National Educational Technology Standards for Teachers—Resources for Assessment

Excerpted from
National Educational Technology Standards for Teachers—Resources for Assessment, by the NETS Project.

How do you get a quick start on the increasingly complex—and necessary—process of assessing teachers? The resources you need are here, in the International Society for Technology in Education’s latest NETS book. NETS•T—Resources for Assessment includes tools for gathering performance data, strategies for both formative and summative assessment, rubrics, guidelines, a roadmap to NCATE accreditation of advanced programs for technology leaders and facilitators, and a focus on new federal mandates for “highly qualified” teachers. For additional information about this title, go to www.iste.org/bookstore/ or call 1.800.336.5191.
The investment in technology in schools has fueled the demand to provide adequate data demonstrating the positive effect of the funds provided. However, the misconception the general public and politicians often voice is that all a teacher needs to know about technology is how to use the basic tools. Assessing only a classroom teacher’s knowledge and ability to use basic technology skills misses the key feature of technology in teaching and learning—that when effectively used, technology empowers students to improve conceptual understanding and learn content in deeper and richer ways than ever before.

The National Educational Technology Standards for Teachers (NETS for Teachers or NETS•T) were expressly designed to articulate the complex nature of using technology in teaching and learning. Effective use of technology cannot be separated from effective teaching that supports student learning. The NETS for Teachers encompass far more than basic technology skills. The standards target technology use in the teaching-learning process, including productivity and professional practice, and also address social, ethical, legal, and human issues. The focus of teacher assessment and professional development should be on the full range of standards and performance indicators.
ISTE NETS FOR TEACHERS AND PERFORMANCE INDICATORS

The NETS for Teachers, published by ISTE in 2000, are listed here. The NETS for Teachers specify that all classroom teachers should be prepared to meet the following standards and performance indicators.

I. Technology Operations and Concepts

Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:

A. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Students).

B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

II. Planning and Designing Learning Environments and Experiences

Teachers plan and design effective learning environments and experiences supported by technology. Teachers:

A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

B. 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.

D. plan for the management of technology resources within the context of learning activities.

E. plan strategies to manage student learning in a technology-enhanced environment.

III. Teaching, Learning, and the Curriculum

Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers:

A. facilitate technology-enhanced experiences that address content standards and student technology standards.

B. use technology to support learner-centered strategies that address the diverse needs of students.

C. apply technology to develop students’ higher order skills and creativity.

D. manage student learning activities in a technology-enhanced environment.
IV. Assessment and Evaluation
Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers:

A. apply technology in assessing student learning of subject matter using a variety of assessment techniques.

B. 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.

V. Productivity and Professional Practice
Teachers use technology to enhance their productivity and professional practice. Teachers:

A. use technology resources to engage in ongoing professional development and lifelong learning.

B. 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.

D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

VI. Social, Ethical, Legal, and Human Issues
Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK–12 schools and apply that understanding in practice. Teachers:

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity.

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.
How can teachers assess their own technology expertise and how do school districts and teacher preparation programs know that teachers and teacher candidates are progressing to meet the standards? The pressure for assessment and accountability for resources invested in technology in schools makes it imperative that the educational community be clear about what teachers and teacher candidates know and are able to do with technology and how that knowledge plays out in student learning.

“Assessment of an ever-changing area such as technology cannot be accomplished with a single test or data source. Assessment is an ongoing process aimed at understanding and improving student learning. It involves making our expectations explicit and public; setting appropriate criteria and high standards for learning quality; systematically gathering, analyzing, and interpreting evidence to determine how well performance matches those expectations and standards; and using the resulting information to document, explain, and improve performance. When it is embedded effectively within larger institutional systems, assessment can help us focus our collective attention, examine our assumptions, and create a shared academic culture dedicated to ensuring and improving the quality of higher education.” (Angelo, 1995, p. 7)

The components of an effective assessment process include determining the purpose or reason for collecting the information, selecting appropriate methods of measurement, evaluating the results, and using the information to inform teaching and learning. To accomplish these purposes, the assessment system should follow a balanced approach that includes multiple data sources such as direct questions (surveys and interviews), performance assessments (observations, presentations, student work), and portfolios (a purposeful collection of artifacts to demonstrate efforts, progress, and achievement).

