

# The **ISTE** National Educational Technology Standards (NETS•S) and Performance Indicators for Students

## **1. Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

- a. apply existing knowledge to generate new ideas, products, or processes.
- b. create original works as a means of personal or group expression.
- c. use models and simulations to explore complex systems and issues.
- d. identify trends and forecast possibilities.

## **2. Communication and Collaboration**

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

- a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
- b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- c. develop cultural understanding and global awareness by engaging with learners of other cultures.
- d. contribute to project teams to produce original works or solve problems.

## **3. Research and Information Fluency**

Students apply digital tools to gather, evaluate, and use information. Students:

- a. plan strategies to guide inquiry.
- b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- d. process data and report results.

## **4. Critical Thinking, Problem Solving, and Decision Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:

- a. identify and define authentic problems and significant questions for investigation.
- b. plan and manage activities to develop a solution or complete a project.
- c. collect and analyze data to identify solutions and/or make informed decisions.
- d. use multiple processes and diverse perspectives to explore alternative solutions.

## **5. Digital Citizenship**

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

- a. advocate and practice safe, legal, and responsible use of information and technology.
- b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
- c. demonstrate personal responsibility for lifelong learning.
- d. exhibit leadership for digital citizenship.

## **6. Technology Operations and Concepts**

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

- a. understand and use technology systems.
- b. select and use applications effectively and productively.
- c. troubleshoot systems and applications.
- d. transfer current knowledge to learning of new technologies.

# Essential Conditions

## Necessary conditions to effectively leverage technology for learning

<b>Shared Vision</b>	Proactive leadership in developing a shared vision for educational technology among school personnel, students, parents, and the community
<b>Implementation Planning</b>	A systemic plan aligned with a shared vision for school effectiveness and student learning through the infusion of ICT and digital learning resources
<b>Consistent and Adequate Funding</b>	Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development
<b>Equitable Access</b>	Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders
<b>Skilled Personnel</b>	Educators and support staff skilled in the use of ICT appropriate for their job responsibilities
<b>Ongoing Professional Learning</b>	Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas
<b>Technical Support</b>	Consistent and reliable assistance for maintaining, renewing, and using ICT and digital resources
<b>Curriculum Framework</b>	Content standards and related digital curriculum resources
<b>Student-Centered Learning</b>	Use of ICT to facilitate engaging approaches to learning
<b>Assessment and Evaluation</b>	Continuous assessment, both of learning and for learning, and evaluation of the use of ICT and digital resources
<b>Engaged Communities</b>	Partnerships and collaboration within the community to support and fund the use of ICT and digital resources
<b>Support Policies</b>	Policies, financial plans, accountability measures, and incentive structures to support the use of ICT in learning and in district and school operations
<b>Supportive External Context</b>	Policies and initiatives at the national, regional, and local levels to support schools in the effective implementation of technology for achieving curriculum and technology (ICT) standards



# Profiles

## for Technology (ICT) Literate Students

A major component of the NETS Project is the development of a general set of profiles describing technology (ICT) literate students at key developmental points in their precollege education. These profiles are based on ISTE's core belief that all students must have regular opportunities to use technology to develop skills that encourage personal productivity, creativity, critical thinking, and collaboration in the classroom and in daily life. Coupled with the standards, the profiles provide a set of examples for preparing students to be lifelong learners and contributing members of a global society.

The profiles highlight a few important types of learning activities in which students might engage as the new NETS•S are implemented. These examples are provided in an effort to bring the standards to life and demonstrate the variety of activities possible. Space limitations and the realities of the constantly evolving learning and technology landscapes make it impossible to provide a comprehensive collection of examples in this document, and consequently, students and teachers should not feel constrained by this resource. Similarly, because this represents only a sampling of illuminating possibilities, the profiles cannot be considered a comprehensive curriculum, or even a minimally adequate one, for achieving mastery of the rich revised National Educational Technology Standards for Students. Educators are encouraged to stay connected to the ISTE NETS Refresh Project and contribute their best examples to expand this resource.

The profiles are divided into the following four grade ranges. Because grade-level designations vary in different countries, age ranges are also provided.

- ▶ Grades PK–2 (ages 4–8)
- ▶ Grades 3–5 (ages 8–11)
- ▶ Grades 6–8 (ages 11–14)
- ▶ Grades 9–12 (ages 14–18)

It's important to remember that the profiles are *indicators of achievement at certain stages* in primary, elementary, and secondary education, and that success in meeting the indicators is predicated on students having regular access to a variety of technology tools. Skills are introduced and reinforced over multiple grade levels before mastery is achieved. If access is an issue, profile indicators will need to be adapted to fit local needs.

The standards and profiles are based on input and feedback provided by instructional technology experts and educators from around the world, including classroom teachers, administrators, teacher educators, and curriculum specialists. Students were also given opportunities to provide input and feedback. In addition, these refreshed documents reflect information collected from professional literature.

