prepare students for the future. Referred to as the "four Cs", students should learn:

- Creativity and Innovation – think and work creatively and implement innovations
- Communication and Collaboration – communicate clearly and work together

- Critical Thinking and Problem Solving – reason effectively and solve problems through judgments and decisions

In order to implement these skills, teachers should consider and implement innovative teaching and learning solutions into their classrooms such as:

- Blended and online learning – provide multiple opportunities for learning that are independent of traditional learning environments characterized by:
    - Student-centered learning
    - Collaborative and interactive learning
    - Metacognitive awareness
    - Increase learning delivery flexibility
    - Immediate feedback for teachers
    - Multimodal content
    - Integrated assessment
- Project based learning – students gain knowledge and skills by working to answer a complex problem characterized by:
    - Key knowledge, understanding and skills
    - Challenging problems or questions
    - Robust and sustained inquiry
    - Authenticity and relevance
- Active Learning – peer instruction, discussion groups and collaborative problem solving
- Personalized Learning – enabling student flexibility in what, how and when they learn
    - Allows for student agency
    - Provides differentiated instruction
    - Instructional help is available on-demand
    - Learning speed is tailored to each student
    - Immediate feedback
    - Performance based assessments

Open Educational Resources (OER)

Widely available learning and informational content is changing the relationship between students, teachers and their curriculum. OER are resources for teaching, learning and research that reside in the public domain or have been released under an intellectual property license that permits their free and open use by others. The ubiquity of the internet has allowed for the aggregation of these resources into a curated, vetted and searchable resource that allows for access to content in order to facilitate 21st century learning.

The need to individualize instruction not only for individual student achievement but also independent of location and time requires resources that can be accessed independently. OER also helps address student equality by providing resources to students who might not have access to books, libraries and other sources of information.

OER allows us to redefine what we consider instructional materials. Innovative teaching and learning styles require access to appropriate and relevant sources of information including books, magazines, video, audio and other online materials. Section 37-43-1 of the Mississippi Code of 1972 restricts districts and schools from replacing traditional, paper textbooks with OER. However, teachers may provide OER as a supplement to their traditional textbooks.

Recommendations

Use Research proven strategies provide personalized, engaging and just-in-time learning opportunities and environments that help students achieve technology literacy.

Strategies

- Digital content should be integrated into all instruction as appropriate
- All students should demonstrate grade appropriate mastery of technology literacy
- Students should use emerging technologies to enhance learning
- Districts and schools should develop and implement learning resources that embody the flexibility and power of technology to create equitable and accessible learning ecosystems
- Align all learning technology resources to intended education outcomes
- Ensure policies and procedures allow for innovation including resources outside of traditional textbooks

5. Leadership

A shared vision of technology requires a shift in the skills and competencies of education leadership. Leaders and administrators must gain personal experience with technology in order to understand how to effectively plan and budget for the deployment of these resources. They must also have effective tools, data and assessments to judge the effectiveness of technology integration.

In order for students and teachers to integrate current technologies into the classroom, education leadership must provide a framework that allows for current methods and future technologies to coexist in the classroom. This framework should help districts, schools and teachers understand how technology affects and enables learning and will help guide organizations in choosing relevant and cost effective technologies.

ISTE Standards for Administrators (ISTE Standards, 2016) (CoSN Infrastructure Survey 2015, 2015)

The ISTE Standards for Administrators provide a framework for effective leadership in education technology. This framework includes guidance for visionary leadership, creating a digital age learning culture, ensuring excellence in professional practice, encouraging systemic improvement and how all of these ideas are part of a framework of digital citizenship. The ISTE Standards for Administrators include:

- Visionary Leadership – inspire and lead with a comprehensive education technology implementation plan
- Digital Age Learning Culture – create, promote and sustain a culture committed to digital learning
- Excellence in Professional Practice – promote an environment of professional learning
- Systemic Improvement – continuously improve the organization through use of information and technology resources
- Digital Citizenship – understand social, ethical and legal issues related to digital culture

For more information, see the Related Resources appendix.

Success within an organization is ultimately dependent on leadership. Shared, innovative and forward-thinking vision and planning will lead to organizations focused on student learning through the effective uses of 21st Century technologies.

Recommendations

Embed an understanding of technology-enabled education within the roles and responsibilities of education leaders at all levels and set state, district and school visions for technology in learning.