**How can administrators use this book?**

Saddled with the responsibility of overseeing the planning, implementation, and assessment of technology use, administrators require an array of sensible tools to meet complex technology assessment needs. Whether it is a school district, school site, or program, assessment is necessary to document change and support improvement. The rubrics, descriptors, and checklists in this book provide a means for administrators to look at how technology is supporting teaching and learning, as well as verify the presence of highly qualified teachers using technology in their classrooms.

**How can teacher educators use this book?**

Supporting candidates to become technology competent while learning to teach is a complex task for teacher preparation, credentialing, and accrediting groups to consider. This book provides a developmental sequence to meeting the ISTE NETS for Teachers. As teacher educators work to ensure that candidates are prepared by meeting the NETS for Teachers and able to teach their students to meet the NETS for Students, it is necessary to examine program expectations and assessment systems using NETS-aligned assessment tools. The rubrics, suggested tasks, self-assessment tools, and general discussion of factors to consider assist programs in meeting accreditation and university goals.
How can teachers use this book?

As teachers take a leadership role within their grade level, mentor novice teachers and student teachers, and reflect on their own practice, this book provides tools for self-assessment, guidance for developing competence, and ways to look at professional practice supported by technology. Teachers are life-long learners. Assessment tools in this book assist teachers in establishing a direction to increase their own confidence and competence in using technology to enhance student learning.

ASSESSING ATTAINMENT OF NETS FOR TEACHERS

The NETS for Teachers Project developed the NETS for Teachers Assessment Model (see Figure 1) to effectively measure progress toward attainment of ISTE educational technology standards and performance indicators in a sustainable, scaleable system. This model includes multiple measures for ongoing formative performance measurement and summative assessment to address both individual progress and program effectiveness. Providing guiding principles and feedback for continuous improvement supports the objectives of the National Council for Accreditation of Teacher Education’s Principles for Performance-Based Assessment Systems in Professional Education Programs (NCATE, 2000a) and ISTE’s mission of advocating career-long professional development in the use of technology to enhance teaching and improve student learning.

The NETS for Teachers Assessment Model illustrates the relationship between the NETS for Teachers and the phases of professional growth in teacher preparation including levels beyond initial certification, such as the first year of teaching and accomplished teaching.

The horizontal rows of the model represent the six NETS for Teachers. The columns of the model represent the four NETS Performance Profiles (General Preparation, Professional Preparation, Student Teaching/Internship, and First-Year Teaching) of a teacher preparation program, as well as Highly Effective Teaching. As candidates advance through their teacher preparation program, each profile designates the minimum level of competence candidates should achieve prior to the next benchmark assessment. The dashed lines designate four benchmark assessments that compose the NETS assessment system for teacher preparation. The following paragraphs describe these benchmarks.

Candidate Readiness Benchmark: An initial benchmark assessment measures the applicant’s readiness for entry into the teacher education professional course-work component. This entry-level assessment provides information to the candidate about the skills that will be required for the teacher education program, and information to the teacher education program about the technology skills individual candidates still need to develop. It provides diagnostic information regarding the teacher candidate's...
current technology knowledge, skills, and dispositions. Results can be used to decide on admission to the professional teaching component (i.e., upper division, professional preparation program). The information may also be used to advise the candidates on a course of action for improving in any areas in which their performance indicates they have not yet met the general preparation standards.

**Initial Certification Benchmark:** This assessment generally occurs at the end of the student teaching/internship and prior to initial licensure. At this point, the faculty members in the program determine the readiness of their pending graduates to be successful teachers. After ongoing formative assessment of effective technology use during the teacher education professional course work and student teaching/internship components, it is essential to apply a summative assessment to determine the
candidates’ ability to apply technology in their own classroom. The teacher candidate who obtains initial licensure should meet the NETS for Teachers at least at the Approaching level.

**Novice Teacher Benchmark:** Within the early years of teaching, colleges of education and school districts will assess new teachers’ effectiveness in the classroom and continue to support their professional growth. Based on criteria from the Higher Education Act (Title II, Section 207, often known as the Federal Report Card for Teacher Preparation), colleges of education may be required to include data on their graduates in a Title II report submitted annually to the U.S. Department of Education. Additionally, school districts will likely seek to determine the level of technology competencies that new teachers demonstrate and use this information to plan appropriate professional development opportunities. The benchmark assessment will evaluate the performance of teachers on each of the six standards as Initial, Developing, Approaching, Proficient, or Exemplary. The teacher meeting the NETS for Teachers at the Proficient level is prepared to take an assessment that results in an ISTE NETS Certificate. ISTE is currently working with nonprofit and for-profit groups to develop assessments for those seeking the ISTE NETS Certificate.