# Profile

## for Technology (ICT) Literate Students Grades PK–2 (Ages 4–8)

The following experiences with technology and digital resources are examples of learning activities in which students might engage during PK–Grade 2 (ages 4–8):

1. Illustrate and communicate original ideas and stories using digital tools and media-rich resources. (1, 2)
2. Identify, research, and collect data on an environmental issue using digital resources and propose a developmentally appropriate solution. (1, 3, 4)
3. Engage in learning activities with learners from multiple cultures through e-mail and other electronic means. (2, 6)
4. In a collaborative work group, use a variety of technologies to produce a digital presentation or product in a curriculum area. (1, 2, 6)
5. Find and evaluate information related to a current or historical person or event using digital resources. (3)
6. Use simulations and graphical organizers to explore and depict patterns of growth such as the life cycles of plants and animals. (1, 3, 4)
7. Demonstrate the safe and cooperative use of technology. (5)
8. Independently apply digital tools and resources to address a variety of tasks and problems. (4, 6)
9. Communicate about technology using developmentally appropriate and accurate terminology. (6)
10. Demonstrate the ability to navigate in virtual environments such as electronic books, simulation software, and Web sites. (6)

The numbers in parentheses after each item identify the standards (1–6) most closely linked to the activity described. Each activity may relate to one indicator, to multiple indicators, or to the overall standards referenced.

The categories are:

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Fluency
4. Critical Thinking, Problem Solving, and Decision Making
5. Digital Citizenship
6. Technology Operations and Concepts

# Profile

## for Technology (ICT) Literate Students Grades 3–5 (Ages 8–11)

The following experiences with technology and digital resources are examples of learning activities in which students might engage during Grades 3–5 (ages 8–11):

1. Produce a media-rich digital story about a significant local event based on first-person interviews. (1, 2, 3, 4)
2. Use digital-imaging technology to modify or create works of art for use in a digital presentation. (1, 2, 6)
3. Recognize bias in digital resources while researching an environmental issue with guidance from the teacher. (3, 4)
4. Select and apply digital tools to collect, organize, and analyze data to evaluate theories or test hypotheses. (3, 4, 6)
5. Identify and investigate a global issue and generate possible solutions using digital tools and resources. (3, 4)
6. Conduct science experiments using digital instruments and measurement devices. (4, 6)
7. Conceptualize, guide, and manage individual or group learning projects using digital planning tools with teacher support. (4, 6)
8. Practice injury prevention by applying a variety of ergonomic strategies when using technology. (5)
9. Debate the effect of existing and emerging technologies on individuals, society, and the global community. (5, 6)
10. Apply previous knowledge of digital technology operations to analyze and solve current hardware and software problems. (4, 6)

The numbers in parentheses after each item identify the standards (1–6) most closely linked to the activity described. Each activity may relate to one indicator, to multiple indicators, or to the overall standards referenced.

The categories are:

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Fluency
4. Critical Thinking, Problem Solving, and Decision Making
5. Digital Citizenship
6. Technology Operations and Concepts

# Profile

## for Technology (ICT) Literate Students Grades 6–8 (Ages 11–14)

The following experiences with technology and digital resources are examples of learning activities in which students might engage during Grades 6–8 (ages 11–14):

1. Describe and illustrate a content-related concept or process using a model, simulation, or concept-mapping software. (1, 2)
2. Create original animations or videos documenting school, community, or local events. (1, 2, 6)
3. Gather data, examine patterns, and apply information for decision making using digital tools and resources. (1, 4)
4. Participate in a cooperative learning project in an online learning community. (2)
5. Evaluate digital resources to determine the credibility of the author and publisher and the timeliness and accuracy of the content. (3)
6. Employ data-collection technology such as probes, handheld devices, and geographic mapping systems to gather, view, analyze, and report results for content-related problems. (3, 4, 6)
7. Select and use the appropriate tools and digital resources to accomplish a variety of tasks and to solve problems. (3, 4, 6)
8. Use collaborative electronic authoring tools to explore common curriculum content from multicultural perspectives with other learners. (2, 3, 4, 5)
9. Integrate a variety of file types to create and illustrate a document or presentation. (1, 6)
10. Independently develop and apply strategies for identifying and solving routine hardware and software problems. (4, 6)

The numbers in parentheses after each item identify the standards (1–6) most closely linked to the activity described. Each activity may relate to one indicator, to multiple indicators, or to the overall standards referenced.