Strategies

- Support the development and use of OER
- Establish clear strategic planning connections among all state, district, and school levels
- Develop funding models and plans for sustainable technology purchases and leverage openly licensed content
- Develop clear communities of practice for education leaders at all levels that act as a hub for setting vision, understanding research, and sharing practices
- Provide for innovative funding models and opportunities
- Ensure technology leadership have a hand in making strategic information technology decisions
- Provide funding for training and sustainment of information technology personnel and equipment

6. Infrastructure Development and Support

Technology infrastructure is often overlooked as the key to delivering a technology centered education. Leadership must understand the need for the planning, funding and implementation of robust, secure and available information technology infrastructure is essential to the success of modern students.

Policy Recommendations

Along with the physical requirements of infrastructure, a robust policy framework must be in place in order to ensure a 21st century learning environment. Policies of note include:

- implement devices to develop 21st century skills
- addressing legal and privacy issues pertaining to student data
- developing technology for pre- and in-service educators
- fostering digital citizenship to ensure appropriate use of technology
- investing in ongoing, consistent and relevant professional learning
- engaging parents and community partners in learning
- maintaining robust data system(s)

Broadband Connectivity and Internal Infrastructure

Technology encourages students to develop habits of collaboration, communication, critical thinking and creative problem solving. Ultimately, technology only creates the opportunity for achieving the types of outcomes necessary for college and career readiness. Broadband internet is a vital component of a robust infrastructure system.

In 2015, the Consortium for School Networking (CoSN) Infrastructure Survey discovered that 55% of nationwide school systems have yet to meet the Federal Communications Commission's (FCC) goal of 100 megabits (Mb) per second Internet speeds per 1,000 students (CoSN Infrastructure Survey 2015). As a result, the Mississippi Department of Education has set a minimum bandwidth speed recommendation of no less than 100Mb for district internet connections. As the quality of digital content and the number of devices on school networks

increases, MDE will work with districts and schools to ensure all schools have adequate bandwidth. Upon request, MDE will monitor and continue to make recommendations to districts and schools in regards to minimum network speeds.

SETDA set forth recommendations on bandwidth requirements for schools and districts for both internal and external networks:

Broadband Access	2014-15 SY Target	2017-18 SY Target
ISP/External Connection	At least 100Mbps per 1000 students/staff	At least 1Gbps per 1000 students/staff
WAN/Internal Connections	At least 1Gbps per 1000 students/staff	At least 10Gbps per 1000 students/staff

Ensuring that all schools have adequate broadband access is important, but it is only the first step in providing a high-quality learning environment. A comprehensive digital infrastructure is key to unlocking the potential of broadband and technology to enhance student learning and achievement.

Equitable distribution and adoption of these systems, tools, and approaches must go hand-in-hand with increased broadband access in and out of school. Without such systems, the students and communities with the highest need will remain unconnected to the increasingly connected and networked world.

Universal Service Fund Schools and Libraries Program (E-rate)

E-rate is a government program that promotes internet and phone connectivity in schools. Funding for E-rate includes four categories of service:

- telecommunication services
- internet access
- internal network infrastructure and Wi-Fi
- maintenance of communications infrastructure

The E-rate program was established in 1998 and has been successful in connecting 99% of schools and libraries to the internet. Today, E-rate has led to the increase in interoperability, accessibility, technical support, privacy/data security and underlying structures needed to support this increase in infrastructure. Districts and schools should look to their technology leaders for guidance on appropriate equipment and service when applying for E-rate funds.

Data Quality, Security and Accessibility

Relevant, robust, secure and accessible data is crucial to the foundation of education and education technology. Schools, districts and states handle Personally Identifiable Information (PII) on a daily basis. This information is used for instruction, to improve policies and programs, justify funding and improve student outcomes. This data is also provided to state and local shareholders, parents and citizens as required.

Safeguarding data and ensuring their ethical and appropriate access and use are critical components of effective data use. Districts and schools can safeguard data and ensure appropriate use by implementing policies, processes, and transparency measures that govern and communicate their data decision making. Special consideration must be given to data access by outside contractors and vendors and appropriate training and certification must be performed if required.

Data on individual students, such as attendance, grades, and course-taking, can give teachers and parents the ability to understand students' strengths and needs to help improve student achievement. Data on classrooms, schools, and districts can provide school leaders, such as principals and superintendents, with information they need to ensure that resources are being allocated fairly, class sizes are manageable, and education programs are improving student achievement.

Parents are critical partners in their children's education. All parents, regardless of where they live, need access to their children's education data and information to help their children succeed. Parents need data that enable them to make the best decisions possible, including which schools their children should attend and what they can do as parents to meet their children's unique education needs. Parents also need access to timely information that is tailored to their needs to help them understand the implications of the courses their children take and how this will affect their children's ability to succeed in the future.

