

NCATE/ITEA/CTTE Program Standards (2003) Programs for the Preparation of Technology Education Teachers

Introduction

Technology education is a discipline designed to promote technological literacy at the K-12 grade level. It is the intent of such study to provide technology students with an understanding of their technological culture so they can become intelligent consumers of their technology. Therefore, technology education programs are designed to produce individuals who can solve problems involving the technical means humans use for their survival. Technology education programs capitalize on the need humans have for expressing themselves with tools and materials. Technological literacy is considered a basic and fundamental study for all people regardless of educational or career goals.

In the field of technology teacher education, accreditation has taken on a more important role. In the past 15 years, guidelines and standards for accreditation have been implemented into many universities. More recently, through the efforts of many individuals in the field of technology teacher education, the Technology for All Americans Project has developed *Standards for Technological Literacy: Content for the Study of Technology* (ITEA, 2000). These standards will continue to guide the technology education profession as new ITEA/CTTE/NCATE standards are reviewed and updated every five years. It should be noted that these ITEA/CTTE/NCATE curriculum standards have been written in such a manner that the technology teacher education candidate will be able to provide positive effects to enhance student learning at the K-12 level.

Definitions

The following definitions of terms will help the reader understand the fields of technology and technology education.

1. **Technological literacy**—The ability to use, manage, understand, and assess technology.
2. **Technological problem-solving**—The process of understanding a technological problem, devising a plan, carrying out the plan, and evaluating the plan in order to solve a problem or meet a need or want.
3. **Technological products and systems**—Products and systems that use or relate to technology.
4. **Technologically literate**—Having technological literacy; capable of understanding—with increasing sophistication—what technology is, how it is created, how it shapes society, and in turn is shaped by society.
5. **Technology**—
 1. The innovation, change, or modification of the natural environment to satisfy perceived human needs and wants.
 2. Human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities.

6. **Technology education**— An interdisciplinary study of technology across grade levels that provides opportunities throughout content area studies for students to learn about the processes and knowledge related to technology needed to solve problems and extend human capabilities.
7. **Technology teacher education program**—The study of the technology methods and procedures at the university level to prepare teacher candidates to teach technology education in grades K-12.

Knowledge Base for Technology Education

A subject area can be defined as having a stand-alone knowledge base validated by research. A sound knowledge base is important because it validates the standards and guidelines for the particular field. Within the field of technology education, there has been a continuous progression of research in the development of technological content. The following depicts the progression of research over the past 20 years.

Jackson's Mill Curriculum Theory

In the field of technology education, there is documented history of changing its knowledge base from the study of industry to technology. Today, it is the study of technology. The technology education profession has undergone curricular and programmatic changes since the *Jackson's Mill Curriculum Theory (Jackson's Mill Project)* was published in 1981 (Snyder & Hales, 1981). This research and the supporting documents called for far-reaching changes. One major change was the recognition of technology as a viable knowledge base. A second was the way technology education was structured and delivered at the elementary, middle, high school, and post-secondary levels.

The knowledge base and guidelines established for technology teacher education programs have been refined since their adoption in 1987. The first and second editions of the ITEA/CTTE/NCATE *Curriculum Guidelines*, that were approved by the SASB in 1987 and 1992, relied heavily on the research, recommendations, and conclusions provided by the *Jackson's Mill Project*.

Conceptual Framework for Technology Education

After the *Jackson's Mill Project*, the knowledge base and research used to revise the guidelines that were approved in 1997 by SASB were based upon *A Conceptual Framework for Technology Education* (Savage & Sterry, 1991). The knowledge base was established through research conducted by practicing technology education teachers, teacher educators, administrators, and other leaders working with the ITEA. This refined knowledge base has allowed technology teacher education programs to increasingly focus instruction on critical technological analysis and technological problem-solving, rather than on product and materials-processing related instructional methodologies. The identified knowledge base organizers for developing curriculum were the technological systems of communicating, constructing, manufacturing, and transporting.