The categories are:

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Fluency
4. Critical Thinking, Problem Solving, and Decision Making
5. Digital Citizenship
6. Technology Operations and Concepts



# Profile

## for Technology (ICT) Literate Students Grades 9–12 (Ages 14–18)

The following experiences with technology and digital resources are examples of learning activities in which students might engage during Grades 9–12 (ages 14–18):

1. Design, develop, and test a digital learning game to demonstrate knowledge and skills related to curriculum content. (1, 4)
2. Create and publish an online art gallery with examples and commentary that demonstrate an understanding of different historical periods, cultures, and countries. (1, 2)
3. Select digital tools or resources to use for a real-world task and justify the selection based on their efficiency and effectiveness. (3, 6)
4. Employ curriculum-specific simulations to practice critical-thinking processes. (1, 4)
5. Identify a complex global issue, develop a systematic plan of investigation, and present innovative sustainable solutions. (1, 2, 3, 4)
6. Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs. (4, 5, 6)
7. Design a Web site that meets accessibility requirements. (1, 5)
8. Model legal and ethical behaviors when using information and technology by properly selecting, acquiring, and citing resources. (3, 5)
9. Create media-rich presentations for other students on the appropriate and ethical use of digital tools and resources. (1, 5)
10. Configure and troubleshoot hardware, software, and network systems to optimize their use for learning and productivity. (4, 6)

The numbers in parentheses after each item identify the standards (1–6) most closely linked to the activity described. Each activity may relate to one indicator, to multiple indicators, or to the overall standards referenced.

The categories are:

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Fluency
4. Critical Thinking, Problem Solving, and Decision Making
5. Digital Citizenship
6. Technology Operations and Concepts



## NETS FOR TEACHERS 2008

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### 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. Teachers:

- 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 assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS•S. Teachers:

- 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. Teachers:

- 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.
- 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. Teachers:

- 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 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 community by promoting and demonstrating the effective use of digital tools and resources. Teachers:

- 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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## NETS FOR ADMINISTRATORS 2002

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The NETS for Administrators builds on the work of the Technology Standards for School Administrators (TSSA) Collaborative, where ISTE had a leading role in developing these standards. The NETS•A embraces the TSSA vision and extends it to additional administrative job roles. These standards are indicators of effective leadership for technology in schools. They are a national consensus among educational stakeholders of what best indicates effective school leadership for comprehensive and appropriate use of technology in schools.

### I. Leadership and Vision

Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision. Educational leaders:

- A. facilitate the shared development by all stakeholders of a vision for technology use and widely communicate that vision.
- B. maintain an inclusive and cohesive process to develop, implement, and monitor a dynamic, long-range, and systemic technology plan to achieve the vision.
- C. foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology.
- D. use data in making leadership decisions.
- E. advocate for research-based effective practices in use of technology.
- F. Advocate on the state and national levels for policies, programs, and funding opportunities that support implementation of the district technology plan.

### II. Learning and Teaching

Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching. Educational leaders:

- A. identify, use, evaluate, and promote appropriate technologies to enhance and support instruction and standards-based curriculum leading to high levels of student achievement.
- B. facilitate and support collaborative technology-enriched learning environments conducive to innovation for improved learning.
- C. provide for learner-centered environments that use technology to meet the individual and diverse needs of learners.
- D. facilitate the use of technologies to support and enhance instructional methods that develop higher-level thinking, decision-making, and problem-solving skills.
- E. provide for and ensure that faculty and staff take advantage of high-quality professional learning opportunities for improved learning and teaching with technology.

### III. Productivity and Professional Practice

Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others. Educational leaders:

- A. model the routine, intentional, and effective use of technology.
- B. employ technology for communication and collaboration among colleagues, staff, parents, students, and the larger community.
- C. create and participate in learning communities that stimulate, nurture, and support faculty and staff in using technology for improved productivity.
- D. engage in sustained, job-related professional learning using technology resources.
- E. maintain awareness of emerging technologies and their potential uses in education.
- F. use technology to advance organizational improvement.

### IV. Support, Management, and Operations

Educational leaders ensure the integration of technology to support productive systems for learning and administration. Educational leaders:

- A. develop, implement, and monitor policies and guidelines to ensure compatibility of

technologies.

- B. implement and use integrated technology-based management and operations systems.
- C. allocate financial and human resources to ensure complete and sustained implementation of the technology plan.
- D. integrate strategic plans, technology plans, and other improvement plans and policies to align efforts and leverage resources.
- E. implement procedures to drive continuous improvement of technology systems and to support technology replacement cycles.

#### **V. Assessment and Evaluation**

Educational leaders use technology to plan and implement comprehensive systems of effective assessment and evaluation. Educational leaders:

- A. use multiple methods to assess and evaluate appropriate uses of technology resources for learning, communication, and productivity.
- B. use technology to collect and analyze data, interpret results, and communicate findings to improve instructional practice and student learning.
- C. assess staff knowledge, skills, and performance in using technology and use results to facilitate high-quality professional development and to inform personnel decisions.
- D. use technology to assess, evaluate, and manage administrative and operational systems.

#### **VI. Social, Legal, and Ethical Issues**

Educational leaders understand the social, legal, and ethical issues related to technology and model responsible decision making related to these issues. Educational leaders:

- A. ensure equity of access to technology resources that enable and empower all learners and educators.
- B. identify, communicate, model, and enforce social, legal, and ethical practices to promote responsible use of technology.
- C. promote and enforce privacy, security, and online safety related to the use of technology.
- D. promote and enforce environmentally safe and healthy practices in the use of technology.
- E. participate in the development of policies that clearly enforce copyright law and assign ownership of intellectual property developed with district resources.