Common Educational Data Standards (CEDS)

The Common Education Data Standards (CEDS) project is a national collaborative effort to develop voluntary, common data standards for a key set of education data elements to streamline the exchange, comparison, and understanding of data within and across all age groups, Pre-K to post-secondary education and into the workforce (P-20W).

Children's Internet Protection Act (CIPA)

CIPA was enacted by Congress in order to assure that students are protected from obscene or harmful content on the internet. Districts and schools must have a certified internet safety policy in order to be eligible for E-rate funds. CIPA requires that certain internet content is blocked by hardware or software solution within schools and libraries. Schools must also provide reasonable notice to students and teachers and have public meetings to inform and discuss the solution.

CIPA also addresses social media and chat room access and how children access the content. Schools must also provide a plan for cyberbullying awareness and response and consider unauthorized disclosure of personal information and unauthorized access.

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's education records. These rights transfer to the student when he or she reaches the age of 18 or attends a school beyond the high school level. Students to whom the rights have transferred are "eligible students."

- Parents or eligible students have the right to inspect and review the student's education records maintained by the school.
- Parents or eligible students have the right to request that a school correct records which they believe to be inaccurate or misleading. If the school decides not to amend the record, the parent or eligible student then has the right to a formal hearing.
- Generally, schools must have written permission from the parent or eligible student in order to release any information from a student's education record. However, FERPA allows schools to disclose those records, without consent, to the following parties or under the following conditions (34 CFR § 99.31):
    - school officials with legitimate education interest
    - other schools to which a student is transferring
    - specified officials for audit or evaluation purposes

- appropriate parties in connection with financial aid to a student
- organizations conducting certain studies for or on behalf of the school
- accrediting organizations
- to comply with a judicial order or lawfully issued subpoena
- appropriate officials in cases of health and safety emergencies
- state and local authorities, within a juvenile justice system, pursuant to specific state law

Common Misconceptions

Teachers, parents and students often have misconceptions about the use of data, CEDS, FERPA and the Mississippi College and Career Ready Standards. Understanding WHO collects it, WHY this data is collected, and WHAT is collected can help understand why education data is important.

Who Collects Data?

Local schools and districts collect locally controlled student data in their student information systems. Only data necessary for federal reporting is forwarded to MDE.

Why is Data Collected?

Without data, assessing and verifying the effectiveness of education is difficult. Data ensures necessary funding is routed to the districts and schools. Data ensures accountability for teachers, districts and schools; it also ensures transparency by verifying taxpayer money is spent appropriately and improves student success by ensuring that successful policies and programs are continued.

What is Collected?

Full student data is collected by schools and districts. States can access basic student level data, but no student level data is forwarded to the U.S. DoE from district and state data systems. MCCRS and CEDS are NOT data collection systems and are forbidden from reporting student-level data to the federal government.

Recommendations

Embed an understanding of technology-enabled education within the roles and responsibilities of education leaders at all levels. Set state, regional, and local visions for technology in learning that include robust infrastructure support and planning as well as available, usable, relevant and secure education data.

Strategies

- Provide students and educators with broadband access to the internet and adequate wireless connectivity and core network infrastructure, with a special focus on equity of access outside of school.
- Draft sustainability plans for infrastructure concerns that include upgrades of wired and wireless access as well as device refresh plans and sustainable funding sources while ensuring the safety and protection of student data.
- Create a comprehensive map and database of connectivity, device access and use of openly licensed educational resources.
- Create comprehensive IT security management policies
- Invest in a robust Wi-Fi infrastructure to allow for uninterrupted network accessibility
- Investigate the use of cloud services for greater accessibility and disaster recovery
- Revise practices, policies, and regulations to ensure privacy and information protection

Further Reading

Supporting Organizations

Mississippi Educational Computing Association - http://www.ms-meca.org

The purpose of MECA is to provide for the sharing and exchanging of ideas, techniques, materials, and procedures for all persons interested in technology in education including instructional applications, administrative applications, and computer science education.

Mississippi Educational Technology Leaders Association - http://www.metla.org

METLA is the premier association of education technology leaders in the state of Mississippi. METLA conferences address issues such as new technology and best practices, district technology innovations and other important education technology related issues.

Partnership for 21st Century Learning - http://www.p21.org

The premier nonprofit organization serving students, educators and education leaders committed to empowering connected learners in a connected world. Central to the concept of 21st century learning are standards, assessments, curriculum, professional development and learning environments.

International Society for Technology in Education - http://www.iste.org

ISTE's mission is to serve as a catalyst for 21st century learning in order to build collaborative partnerships among education, businesses, community and government leaders. Standards include guidance for students, teachers, administrators, leadership and computer science educators.