Since 1990, there have been numerous published documents that have contributed to the knowledge base of technology education. One was the 44th CTTE Yearbook, *Foundations of Technology Education* (Martin, 1996). This document, researched and written by leaders in the profession, presented a complete review of the most current thinking in the field of technology education pertaining to the basis for technology education, curriculum theory, professional practices, and leadership. A second was *A Rationale and Structure for the Study of Technology* (ITEA, 1996). This research publication outlined the rationale and structure for the study of technology and was the knowledge base for *ITEA's Standards for Technological Literacy*.

The CTTE has also developed other yearbooks that have contributed significantly to the knowledge base for technology education. Some of the more important titles include:

- Kemp, W.H., & Schwaller, A.E. (1988). *Instructional strategies for technology education*. New York: Glencoe McGraw-Hill.
- Liedtke, J. A. (1990). *Communication in technology education*. New York: Glencoe McGraw-Hill.
- Dyrenfurth, M. R., & Kozak, M. R. (1991). *Technological literacy*. New York: Glencoe McGraw-Hill.
- Wright, J. R., & Komacek, S. (1992). *Transportation in technology education*. New York: Glencoe McGraw-Hill.
- Seymour, R. D., & Shackelford, R. L. (1993). *Manufacturing in technology education*. New York: Glencoe McGraw-Hill.
- Wescott, J. W., & Henak, R. M. (1994). *Construction in technology education*. New York: Glencoe McGraw-Hill.
- Custer, R. L., & Wiens, E. A. (1996). *Technology and the quality of life*. New York: Glencoe McGraw-Hill.
- Rider, B. L. (1998). *Diversity in technology education*. New York: Glencoe McGraw-Hill.
- Martin, E. G. (2000). *Technology education for the 21st century: A collection of essays*. New York: Glencoe McGraw-Hill.
- Ritz, J. M., Dugger, W. E., & Israel E. N. (Eds.) (2002). *Standards for Technological Literacy, The Role of Teacher Education: Fifty-first yearbook of the Council on Technology Teacher Education*. New York: Glencoe McGraw-Hill.
- Helgeson K. & Schwaller, A. E. (2003). *Selecting Instructional Strategies for Technology Education*. New York: Glencoe McGraw-Hill.

The Technology for All Americans Project as a Knowledge Base

The information presented in the *A Rationale and Structure for the Study of Technology* (ITEA, 1996) was the basis for the development of *Standards for Technological Literacy: Content for the Study of Technology* (ITEA, 2000). Often referred to as *STL*, this project developed national technological literacy standards for K-12 technology teacher education programs. The National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA) funded this project. The *STL* project took approximately four years to complete and was presented to the technology education profession at the ITEA Conference in Salt Lake City, April 2000.

The vision of achieving technological literacy for all people is a fundamental tenet of *STL*. These standards and related benchmarks identify what all students need to know and be able to do to progress toward technological literacy. *STL* provides a foundation upon which technology teacher education programs may be built. Good teaching practices, coordinated with standards-based content, quality curriculum materials, effective program development, progressive professional development, and carefully planned and articulated assessment provide the power that brings the learning process to life.

Who Should Respond to ITEA/CTTE/NCATE Curriculum Standards?

All technology teacher education programs with the mission of preparing technology education teachers should respond to these standards. If your program is a vocational program based on a philosophy different than technology education addressed by these standards, you are not required to respond to these standards. You should respond to these standards if the institution offers an **initial certification program in technology teacher education**. These ITEA/CTTE/NCATE curriculum standards are not to be used for any advanced technology teacher education program review at the graduate level. Presently, there are no approved advanced (graduate) curriculum standards for technology teacher education programs that have been approved by NCATE and the SASB. Please contact either the ITEA or NCATE offices for further information if necessary.