- [NETS for Administrators 2002 Standards](#) (pdf)
- [NETS for Administrators 2002 Essential Conditions](#) (pdf)
- [NETS for Administrators 2002 Profiles](#) (pdf)

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## TECHNOLOGY LEADERSHIP STANDARDS

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The Technology Leadership program standards are aligned with the six NETS for Teachers 2000 but extend the performance expectations of each standard. These increased expectations reflect preparation for serving as a director, coordinator, or technology integration specialist at the district, regional, and/or state levels, assisting teachers as well as technology facilitators in their efforts to support student learning and educator professional growth with technology.

**TL-I** [Technology Operations and Concepts](#)

**TL-II** [Planning and Designing Learning Environments and Experiences](#)

**TL-III** [Teaching, Learning, and the Curriculum](#)

**TL-IV** [Assessment and Evaluation](#)

**TL-V** [Productivity and Professional Practice](#)

**TL-VI** [Social, Ethical, Legal, and Human Issues](#)

**TL-VII** [Procedures, Policies, Planning, and Budgeting for Technology Environments](#)

**TL-VIII** [Leadership and Vision](#)

### **TL-I** [Technology Operations and Concepts](#)

Educational technology leaders demonstrate an advanced understanding of technology operations and concepts. Educational technology leaders:

- A. Demonstrate knowledge, skills, and understanding of concepts related to technology (as described in the ISTE NETS for Teachers 2000). Candidates:
  - 1. identify and evaluate components needed for the continual growth of knowledge, skills, and understanding of concepts related to technology.
  - 2. offer a variety of professional development opportunities that facilitate the ongoing development of knowledge, skills, and understanding of concepts related to technology
- B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies. Candidates:
  - 1. offer a variety of professional development opportunities that facilitate the continued growth and development of the understanding of technology operations and concepts.

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### **TL-II** [Planning and Designing Learning Environments and Experiences](#)

Educational technology leaders plan, design, and model effective learning environments and multiple experiences supported by technology. Educational technology leaders:

- A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. Candidates:
  - 1. research and disseminate project-based instructional units modeling appropriate use of technology to support learning.
  - 2. identify and evaluate methods and strategies for teaching computer/technology concepts and skills within the context of classroom learning and coordinate dissemination of best practices at the district/state/regional level.
  - 3. stay abreast of current technology resources and strategies to support the diverse needs of learners including adaptive and assistive technologies and disseminate information to teachers.
- B. Apply current research on teaching and learning with technology when planning learning environments and experiences. Candidates:
  - 1. locate and evaluate current research on teaching and learning with technology when planning learning environments and experiences.

- C. Identify and locate technology resources and evaluate them for accuracy and suitability. Candidates:
  1. identify technology resources and evaluate them for accuracy and suitability based on content standards.
  2. provide ongoing appropriate professional development to disseminate the use of technology resources that reflect content standards.
- D. Plan for the management of technology resources within the context of learning activities. Candidates:
  1. identify and evaluate options for management of technology resources within the context of learning activities.
- E. Plan strategies to manage student learning in a technology-enhanced environment. Candidates:
  1. continually evaluate a variety of strategies to manage student learning in a technology-enhanced environment and disseminate through professional development activities.
- F. Identify and apply instructional design principles associated with the development of technology resources. Candidates:
  1. identify and evaluate instructional design principles associated with the development of technology resources.

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### **TL-III Teaching, Learning, and the Curriculum**

Educational technology leaders model, design, and disseminate plans that include methods and strategies for applying technology to maximize student learning. Educational technology leaders:

- A. Facilitate technology-enhanced experiences that address content standards and student technology standards. Candidates:
  1. design methods and strategies for teaching concepts and skills that support integration of technology productivity tools (refer to the NETS for Students).
  2. design methods for teaching concepts and skills that support integration of communication tools (refer to NETS for Students).
  3. design methods and strategies for teaching concepts and skills that support integration of research tools (refer to NETS for Students).
  4. design methods and model strategies for teaching concepts and skills that support integration of problem-solving/decision-making tools (refer to NETS for Students).
  5. design methods and model strategies for teaching concepts and skills that support use of media-based tools such as television, audio, print media, and graphics.
  6. evaluate methods and strategies for teaching concepts and skills that support use of distance learning systems appropriate in a school environment.
  7. design methods and model strategies for teaching concepts and skills that support the use of Web-based and non Web-based authoring tools in a school environment.
- B. Use technology to support learner-centered strategies that address the diverse needs of students. Candidates:
  1. design methods and strategies for integrating technology resources that support the needs of diverse learners, including adaptive and assistive technology.
- C. Apply technology to demonstrate students' higher-order skills and creativity. Candidates:
  1. design methods and strategies for teaching hypermedia development, scripting, and/or computer programming, in a problem-solving context in the school environment.
- D. Manage student learning activities in a technology-enhanced environment. Candidates:
  1. design methods and model classroom management strategies for teaching technology concepts and skills used in PK-12 environments.
- E. Use current research and district/state/national content and technology standards to build lessons and units of instruction. Candidates:
  1. disseminate curricular methods and strategies that are aligned with district/regional/state/national content and technology standards.
  2. investigate major research findings and trends relative to the use of technology in education to support integration throughout the curriculum.