### A LITTLE BACKGROUND ON ISTE NETS ASSESSMENT

The NETS Project held a focused assessment writing meeting in Tempe, Arizona, in December 2000. Through an exhaustive selection process, several highly regarded educators from across the nation were chosen to thoughtfully examine the issues of assessment and technology. The contributing team members included teachers, technology coordinators, administrators, teacher educators, college of education administrators, and professionals from the assessment community. Four subcommittees were formed, each working on different strategies to assess the extent to which the NETS for Teachers are met. The focus and tasks for each subcommittee were as follows:

- **General Preparation:** This subcommittee listed specifications for the assessments for meeting the tasks described in the profile.
- **Performance Assessment Tasks and Rubrics:** This group developed a metarubric to address the Professional Preparation and Student Teaching/Internship Performance Profiles.
- **Electronic Portfolio:** This subcommittee outlined the process and content for development of an electronic portfolio for the Professional Preparation and Student Teaching/Internship Performance Profiles with links to the First-Year Teaching Performance Profile.
- **Observation and Survey Tools:** This group identified a series of options to address the Student Teaching/Internship and First-Year Teaching Performance Profiles.

A smaller team convened in Dallas, Texas, in July 2002 to refine the work of the first team. Members of both teams are listed in Appendix D.
Advanced Proficiency Benchmark: A teacher scoring at the Exemplary level has performed technology integration at a level commensurate with Advanced or National Board Certification. In the future, ISTE will work, possibly in conjunction with the National Board for Professional Teaching Standards (NBPTS), to identify technology performance proficiency at this “accomplished” level. The purpose is to recognize those highly effective teachers who integrate technology into the teaching and learning experiences in their classroom and who provide models for others to emulate.

COLLECTING DATA TO ASSESS MEETING THE NETS FOR TEACHERS

Learning is a continuous process for both teachers and students. If teachers are to improve their practice they, like their students, need both formative and summative assessment to support continuous progress. For the professional educator, formative assessment in the area of technology can come in the form of periodic self-assessment, feedback from peers and administrators, reflections on teaching, and examination of student products. Summative assessment typically comes at benchmark points in a teaching career, at the end of a professional development experience or employment cycle, or as a result of seeking advanced certification or degrees. Summative assessments are often comprehensive and increasingly include an element focusing on the effect on student learning. Regardless of the purpose of the assessment, there are many data points and forms of data that can be collected that contribute to understanding the path a teacher has taken to meet the performance criteria outlined in the standards. These options are discussed in the following paragraphs.

Rubrics

Chapter 3 provides rubrics for the standards and performance indicators. Chapter 4 offers a continuum for teacher standards across the four stages of teacher preparation.

Rubrics used to examine performance communicate to the learner the level of achievement compared with a stated criterion. When assessment is designed to assist in the mastery or attainment of a specific level of performance, rubrics can be very instructive in setting target behaviors or guidelines for products.

Rubrics used for assessment have varying formats. The rubrics in this volume are all similar in purpose and are therefore consistently formatted. A previous ISTE resource, National Educational Technology Standards for Teachers—Preparing Teachers to Use Technology, purposefully contained rubrics that differed considerably, organized top-to-bottom, left-to-right, or right-to-left, to give examples of the many ways rubrics can be constructed. There does not appear to be a preference in the literature for one format over another; the organization appears to be determined by the appropriateness to the task or situation. Because progress in technology competence generally follows a
developmental continuum, the rubrics in this volume read left-to-right, with the lowest level of performance on the left and the highest level on the right.

**Surveys**

Survey research refers to both questionnaires and interviews. They are often a convenient and efficient way of collecting information from teachers to review aspects of technology integration that may not be observable. Through a survey the interviewer can also identify attitudes, values, opinions, interests, obstacles, and so on. Through interviews, the questioner can obtain specific information about a teacher’s conceptual understanding of integrating technology into the curriculum, developing effective teaching practices, working with students with disabilities, and so on.