Introduction to the Standards

Description of the Standards

Types of Standards

There are ten standards. The ten standards are subdivided into two sets as shown below:

Subject Matter Standards for Technology Education

Standard 1—The Nature of Technology

Standard 2—Technology and Society

Standard 3—Design

Standard 4—Abilities for a Technological World

Standard 5—The Designed World

Effective Teaching Standards for Technology Education

Standard 6—Curriculum

Standard 7—Instructional Strategies

Standard 8—Learning Environment

Standard 9—Students

Standard 10—Professional Growth

Standards 1-5 of this document specifically focus on the subject matter of technology. For more detailed descriptions of standards 1-5, refer to the *Standards for Technological Literacy: Content for the Study of Technology* (ITEA, 2000). Standards 6-10 identify the knowledge necessary for effective teaching of technology in technology teacher education programs. For more detailed descriptions of standards 6-10 refer to the *Professional Development Standards* (ITEA 2003). Both of these documents are part of the Technology for All Americans Project.

The Designed World

The document *Standards for Technological Literacy: Content for the Study of Technology* includes an area entitled “The Designed World.” This content (medical, agricultural/biotechnologies, energy, communication, transportation, construction, and manufacturing technologies) has also been included as an ITEA/CTTE/NCATE subject matter standard (standard 5). It should be noted that in addition to standard 5, The Designed World content should also be evident in all of the subject matter standards 1-4. For example, when teaching and learning occurs in any of the subject matter content standards 1-4, it should be learned in the context of medical, agricultural/biotechnology, energy, communication, transportation, construction, and/or manufacturing technologies. It is not necessary to have courses in each of these areas. However, there should be ample evidence included that shows all of these areas are being covered within a variety of courses in the technology teacher education program.

Indicators

Each of the ten standards is further described and explained by including outcome statements that are called “**indicators.**” The “indicators” are statements that further define the standard. They help to show the depth and breadth of the standard and give examples as to the type of topics that are components of the standard.

To provide technology teacher education candidates with comprehensive learning opportunities, there are knowledge, performance and disposition indicators included with each standard. **Knowledge indicators** are those that focus on cognitive information such as concepts, theories, ideas, formulas, definitions, identifications and analyses about the standard. **Performance indicators** are those that focus on physical outcomes, applications of learning, and the ability to use content concerning the standard. **Disposition indicators** are those that concentrate on attitudes, values, ethics, beliefs, and affective behaviors about the standard. **It is important to remember that when writing a program report, it is not necessary to respond to each and every indicator. The program report and supporting documentation should be prepared to show that the overall standard has been met.** However, mastery of indicators will lead to more complete achievement of each standard.

STANDARD 1 — THE NATURE OF TECHNOLOGY

Technology teacher education program candidates develop an understanding of the nature of technology within the context of the *Designed World*.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 1.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Explain the characteristics and scope of technology.
- Compare the relationship among technologies and the connections between technology and other disciplines.

Performance Indicators:

- Apply the concepts and principles of technology when teaching technology in the classroom and laboratory.

Disposition Indicators:

- Comprehend the nature of technology in a way that demonstrates sensitivity to the positive and negative aspects of technology in our world.

RUBRIC FOR STANDARD 1-The Nature of Technology

TARGET

Technology teacher education program candidates have in-depth knowledge of the subject matter that they plan to teach as described in the standard and they demonstrate their knowledge through inquiry, critical analysis and evaluation of the subject matter.

ACCEPTABLE

Technology teacher education program candidates know the subject matter that they plan to teach and can explain important principles and concepts delineated in the standard.

UNACCEPTABLE

Technology teacher education program candidates have inadequate knowledge of the subject matter that they plan to teach and are unable to provide examples of important principles or concepts identified as part of the standard.

Knowledge Indicators:

- Explain the characteristics and scope of technology.
- Compare the relationship among technologies and the connections between technology and other disciplines.

Performance Indicators:

- Apply the concepts and principles of technology when teaching technology in the classroom and laboratory.

Disposition Indicators:

- Comprehend the nature of technology in a way that demonstrates sensitivity to the positive and negative aspects of technology in our world.

STANDARD 2 — TECHNOLOGY AND SOCIETY

Technology teacher education program candidates develop an understanding of technology and society within the context of the *Designed World*.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 2.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Compare the relationships between technology and social, cultural, political, and economic systems.
- Assess the role of society in the development and use of technology.
- Assess the importance of significant technological innovations on the history of human kind.