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### **TL-IV Assessment and Evaluation**

Educational technology leaders communicate research on the use of technology to implement effective assessment and evaluation strategies. Educational technology leaders:

- A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques. Candidates:
  1. facilitate the development of a variety of techniques to use technology to assess student learning of subject matter.
  2. provide technology resources for assessment and evaluation of artifacts and data.
- B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning. Candidates:
  1. identify and procure technology resources to aid in analysis and interpretation of data.
- C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity. Candidates:
  1. design strategies and methods for evaluating the effectiveness of technology resources for learning, communication, and productivity.
  2. conduct a research project that includes evaluating the use of a specific technology in P-12 environments.

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#### **TL-V Productivity and Professional Practice**

Educational technology leaders design, develop, evaluate and model products created using technology resources to improve and enhance their productivity and professional practice. Educational technology leaders:

- A. Use technology resources to engage in ongoing professional development and lifelong learning. Candidates:
  1. design, prepare, and conduct professional development activities to present at the school/district level and at professional technology conferences to support ongoing professional growth related to technology.
  2. plan and implement policies that support district-wide professional growth opportunities for staff, faculty, and administrators.
- B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning. Candidates:
  1. based on evaluations make recommendations for changes in professional practices regarding the use of technology in support of student learning.
- C. Apply technology to increase productivity. Candidates:
  1. model the integration of data from multiple software applications using advanced features of applications such as word processing, database, spreadsheet, communication, and other tools into a product.
  2. create multimedia presentations integrated with multiple types of data using advanced features of a presentation tool and model them to district staff using computer projection systems.
  3. document and assess field-based experiences and observations using specific-purpose electronic devices.
  4. use distance learning delivery systems to conduct and provide professional development opportunities for students, teachers, administrators, and staff.
  5. apply instructional design principles to develop and analyze substantive interactive multimedia computer-based instructional products.
  6. design and practice strategies for testing functions and evaluating technology use effectiveness of instructional products that were developed using multiple technology tools.
  7. analyze examples of emerging programming, authoring or problem-solving environments that support personal and professional development, and make recommendations for integration at school/district level.
  8. analyze and modify the features and preferences of major operating systems and/or productivity tool programs when developing products to solve problems.
- D. Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning. Candidates:
  1. model and implement the use of telecommunications tools and resources to foster and support information sharing, remote information access, and communication between students, school staff, parents, and local community.
  2. organize, coordinate, and participate in an online learning community related to the use of technology to support learning.
  3. organize and coordinate online collaborative curricular projects with corresponding team activities/responsibilities to build bodies of knowledge around specific topics.

4. design, modify, maintain, and facilitate the development of Web pages and sites that support communication and information access between the entire school district and local/state/national/international communities.

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#### **TL-VI [Social, Ethical, Legal, and Human Issues](#)**

Educational technology leaders understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and develop programs facilitating application of that understanding in practice throughout their district/region/state. Educational technology leaders:

- A. Model and teach legal and ethical practice related to technology use. Candidates:
  - 1. establish and communicate clear rules, policies, and procedures to support legal and ethical use of technologies at the district/regional/state levels.
  - 2. implement a plan for documenting adherence to copyright laws.
- B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities. Candidates:
  - 1. communicate research on best practices related to applying appropriate technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.
  - 2. develop policies and provide professional development related to acquisition and use of appropriate adaptive/assistive hardware and software for students and teachers with special needs.
- C. Identify and use technology resources that affirm diversity. Candidates:
  - 1. communicate research on best practices related to applying appropriate technology resources to affirm diversity and address cultural and language differences.
- D. Promote safe and healthy use of technology resources. Candidates:
  - 1. communicate research and establish policies to promote safe and healthy use of technology.
- E. Facilitate equitable access to technology resources for all students. Candidates:
  - 1. use research findings in establishing policy and implementation strategies to promote equitable access to technology resources for students and teachers.

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#### **TL-VII [Procedures, Policies, Planning, and Budgeting for Technology Environments](#)**

Educational technology leaders coordinate development and direct implementation of technology infrastructure procedures, policies, plans, and budgets for PK-12 schools. Educational technology leaders:

- A. Use the school technology facilities and resources to implement classroom instruction. Candidates:
  - 1. develop plans to configure software/computer/technology systems and related peripherals in laboratory, classroom cluster, and other appropriate instructional arrangements.
  - 2. install local mass storage devices and media to store and retrieve information and resources.
  - 3. prioritize issues related to selecting, installing, and maintaining wide area networks (WAN) for school districts, and facilitate integration of technology infrastructure with the WAN.
  - 4. manage software used in classroom and administrative settings, including productivity tools, information access/telecommunication tools, multimedia/hypermedia tools, school management tools, evaluation/portfolio tools, and computer-based instruction.
  - 5. evaluate methods of installation, maintenance, inventory, and management of software libraries.
  - 6. develop and disseminate strategies for troubleshooting and maintaining various hardware/software configurations found in school settings.
  - 7. select network software packages for operating a computer network system and/or local area network (LAN).
  - 8. analyze needs for technology support personnel to manage school/district technology resources and maximize use by administrators, teachers, and students to improve student learning.
- B. Follow procedures and guidelines used in planning and purchasing technology resources. Candidates:
  - 1. investigate purchasing strategies and procedures for acquiring administrative and instructional software for educational settings.
  - 2. develop and utilize guidelines for budget planning and management procedures related to educational computing and technology facilities and resources.
  - 3. develop and disseminate a system for analyzing and implementing procedures related to troubleshooting and preventative maintenance on technology infrastructure.
  - 4. maintain and disseminate current information involving facilities planning issues and computer-related technologies.
  - 5. design and develop policies and procedures concerning staging, scheduling, and security for

managing hardware, software, and related technologies in a variety of instructional and administrative school settings.

6. research and recommend systems and processes for implementation of distance learning facilities and infrastructure.

7. differentiate among specifications for purchasing technology systems in school settings.

C. Participate in professional development opportunities related to management of school facilities, technology resources, and purchases. Candidates:

1. implement technology professional development at the school/district level utilizing adult learning theory.

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#### **TL-VIII Leadership and Vision**

Educational technology leaders will facilitate development of a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of the vision. Educational technology leaders:

A. Identify and apply educational and technology-related research, the psychology of learning, and instructional design principles in guiding the use of computers and technology in education.

Candidates:

1. communicate and apply principles and practices of educational research in educational technology.

B. Apply strategies for and knowledge of issues related to managing the change process in schools.

Candidates:

1. describe social/historical foundations of education and how they relate to use of technology in schools.

C. Apply effective group process skills. Candidates:

1. discuss issues related to building collaborations, alliances, and partnerships involving educational technology initiatives.

D. Lead in the development and evaluation of district technology planning and implementation.

Candidates:

1. design and lead in the implementation of effective group process related to technology leadership or planning.

2. use evaluation findings to recommend modifications in technology implementations.

3. use national, state, and local standards to develop curriculum plans for integrating technology in the school environment.

4. develop curriculum activities or performances that meet national, state, and local technology standards.

5. compare and evaluate district-level technology plans.

6. use strategic planning principles to lead and assist in the acquisition, implementation, and maintenance of technology resources.

7. plan, develop, and implement strategies and procedures for resource acquisition and management of technology-based systems, including hardware and software.

E. Engage in supervised field-based experiences with accomplished technology facilitators and/or directors. Candidates:

1. participate in a significant field-based activity involving experiences in instructional program development, professional development, facility and resource management, WAN/LAN/wireless systems, or managing changes related to technology use in school-based settings.

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## TECHNOLOGY FACILITATION STANDARDS

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Beyond educational computing and technology foundations for teachers, ISTE has established Technology Facilitation Standards for teacher education programs or professional development that prepare candidates to serve as building/campus-level technology facilitators. Candidates completing this program will exhibit knowledge, skills, and dispositions equipping them to teach technology applications; demonstrate effective use of technology to support student learning of content; and provide professional development, mentoring, and basic technical assistance for other teachers.

- TF-I [Technology Operations and Concepts](#)
- TF-II [Planning and Designing Learning Environments and Experiences](#)
- TF-III [Teaching, Learning, and the Curriculum](#)
- TF-IV [Assessment and Evaluation](#)
- TF-V [Productivity and Professional Practice](#)
- TF-VI [Social, Ethical, Legal, and Human Issues](#)
- TF-VII [Procedures, Policies, Planning, and Budgeting for Technology Environments](#)
- TF-VIII [Leadership and Vision](#)

### TF-I. [Technology Operations and Concepts](#)

Educational technology facilitators demonstrate an in-depth understanding of technology operations and concepts. Educational technology facilitators:

- A. Demonstrate knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Teachers). Candidates:
  1. assist teachers in the ongoing development of knowledge, skills, and understanding of technology systems, resources, and services that are aligned with district and state technology plans.
  2. provide assistance to teachers in identifying technology systems, resources, and services to meet specific learning needs.
- B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies. Candidates:
  1. Model appropriate strategies essential to continued growth and development of the understanding of technology operations and concepts.