Well-designed questionnaires and interviews provide information that can help staff development specialists plan professional development opportunities as well as illuminate teacher-perceived strengths and weaknesses. Although a teacher’s perception of his or her technology skills is extremely important, it must be noted that questionnaires and interviews are self-reported data and therefore considered the most suspect of all types of data. However, a teacher’s perceptions, feelings, and interests should be considered when improvements in technology use in the classroom are desired. Although researchers tend to use less rigorous standards of reliability and validity when assessing questionnaire and interview data, the average responses in surveys still provide valuable insight about teacher proficiencies.

Chapter 5 provides several questionnaires and interview protocols. Each instrument has strengths and limitations in its design. While some instruments were designed for program assessment or planning and assessing professional development by aggregating data to look at trends in teacher education program implementation, others were designed for self-reporting over time to look at individual changes in development. As with all research instruments, selecting the appropriate instrument depends on the purpose of the data collection.

**Observation Tools**

Once prospective teachers move into their student teaching/internship experience, there is a need for classroom observation tools to assess appropriate uses of technology in the curriculum. With experienced teachers, observations completed by principals and curriculum supervisors provide feedback on actual performance in the context of the classroom. While a narrative approach to documenting the use of technology in the classroom may provide interesting scenarios of classroom practice, it is difficult to analyze narratives or to find common criteria in them to assess. “Ideally, classroom observations should provide information about the quality of technology integration into the lesson, not just its presence or absence or the extent of its use” (Painter, 2001, p. 24). The dilemma is in designing an observation protocol that can capture this distinction.
Chapter 6 provides examples of observation instruments. One is a timed-interval observation tool that very specifically pinpoints teacher and student performance during a predetermined technology showcase lesson. Another tool is a simple add-on rubric to a general lesson evaluation instrument for use when the observer is required to employ a specific observation tool that is unique to the district or school. Additionally, the Snapshot Assessment tool, which involves collecting data during a casual walk around campus, provides information on the technology that is currently in use and the ways it is being used. This is useful information when examining the total technology use in a school building to determine general trends.

Performance Assessments

Performance assessment techniques particularly lend themselves to systems that focus on outcomes-based assessment. Performance assessment concentrates on the direct observation of a teacher’s performance or products as a result of teacher work. Teacher candidates and inservice teachers create projects or perform tasks based on predetermined standards, criteria, and indicators, which are typically evaluated by rubrics. The results or products from the performance tasks may form the contents or artifacts of a portfolio and become part of an overall assessment of teacher competence in meeting the standards.

Chapter 7 explores tasks that can be used to assess whether a teacher or teacher candidate meets the NETS for Teachers. While a holistic assessment system integrates the performance tasks in the context of overall teacher assessment, some situations require that specific tasks be used to assess a particular area, such as the NETS for Teachers. Chapter 7 discusses both the ISTE Recommended Performance Tasks, which are designed to be part of a teacher education program, and the Maryland Technology Performance Tasks, which focus directly on meeting technology standards.

Portfolios

Chapter 8 identifies how a teaching portfolio can take on many uses—from reflection, to assessment, to review for employment purposes. The purpose of the portfolio must be clearly articulated, with the format and contents designed to reach a specific audience. The artifacts selected for the portfolio can come from a required list, such as the ISTE Recommended Performance Tasks or the Maryland Technology Performance Tasks. Every artifact in the portfolio should have a reflection, which provides the context and rationale or justification for how the artifact meets the standard or criterion.

Whether the portfolio is used for meeting advanced certification or basic credential requirements, the process of developing the portfolio can be a significant learning experience for the teacher or teacher candidate. The selection of and reflection on prior work requires the portfolio developer to make connections between the standards and the prior work to demonstrate competence. It has been the experience
of those who have completed a standards-based portfolio that assembly of materials provides the opportunity to become reacquainted with prior work products. It is the selection and reflection on the work through the lens of the standards that provides a comprehensive view of the growth of the teacher candidate.

NETS FOR TEACHERS AND INTASC PRINCIPLES

The ISTE NETS for Teachers should become an integral part of the assessment of program, district, or teacher expectations. In the case of teacher preparation and induction programs using the INTASC (Interstate New Teacher Assessment and Support Consortium) principles, NETS for Teachers can be fully integrated into the assessment system. The tables in this section show the correlation of the NETS for Teachers with the INTASC principles.