Performance Indicators:

- Judge the effects of technology on the environment.
- Evaluate the relationship between technology and social institutions such as family, religion, education, government, and workforce.

Disposition Indicators:

- Demonstrate sensitivity to appropriate and inappropriate uses of technology and its effects on society and the environment.
- Make decisions based on knowledge of intended and unintended effects of technology on society and the environment.

RUBRIC FOR STANDARD 2-Technology and Society

TARGET

Technology teacher education program candidates have in-depth knowledge of the subject matter that they plan to teach as described in the standard and they demonstrate their knowledge through inquiry, critical analysis and evaluation of the subject matter.

ACCEPTABLE

Technology teacher education program candidates know the subject matter that they plan to teach and can explain important principles and concepts delineated in the standard.

UNACCEPTABLE

Technology teacher education program candidates have inadequate knowledge of the subject matter that they plan to teach and are unable to provide examples of important principles or concepts identified as part of the standard.

Knowledge Indicators:
<ul style="list-style-type: none"> - Compare the relationships between technology and social, cultural, political, and economic systems. - Assess the role of society in the development and use of technology. - Assess the importance of significant technological innovations on the history of human kind.
Performance Indicators:
<ul style="list-style-type: none"> - Judge the effects of technology on the environment. - Evaluate the relationship between technology and social institutions such as family, religion, education, government, and workforce.
Disposition Indicators:
<ul style="list-style-type: none"> - Demonstrate sensitivity to appropriate and inappropriate uses of technology and its effects on society and the environment. - Make decisions based on knowledge of intended and unintended effects of technology on society and the environment..

STANDARD 3 — DESIGN

Technology teacher education program candidates develop an understanding of design within the context of the *Designed World*.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 3.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Explain the importance of design in the human-made world.
- Describe the attributes of design.
- Analyze the engineering design process and principles.

Performance Indicators:

- Apply the process of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem.

Disposition Indicators:

- Investigate the relationship between designing a product and the impact of the product on the environment, economy, and society.

RUBRIC FOR STANDARD 3-Design

TARGET

Technology teacher education program candidates have in-depth knowledge of the subject matter that they plan to teach as described in the standard and they demonstrate their knowledge through inquiry, critical analysis and evaluation of the subject matter.

ACCEPTABLE

Technology teacher education program candidates know the subject matter that they plan to teach and can explain important principles and concepts delineated in the standard.

UNACCEPTABLE

Technology teacher education program candidates have inadequate knowledge of the subject matter that they plan to teach and are unable to provide examples of important principles or concepts identified as part of the standard.

Knowledge Indicators:

- Explain the importance of design in the human-made world.
- Describe the attributes of design.
- Analyze the engineering design process and principles.

Performance Indicators:

- Apply the process of troubleshooting, research and development, invention, innovation, and experimentation in developing a solution to a design problem.

Disposition Indicators:

- Investigate the relationship between designing a product and the impact of the product on the environment, economy, and society.

STANDARD 4 — ABILITIES FOR A TECHNOLOGICAL WORLD

Technology teacher education program candidates develop abilities for a technological world within the contexts of the *Designed World*.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 4.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Select design problems and include appropriate criteria and constraints for each problem.
- Evaluate a design, assessing the success of a design solution, and develop proposals for design improvements.
- Analyze a designed product, and identify the key components of how it works and how it was made.
- Operate and maintain technological products and systems.

Performance Indicators:

- Develop and model a design solution.
- Complete an assessment to evaluate merits of design solution.
- Operate a technological device and/or system.
- Diagnose a malfunctioning system, restore the system, and maintain the system.
- Investigate the impacts of products and systems on individuals, the environment, and society.

Disposition Indicators:

- Assess the impacts of products and systems.
- Follow safe practices and procedures in the use of tools and equipment.
- Judge the relative strengths and weaknesses of a designed product from a consumer perspective.
- Exhibit respect by properly applying tools and equipment to the processes for which they were designed.
- Design and use instructional activities that emphasized solving real world open-ended problems.