Consortium for School Networking - http://www.cosn.org

CoSN is the premier professional association for state and district technology leaders. CoSN focuses on educational technology transformation by fostering essential skills, detailing fundamental requirements, providing advocacy for sustainable investment in technology and organizational capacity.

U.S. Department of Education - http://www.ed.gov

The Department of Education (DoE) promotes student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access. The DoE Educational Technology Plan sets a national vision for learning enabled technology.

Open Educational Resources

OER Commons - http://www.oercommons.org

OER Commons provides a single point of access to over 50,000 vetted and fully indexed OER from around the world.

National Science Digital Library - http://nsdl.oercommons.org

The National Science Digital Library provides high quality online educational resources for teaching and learning, with current emphasis on the sciences, technology, engineering, and mathematics (STEM) disciplines.

The Learning Registry - http://www.learningregistry.org

The Learning Registry is an aggregator of metadata—data about the learning resources available online.

OpenStax - http://www.openstax.org

OpenStax, OpenStax CNX and OpenStax College provide open, book-like modules that can be arranged as courses, books, reports or other educational resources.

Smithsonian Learning Lab - https://learninglab.si.edu

The Smithsonian Center for Learning and Digital Access has created a portal to access the digital resources from across the Smithsonian's 19 museums, 9 major research centers, the National Zoo and more.

MIT Open Courseware - http://ocw.mit.edu

MIT OpenCourseWare (OCW) is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity.

ISTE Standards for Students

2016

ISTE STANDARDS
FOR STUDENTS

1. 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. Students:

a. articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
b. build networks and customize their learning environments in ways that support the learning process.
c. use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
d. 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.

2. Digital Citizen

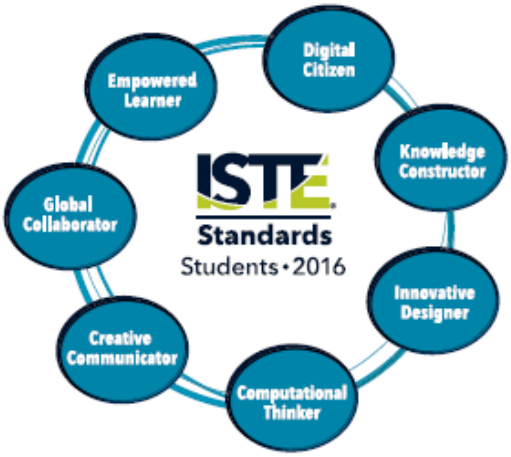
Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical. Students:

a. cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
b. engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
c. demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
d. manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.

3. 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. Students:

a. plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
b. evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
c. curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
d. build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.



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4. Innovative Designer

Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. Students:

a. know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
b. select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
c. develop, test and refine prototypes as part of a cyclical design process.
d. exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

5. 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. Students:

a. formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
b. 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.
c. break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
d. understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

6. Creative Communicator

Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. Students:

a. choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
b. create original works or responsibly repurpose or remix digital resources into new creations.
c. communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
d. publish or present content that customizes the message and medium for their intended audiences.

7. Global Collaborator

Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students:

a. 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.
b. use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
c. contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.
d. explore local and global issues and use collaborative technologies to work with others to investigate solutions.

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ISTE Standards for Teachers

ISTE STANDARDS
FOR TEACHERS

1. Facilitate and Inspire Student Learning and Creativity

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity and innovation in both face-to-face and virtual environments.

a. Promote, support, and model creative and innovative thinking and inventiveness.
b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources.
c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning and creative processes.
d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments.

2. Design and Develop Digital Age Learning Experiences and Assessments

Teachers design, develop and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills and attitudes identified in the ISTE Standards•S.

a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.
b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning and assessing their own progress.
c. Customize and personalize learning activities to address students' diverse learning styles, working strategies and abilities using digital tools and resources.
d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.

3. Model Digital Age Work and Learning

Teachers exhibit knowledge, skills and work processes representative of an innovative professional in a global and digital society.

a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.
b. Collaborate with students, peers, parents and community members using digital tools and resources to support student success and innovation.
c. Communicate relevant information and ideas effectively to students, parents and peers using a variety of digital age media and formats.

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d. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate and use information resources to support research and learning.

4. Promote and Model Digital Citizenship and Responsibility

Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

a. Advocate, model, and teach safe, legal and ethical use of digital information and technology, including respect for copyright, intellectual property and the appropriate documentation of sources.
b. Address the diverse needs of all learners by using learner-centered strategies and providing equitable access to appropriate digital tools and resources.
c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information.
d. Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools.