INTASC is a collection of more than 30 states operating under the Council of Chief State School Officers. This consortium has developed standards and an assessment process for initial teacher certification (Campbell, Cignetti, Melenyzer, & Wyman, 2001).

Interstate New Teacher Assessment and Support Consortium Principles

The 10 principles provide a basis for evaluating a candidate’s achievement, providing guidance for both preparation and assessment.

PRINCIPLE 1. Knowledge of Subject Matter
The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

PRINCIPLE 2. Knowledge of Human Development and Learning
The teacher understands how children learn and develop and can provide learning opportunities that support their intellectual, social, and personal development.

PRINCIPLE 3. Adapting Instruction for Individual Needs
The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

PRINCIPLE 4. Multiple Instructional Strategies
The teacher understands and uses a variety of instructional strategies to encourage students’ development of critical-thinking, problem-solving, and performance skills.

PRINCIPLE 5. Classroom Motivation and Management
The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
PRINCIPLE 6. Communication Skills
The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

PRINCIPLE 7. Instructional Planning Skills
The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.

PRINCIPLE 8. Assessment of Student Learning
The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.

PRINCIPLE 9. Professional Commitment and Responsibility
The teacher is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

PRINCIPLE 10. Partnerships
The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.
Correlating the NETS for Teachers and INTASC Principles

The two sets of standards correlate with one another but do not completely overlap. Achieving the ISTE NETS for Teacher should help students achieve the appropriate INTASC principle. Yet the reverse may not be true because technology is not mentioned in the INTASC principles. Table 1 provides an overview of the correlation. Table 2 details correlation with the specific NETS for Teachers performance indicators.

**TABLE 1**
Overview—Correlation of the NETS for Teachers and INTASC Principles

<table>
<thead>
<tr>
<th>NETS•T</th>
<th>INTASC PRINCIPLES ADDRESSED</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>I. Technology Operations and Concepts. Teachers demonstrate a sound understanding of technology operation and concepts.</td>
<td>•</td>
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<td>IV. Assessment and Evaluation. Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.</td>
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<td>V. Productivity and Professional Practice. Teachers use technology to enhance their productivity and professional practice.</td>
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### Table 2
**Detailed View—Correlation of the NETS for Teachers and INTASC Principles**

<table>
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<tr>
<td><strong>I. Technology Operations and Concepts.</strong> Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:</td>
<td></td>
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<tr>
<td>A. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in ISTE National Educational Technology Standards for Students).</td>
<td>1*</td>
</tr>
<tr>
<td>B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.</td>
<td>9</td>
</tr>
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<td><strong>II. Planning and Designing Learning Environments and Experiences.</strong> Teachers plan and design effective learning environments and experiences supported by technology. Teachers:</td>
<td>3, 4, 5, 7</td>
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<td>A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.</td>
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<td>A. facilitate technology-enhanced experiences that address content standards and student technology standards.</td>
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<td>B. use technology to support learner-centered strategies that address the diverse needs of students.</td>
<td>2, 3</td>
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<td>C. apply multiple methods of evaluation to determine students’ appropriate use of technology resources for learning, communication, and productivity.</td>
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*This applies only if technology is considered a subject matter that teachers need to understand and make meaningful for students.
Looking at the Big Picture • Chapter 1

TABLE 2—Continued

<table>
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<td>D. use technology to communicate and collaborate with peers, parents, and the larger community to nurture student learning.</td>
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<td>E. facilitate equitable access to technology resources for all students.</td>
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Assessing the extent to which teachers meet the NETS allows for a comprehensive examination of the professional development within a school district or educational agency. If teachers are to meet the standards and have ongoing opportunities to remain current in effective strategies using technology in teaching and learning, there must be some level of leadership at both the building and the district level to guide professional development and the appropriate use of resources. In alignment with the INTASC principles and the NCATE objectives, ISTE has extended the NETS for Teachers foundation standards to two additional levels, technology facilitators at the building level and technology leaders at the district, regional, or state levels. Chapter 9 provides information on how the NETS for Teachers have been expanded to support these necessary roles.