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### TF-II. [Planning and Designing Learning Environments and Experiences](#)

Educational technology facilitators plan, design, and model effective learning environments and multiple experiences supported by technology. Educational technology facilitators:

- A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. Candidates:
  1. provide resources and feedback to teachers as they create developmentally appropriate curriculum units that use technology.
  2. consult with teachers as they design methods and strategies for teaching computer/technology concepts and skills within the context of classroom learning.
  3. assist teachers as they use technology resources and strategies to support the diverse needs of learners including adaptive and assistive technologies.
- B. Apply current research on teaching and learning with technology when planning learning environments and experiences. Candidates:
  1. assist teachers as they apply current research on teaching and learning with technology when planning

- learning environments and experiences.
- C. Identify and locate technology resources and evaluate them for accuracy and suitability. Candidates:
    1. assist teachers as they identify and locate technology resources and evaluate them for accuracy and suitability based on district and state standards.
    2. model technology integration using resources that reflect content standards.
  - D. Plan for the management of technology resources within the context of learning activities. Candidates:
    1. provide teachers with options for management of technology resources within the context of learning activities.
  - E. Plan strategies to manage student learning in a technology-enhanced environment. Candidates:
    1. provide teachers with a variety of strategies to use to manage student learning in a technology-enhanced environment and support them as they implement the strategies.
  - F. Identify and apply instructional design principals associated with the development of technology resources. Candidates:
    1. assist teachers as the identify and apply instructional design principals associated with the development of technology resources.

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#### **TF-III. Teaching, Learning, and the Curriculum**

Educational technology facilitators apply and implement curriculum plans that include methods and strategies for utilizing technology to maximize student learning. Educational technology facilitators:

- A. Facillitate technology-enhanced experiences that address content standards and student technology standards. Candidates:
  1. use methods and strategies for teaching concepts and skills that support integration of technology productivity tools (refer to NETS for Students).
  2. use and apply major research findings and trends related to the use of technology in education to support integration throughout the curriculum.
  3. use methods and strategies for teaching concepts and skills that support integration of research tools (refer to NETS for Students).
  4. use methods and strategies for teaching concepts and skills that support integration of problem solving/decision-making tools (refer to NETS for Students)
  5. use methods and strategies for teaching concepts and skills that support use of media-based tools such as television, audio, print materials, and graphics.
  6. use and describe methods and strategies for teaching concepts and skills that support use of distance learning systems appropriate in a school environment.
  7. use methods for teaching concepts and skills that support use of Web-based and non Web-based authoring tools in a school environment.
- B. Use technology to support learner-centered strategies that address the diverse needs of students. Candidates:
  1. use methods and strategies for integrating technology resources that support the needs of diverse learners including adaptive and assistive technology.
- C. Apply technology to demonstrate students' higher-order skills and creativity. Candidates:
  1. use methods and facilitate strategies for teaching problem-solving principles and skills using technology resources.
- D. Manage student learning activities in a technology-enhanced environment. Candidates:
  1. use methods and classroom management strategies for teaching technology concepts and skills in individual, small group, classroom, and/or lab settings.
- E. Use current research and district/regional/state/national content and technology standards to build lessons and units of instruction. Candidates:
  1. describe and identify curricular methods and strategies that are aligned with district/regional/state/national content and technology standards.
  2. use major research findings and trends related to the use of technology in education to support integration throughout the curriculum.

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#### **TF-IV. Assessment and Evaluation**

Educational technology facilitators apply technology to facilitate a variety of effective assessment and evaluation strategies. Educational technology facilitators:

- A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques. Candidates:
  1. model the use of technology tools to assess student learning of subject matter using a variety of

assessment techniques.

2. assist teachers in using technology to improve learning and instruction through the evaluation and assessment of artifacts and data.
- B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning. Candidates:
1. guide teachers as they use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.
- C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity. Candidates:
1. assist teachers in using recommended evaluation strategies for improving students' use of technology resources for learning, communication, and productivity.
  2. examine and apply the results of a research project that includes evaluating the use of a specific technology in a PK-12 environment.

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#### **TF-V. [Productivity and Professional Practice](#)**

Educational technology facilitators apply technology to enhance and improve personal productivity and professional practice. Educational technology facilitators:

- A. Use technology resources to engage in ongoing professional development and lifelong learning. Candidates:
1. identify resources and participate in professional development activities and professional technology organizations to support ongoing professional growth related to technology.
  2. disseminate information on district-wide policies for the professional growth opportunities for staff, faculty, and administrators.
- B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning. Candidates:
1. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.
- C. Apply technology to increase productivity. Candidates:
1. model advanced features of word processing, desktop publishing, graphics programs, and utilities to develop professional products.
  2. assist others in locating, selecting, capturing, and integrating video and digital images in various formats for use in presentations, publications, and/or other products.
  3. demonstrate the use of specific-purpose electronic devices (such as graphic calculators, language translators, scientific probeware, or electronic thesaurus) in content areas.
  4. use a variety of distance learning systems and use at least one to support personal/professional development.
  5. use instructional design principles to develop hypermedia and multimedia products to support personal and professional development.
  6. select appropriate tools for communicating concepts, conducting research, and solving problems for an intended audience and purpose.
  7. use examples of emerging programming, authoring or problem-solving environments that support personal/professional development.
  8. set and manipulate preferences, defaults, and other selectable features of operating systems and productivity tool programs commonly found in PK-12 schools.
- D. Use technology to communicate and collaborate with peers, parents, and the larger community to nurture student learning. Candidates:
1. model the use of telecommunications tools and resources for information sharing, remote information access, and multimedia/hypermedia publishing in order to nurture student learning.
  2. communicate with colleagues and discuss current research to support instruction, using applications including electronic mail, online conferencing, and Web browsers.
  3. participate in online collaborative curricular projects and team activities to build bodies of knowledge around specific topics.
  4. design, develop, and maintain Web pages and sites that support communication between the school and community.