5. Engage in Professional Growth and Leadership

Teachers continuously improve their professional practice, model lifelong learning and exhibit leadership in their school and professional communities by promoting and demonstrating the effective use of digital tools and resources.

a. Participate in local and global learning communities to explore creative applications of technology to improve student learning.
b. Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others.
c. Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning.
d. Contribute to the effectiveness, vitality and self-renewal of the teaching profession and of their school and community.

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ISTE Standards for Administrators

ISTE STANDARDS
FOR ADMINISTRATORS

1. Visionary Leadership

Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization.

a. Inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes use of digital age resources to meet and exceed learning goals, support effective instructional practice, and maximize performance of district and school leaders.
b. Engage in an ongoing process to develop, implement and communicate technology-infused strategic plans aligned with a shared vision.
c. Advocate on local, state and national levels for policies, programs and funding to support implementation of a technology-infused vision and strategic plan.

2. Digital Age Learning Culture

Administrators create, promote and sustain a dynamic, digital age learning culture that provides a rigorous, relevant and engaging education for all students.

a. Ensure instructional innovation focused on continuous improvement of digital age learning.
b. Model and promote the frequent and effective use of technology for learning.
c. Provide learner-centered environments equipped with technology and learning resources to meet the individual, diverse needs of all learners.
d. Ensure effective practice in the study of technology and its infusion across the curriculum.
e. Promote and participate in local, national and global learning communities that stimulate innovation, creativity and digital age collaboration.

3. Excellence in Professional Practice

Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources.:

a. Allocate time, resources and access to ensure ongoing professional growth in technology fluency and integration.
b. Facilitate and participate in learning communities that stimulate, nurture and support administrators, faculty and staff in the study and use of technology.
c. Promote and model effective communication and collaboration among stakeholders using digital age tools.
d. Stay abreast of educational research and emerging trends regarding effective use of technology and encourage evaluation of new technologies for their potential to improve student learning.

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4. Systemic Improvement

Administrators provide digital age leadership and management to continuously improve the organization through the effective use of information and technology resources.

a. Lead purposeful change to maximize the achievement of learning goals through the appropriate use of technology and media-rich resources.
b. Collaborate to establish metrics, collect and analyze data, interpret results and share findings to improve staff performance and student learning.
c. Recruit and retain highly competent personnel who use technology creatively and proficiently to advance academic and operational goals.
d. Establish and leverage strategic partnerships to support systemic improvement.
e. Establish and maintain a robust infrastructure for technology including integrated, interoperable technology systems to support management, operations, teaching and learning.

5. Digital Citizenship

Administrators model and facilitate understanding of social, ethical and legal issues and responsibilities related to an evolving digital culture.

a. Ensure equitable access to appropriate digital tools and resources to meet the needs of all learners.
b. Promote, model and establish policies for safe, legal and ethical use of digital information and technology.
c. Promote and model responsible social interactions related to the use of technology and information.
d. Model and facilitate the development of a shared cultural understanding and involvement in global issues through the use of contemporary communication and collaboration tools.

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Glossary and Acronyms

CEDS – Common Educational Data Standard
CIPA – Children's Internet Protection Act
CoSN – Consortium for School Networking
Cyberbullying – using electronic communication to intimidate or threaten
E-rate – Schools and Libraries Program of the Universal Service Fund
FCC – Federal Communications Commission
FERPA – Family Educational Rights and Privacy Act
Gb – 1000 megabits
Higher Order Thinking – learning taxonomy that requires higher mental processing skills
Information Fluency – the ability to find, evaluate and use information retrieved online effectively, efficiently and ethically
ISP – internet service provider
ISTE – International Society for Technology in Education
IT – information technology
Kinesthetic Learners – students that learn by completing physical activities
Mb – megabit, commonly used for measuring computer network throughput
MCCRS – Mississippi College- and Career-Ready Standards
MDE – Mississippi Department of Education
MECA – Mississippi Educational Computing Association
METLA – Mississippi Education Technology Leaders Association
MIT – Massachusetts Institute of Technology
OER – Open Educational Resources
OTSS – Office of Technical and Strategic Services
P-20W – pre-kindergarten to workforce
P21 – Partnership for 21st Century Learning
Personalized Learning – learning strategy that lets students choose type, delivery and method of content
PII – personally identifiable information
SETDA – State Educational Technology Directors Association
SETG – Statewide Educational Technology Guide
SME – subject matter expert
Social Media – websites and applications that enable users to create and share content or network
Systemic – of a system, as opposed to a single part of a system
TAC – Technology Advisory Committee
Technology Infrastructure –hardware, software, networks and facilities to support IT
WAN – wide area network
Wi-Fi – wireless network connectivity protocol