NETS FOR TEACHERS AND THE NO CHILD LEFT BEHIND ACT

Technology plays a key role in the No Child Left Behind Act of 2001. The flexibility provided by the law enables states and districts to have discretion in spending within the parameters defined in these six priority areas:
In addition to being one of the six priorities, educational technology can play a key role in the implementation of the other five priority areas. The following boxed information is from the U.S. Department of Education fact sheet on the No Child Left Behind Act.

**HOW TECHNOLOGY CAN WORK WELL IN SCHOOLS**

No Child Left Behind focuses on how teachers and students can use technology. Previous federal programs focused on increasing access to more technology. In an effort to improve student achievement through the use of technology, U.S. Secretary of Education Rod Paige announced a new Enhancing Education Through Technology (Ed Tech) initiative.

The goals of Ed Tech grants are to:

- Improve student academic achievement through the use of technology in elementary schools and secondary schools.
- Assist students to become technologically literate by the time they finish the eighth grade.
- Ensure that teachers are able to integrate technology into the curriculum to improve student achievement.

**Technology must enhance learning.**

- It’s not enough simply to have a computer and an Internet connection in the classroom if they are not made part of the learning process.
- Technology is a tool like any other, and the value does not come from having access to it, but rather how it is used.
- Ed Tech grants will improve the quality of education by developing new ways to apply this tool to teaching and learning.

**It expands options and provides better information on education.**

- Several components of No Child Left Behind allow schools to purchase technology resources to support program goals. The result is technology aligned with specific goals tied to state academic standards.
- Online tests deliver reports on student progress instantaneously instead of weeks later. When designed well, curriculum software can engage students in solid academic curriculum like never before.

No Child Left Behind and the Role of the NETS

Collectively, the ISTE NETS for Students, Teachers, and Administrators support improvement in all focus areas. Having teachers who meet the NETS for Teachers is important in addressing the provisions described in the Enhancing Education Through Technology (Ed Tech) component of the act. The act places a priority on integrating technology into teaching and learning as a means for improving student achievement— one of the underlying principles of the ISTE NETS for Teachers. Educational entities targeting professional development, which includes effective use of technology to support teaching and learning, contribute to building and sustaining a high-quality teaching force. Teachers in Grades PK–8 who work to meet the ISTE NETS will also be preparing students to meet the education technology literacy requirement by the eighth grade while teaching challenging standards-based content.

The term well-qualified teacher extends beyond content and pedagogical understanding of the basic disciplines; it includes the knowledge, skills, and dispositions necessary to provide a technology-enhanced environment in which students meet the NETS for Students. A “well-qualified” teacher must be supported by an equally “well-qualified” administrator. School and district administrators who are able to meet the NETS for Administrators understand the support necessary to provide a well-functioning, technology-rich learning environment to enhance student learning.

Meeting the standards is more than a checklist for students, teachers, and administrators. It requires collaboration and a commitment to standards-aligned professional development and curriculum in which the focus is on engaging students for the improvement of teaching and learning.

It is in this context that the classroom learning environment shifts to engaging, motivating, and supporting all learners, with technology integrated into classroom practice and student learning. The act requires the use of scientifically based research that provides evidence of students making progress in learning. Research on the effectiveness of implementing technology-rich learning environments has been collected by the Center for Applied Research on Educational Technology (CARET) and is available on the ISTE Web site (http://caret.iste.org). However, like any emerging and vital field of study, more research needs to be done.

Developing Evaluation Plans

The tools in the following chapters can assist in meeting the accountability requirements, establishing programs for developing teacher technology competence, and assessing the effect of implementation strategies for the No Child Left Behind Act. As with any initiative, an effective and appropriate evaluation plan should be established prior to implementation.
The following list may be used to create implementation plans, and then evaluate their effectiveness.

1. Preservice teacher education and professional development can be assessed using surveys, interviews, tallies, and inventories. Questions to consider include:
   - Was the technology appropriate?
   - Do teachers have access to it?
   - Is the professional development well designed?
   - Is it well received?
   - Does it reach the individuals it’s supposed to?

2. Changes in the learning environments, which can be assessed using surveys, interviews, classroom observations, lesson plans, teacher portfolios, and class syllabi, can provide information to answer the following:
   - Was technology integrated into teaching?
   - Did teachers apply the content of the professional development they received?
   - Are the classrooms addressing the content standards on which students will be assessed?
   - Are the resources being used? Are they being used appropriately?
   - How many students are being affected by professional development and changes in the learning environment?