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#### **TF-VI. [Social, Ethical, Legal, and Human Issues](#)**

Educational technology facilitators understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and assist teachers in applying that understanding in their practice. Educational technology facilitators:

- A. Model and teach legal and ethical practice related to technology use. Candidates:
  1. develop strategies and provide professional development at the school/classroom level for teaching social, ethical, and legal issues and responsible use of technology.
  2. assist others in summarizing copyright laws related to use of images, music, video, and other digital resources in varying formats.
- B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities. Candidates:
  1. assist teachers in selecting and applying appropriate technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.
  2. identify, classify, and recommend adaptive/assistive hardware and software for students and teachers with special needs and assist in the procurement and implementation.
- C. Identify and use technology resources that affirm diversity. Candidates:
  1. assist teachers in selecting and applying appropriate technology resources to affirm diversity and address cultural and language differences.
- D. Promote safe and healthy use of technology resources. Candidates:
  1. assist teachers in selecting and applying appropriate technology resources to promote safe and healthy use of technology.
- E. Facilitate equitable access to technology resources for all students. Candidates:
  1. recommend policies and implement school/classroom strategies for achieving equitable access to technology resources for all students and teachers.

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#### **TF-VII. [Procedures, Policies, Planning, and Budgeting for Technology Environments](#)**

Educational technology facilitators promote the development and implementation of technology infrastructure, procedures, policies, plans, and budgets for PK-12 schools. Educational technology facilitators:

- A. Use the school technology facilities and resources to implement classroom instruction. Candidates:
  1. use plans to configure software/computer/technology systems and related peripherals in laboratory, classroom cluster, and other appropriate instructional arrangements.
  2. use local mass storage devices and media to store and retrieve information and resources.
  3. discuss issues related to selecting, installing, and maintaining wide area networks (WAN) for school districts.
  4. model integration of software used in classroom and administrative settings including productivity tools, information access/telecommunications tools, multimedia/hypermedia tools, school management tools, evaluation/portfolio tools, and computer-based instruction.
  5. utilize methods of installation, maintenance, inventory, and management of software libraries.
  6. use and apply strategies for troubleshooting and maintaining various hardware/software configurations found in school settings.
  7. use network software packages to operate a computer network system.
  8. work with technology support personnel to maximize the use of technology resources by administrators, teachers, and students to improve student learning.
- B. Follow procedures and guidelines used in planning and purchasing technology resources. Candidates:
  1. identify instructional software to support and enhance the school curriculum and develop recommendations for purchase.
  2. discuss and apply guidelines for budget planning and management procedures related to educational computing and technology facilities and resources.
  3. discuss and apply procedures related to troubleshooting and preventative maintenance of technology infrastructure.
  4. apply current information involving facilities planning issues and computer-related technologies.
  5. suggest policies and procedures concerning staging, scheduling, and security for managing computers/technology in a variety of school/laboratory/classroom settings.
  6. use distance and online learning facilities.
  7. describe and identify recommended specifications for purchasing technology systems in school settings.
- C. Participate in professional development opportunities related to the management of school facilities, technology resources, and purchases. Candidates:
  1. support technology professional development at the building/school level utilizing adult learning theory.

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#### **TF-VIII. [Leadership and Vision](#)**

Educational technology facilitators will contribute to the shared vision for campus integration of technology and foster an environment and culture conducive to the realization of the vision. Educational technology facilitators:

- A. Use the school technology facilities and resources to implement classroom instruction. Candidates:
  - 1. discuss and evaluate current research in educational technology.
- B. Apply strategies for and knowledge of issues related to managing the change process in schools. Candidates:
  - 1. discuss the history of technology use in schools.
- C. Apply effective group process skills. Candidates:
  - 1. discuss the rationale for forming school partnerships to support technology integration and examine an existing partnership within a school setting.
- D. Lead in the development and evaluation of district technology planning and implementation. Candidates:
  - 1. participate in cooperative group processes and identify the processes that were effective.
  - 2. conduct an evaluation of a school technology environment.
  - 3. identify and discuss national, state, and local standards for integrating technology in a school environment.
  - 4. describe curriculum activities or performances that meet national, state, and local technology standards.
  - 5. discuss issues related to developing a school technology plan.
  - 6. discuss the elements of and strategies for developing a technology strategic plan.
  - 7. examine issues related to hardware and software acquisition and management.
- E. Engage in supervised field-based experiences with accomplished technology facilitators and/or directors. Candidates:
  - 1. examine components needed for effective field-based experiences in instructional program development, professional development, facility and resource management, WAN/LAN/wireless systems, or managing change related to technology use in school-based settings.

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