3. Student outcomes, which can be assessed by reviewing student products, test scores, and documented behavior in the classroom, can provide information to address the following:
   - Did students exposed to the changed learning environments achieve at different levels or in different ways than similar students who were not exposed?
   - Are those students’ school behaviors (e.g., attendance) different from behaviors of other students?

Because the act specifically emphasizes the use of scientifically conducted research, the following two considerations are important to maintain the integrity of any comprehensive implementation plan that is aligned with the ISTE NETS:

1. Each main area in the previous list needs to be evaluated in turn. If it is unclear whether the intervention actually took place as planned, the change in teaching practice cannot necessarily be attributed to the NETS-aligned professional development or intervention. If it is not clear how the classroom practice changed, the changed behaviors cannot be attributed to any particular classroom experience or professional development.
2. Controlling other variables is always a difficulty in conducting evaluative research. One role of qualitative formative evaluation is to identify complicating variables (for example, the students are exposed to technology outside of school). Usually, the biggest structural problem is that the main methods of controlling for differences between students (random selection of participants and random assignment to treatment and control groups) have serious equity problems. However, the first step is to identify as many of the confounding variables as possible. Once that is completed, there are various ways to control for confounding variables (for example, handicapping advantaged students by using their prior technology skills as a covariate or letting classes of students take turns being exposed to the new computer lab).

Additionally, the National Center for Educational Statistics (NCES) has an ongoing effort to standardize the collection of use of statistical information provided by schools relating to the use of technology. As schools develop their technology plans, it is the goal of the NCES Technology in Schools Task Force to enable systematically acquisition of information on many dimensions that can be compared with other schools and districts. Chapters on professional development and technology integration have excerpted the ISTE NETS for Students, Teachers, and Administrators (http://nces.ed.gov/pubs2003/2003313.pdf).

As you examine the assessment tools in this book, keep in mind that they are designed to be modified to fit the circumstances of the educational entity. As with the No Child Left Behind Act, the plan for assessing teacher competence should reflect the local standards and challenges.
STANDARD II
Planning and Designing Learning Environments and Experiences

Teachers plan and design effective learning environments and experiences supported by technology.

Meets the Standard. Teachers who meet the standard are able to arrange equitable access to appropriate technology resources that enable students to engage successfully in learning activities across subject/content areas and grade levels. They plan, implement, manage, and evaluate student use of technology resources to support the diverse needs of learners, including adaptive and assistive technologies. Teachers plan lessons that effectively use technology and are consistent with best practices for integrating subject matter and student technology standards. In their planning, teachers demonstrate an awareness of and make appropriate choices of technology systems, resources, and services that are aligned with district and state standards.

II.A. Teachers design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

Description
Teachers consider many aspects of teaching and learning as they plan activities for their students. Among the considerations for creating developmentally appropriate learning activities are the diversity of learning styles, stages of development, and cultural influences. Activity designs apply cohesive technology-enhanced instructional strategies in the context of supporting student learning.

Suggested Artifacts
A classroom technology plan, an instructional unit, and a cohesive set of lesson plans in which the teacher has selected a broad range of technology resources to adapt instruction to different learning needs and ability levels, to enable participation of students with special needs, and to support second language learners.
## II.A. RUBRIC

Teachers design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>PERFORMANCE LEVEL</th>
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</table>
| **Plan developmentally appropriate learning opportunities** | **DEVELOPING** Developmentally appropriate levels of difficulty in content lack many areas of consideration or are questionable.  
**APPROACHING** Developmentally appropriate levels of difficulty are considered as a part of instructional planning but are incomplete.  
**MEETS** Developmentally appropriate levels of difficulty are considered in planning content and processes (i.e., cognitive, physical, social, and emotional development).  
**EXCEEDS** Developmentally appropriate levels of difficulty are considered in planning content and processes. Plan provides multiple learning activities to meet specific needs of learners in a cohesive instructional design. |
| **Apply technology-enhanced instructional strategies** | **DEVELOPING** Learning activities apply one technology-enhanced instructional strategy, but students do not use the technology.  
**APPROACHING** Learning activities apply one technology-enhanced instructional strategy with insufficient student use of technology.  
**MEETS** Learning activities apply multiple technology-enhanced instructional strategies that include student use of technology.  
**EXCEEDS** Learning activities apply multiple technology-enhanced instructional strategies that focus on the student-centered use of technology. |
| **Meet diverse needs of learners** | **DEVELOPING** Technology resources and strategies are selected for some other reason than meeting the diverse needs of learners.  
**APPROACHING** Technology resources and strategies support narrow sets of needs rather than a diverse array of learner needs.  
**MEETS** Technology resources and strategies are selected that include attention to diverse learning styles, special education needs, and language acquisition.  
**EXCEEDS** Technology resources and strategies are selected that include attention to diverse learning styles, special education needs, and language acquisition. Plan provides challenging and creative opportunities for learners. |
II.B. Teachers apply current research on teaching and learning with technology when planning learning environments and experiences.

Description

Effective use of technology in support of learning is not likely to happen without a deliberate process. This process should include a review of research and best practices related to technology-supported learning. Research can provide guidance in the use of technology, the conditions under which this use is likely to be successful, and when and how it is appropriate. Teachers have an obligation to be aware of current research on teaching and learning with technology as they plan learning environments and experiences to ensure that the use of technology supports the desired student outcomes.

Lessons that are supported by technology should use a variety of research-based instructional strategies that meet the diverse learning needs of students. Students may have:

- Different learning styles
- Different forms of intelligence (based on multiple intelligences)
- Special needs
- Varying academic abilities

Research demonstrates that for learning to take place, the instructional strategies must be varied to accommodate the diverse learning needs of all students in the classroom.

Suggested Artifacts

- Current research on teaching and learning with technology cited in classroom technology and unit plans
- Reflective journal entries that ponder the decision-making process in creating lessons and units. Entries consider the dilemmas in applying what is known from research to the identified needs of the students.
- Recorded conversations with colleagues in which knowledge of research on teaching and learning is discussed in the context of justifying planning decisions.
## II.B. RUBRIC

Teachers apply current research on teaching and learning with technology when planning learning environments and experiences.

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>PERFORMANCE LEVEL</th>
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<tbody>
<tr>
<td><strong>Apply current and appropriate research</strong></td>
<td></td>
</tr>
<tr>
<td>Classroom technology plan attempts to apply current research on teaching and learning with technology but is incomplete or inappropriately used in the setting. Plan may indicate misinterpretation of the research.</td>
<td>Developing</td>
</tr>
<tr>
<td>Unit plan demonstrates application of current research on teaching and learning with technology, but the design does not consistently carry the use of the research throughout the sequence of the lessons.</td>
<td>Approaching</td>
</tr>
<tr>
<td>Unit plan consistently demonstrates application of current research on teaching and learning with technology in the design of the lessons and in the learning environment.</td>
<td>Meets</td>
</tr>
<tr>
<td>Unit plan consistently demonstrates application of current and diverse research on teaching and learning with technology in the design of the lessons and in the learning environment.</td>
<td>Exceeds</td>
</tr>
<tr>
<td><strong>Provide research citations</strong></td>
<td></td>
</tr>
<tr>
<td>Classroom technology and unit plans rarely provide appropriate citations. There are no journal entries that indicate planning for incorporating research into classroom practice.</td>
<td>Developing</td>
</tr>
<tr>
<td>Unit plan documents appropriate citations for the research used. Journal entries include some ideas for applying the research in the classroom.</td>
<td>Approaching</td>
</tr>
<tr>
<td>Unit plan documents appropriate and complete citations for the research used. Journal entries reflect the challenges of applying the research to classroom practice.</td>
<td>Meets</td>
</tr>
<tr>
<td>Unit plan documents appropriate and complete citations for the research used and notations for other research that is applicable as a resource for future revisions of the lesson sequence. Journal entries include many ideas for future implementation of the research in the classroom.</td>
<td>Exceeds</td>
</tr>
</tbody>
</table>

Schools need a coherent approach to assessing teacher performance, and ISTE can help. This excerpt with its sample rubric for helping teachers plan and design effective learning environments shows how ISTE’s NETS can be used to develop a rigorous yet workable system of assessment. You’ll want the full book for its complete coverage of standards-based observation techniques, portfolio evidence, and professional development plans. Order this essential reference book in bulk now, by phone, fax, or online. Single copy price $39.95. ISTE member price $35.95. Special bulk pricing available. Call 1.800.336.5191 or go to www.iste.org/bookstore/.