RUBRIC FOR STANDARD 4-Abilities for a Technological World

TARGET

Technology teacher education program candidates have in-depth knowledge of the subject matter that they plan to teach as described in the standard and they demonstrate their knowledge through inquiry, critical analysis and evaluation of the subject matter.

ACCEPTABLE

Technology teacher education program candidates know the subject matter that they plan to teach and can explain important principles and concepts delineated in the standard.

UNACCEPTABLE

Technology teacher education program candidates have inadequate knowledge of the subject matter that they plan to teach and are unable to provide examples of important principles or concepts identified as part of the standard.

Knowledge Indicators:

- **Select design problems and include appropriate criteria and constraints for each problem.**
- **Evaluate a design, assessing the success of a design solution, and develop proposals for design improvements.**
- **Analyze a designed product, and identify the key components of how it works and how it was made.**
- **Operate and maintain technological products and systems.**

Performance Indicators:

- **Develop and model a design solution.**
- **Complete an assessment to evaluate merits of design solution.**
- **Operate a technological device and/or system.**
- **Diagnose a malfunctioning system, restore the system, and maintain the system.**
- **Investigate the impacts of products and systems on individuals, the environment, and society.**

Disposition Indicators:

- **Assess the impacts of products and systems.**
- **Follow safe practices and procedures in the use of tools and equipment.**
- **Judge the relative strengths and weaknesses of a designed product from a consumer perspective.**
- **Exhibit respect by properly applying tools and equipment to the processes for which they were designed.**
- **Design and use instructional activities that emphasized solving real open-ended problems.**

STANDARD 5 — THE DESIGNED WORLD

Technology teacher education program candidates develop an understanding of the *Designed World*.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 5.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Analyze the principles of various medical technologies as part of the designed world.
- Analyze the principles of various agricultural and related biotechnologies as part of the designed world.
- Analyze the principles, concepts and applications of energy and power technologies as part of the designed world.
- Analyze the principles, concepts and applications of information and communication technologies as part of the designed world.
- Analyze the principles of various transportation technologies that are part of the designed world.
- Analyze the principles, concepts, and applications of manufacturing technologies as part of the designed world.
- Analyze the principles, concepts, and applications of construction technologies as part of the designed world.

Performance Indicators:

- Select and use appropriate technologies in a variety of contexts including medical, agricultural and related biotechnologies, energy and power applications, information and communications, transportation, manufacturing, and construction.

Disposition Indicators:

- Effectively use and improve technology in a variety of contexts including medical, agricultural and related biotechnologies, energy and power applications, information and communications, transportation, manufacturing, and construction.

RUBRIC FOR STANDARD 5-The Designed World

TARGET

Technology teacher education program candidates have in-depth knowledge of the subject matter that they plan to teach as described in the standard and they demonstrate their knowledge through inquiry, critical analysis and evaluation of the subject matter.

ACCEPTABLE

Technology teacher education program candidates know the subject matter that they plan to teach and can explain important principles and concepts delineated in the standard.

UNACCEPTABLE

Technology teacher education program candidates have inadequate knowledge of the subject matter that they plan to teach and are unable to provide examples of important principles or concepts identified as part of the standard.

Knowledge Indicators:

- Analyze the principles of various medical technologies as part of the designed world.
- Analyze the principles of various agricultural and related biotechnologies as part of the designed world.
- Analyze the principles, concepts and applications of energy and power technologies as part of the designed world.
- Analyze the principles, concepts and applications of information and communication technologies as part of the designed world.
- Analyze the principles of various transportation technologies that are part of the designed world.
- Analyze the principles, concepts, and applications of manufacturing technologies as part of the designed world.
- Analyze the principles, concepts, and applications of construction technologies as part of the designed world.

Performance Indicators:

- Select and use appropriate technologies in a variety of contexts including medical, agricultural and related biotechnologies, energy and power applications, information and communications, transportation, manufacturing, and construction.

Disposition Indicators:

- Effectively use and improve technology in a variety of contexts including medical, agricultural and related biotechnologies, energy and power applications, information and communications, transportation, manufacturing, and construction.

STANDARD 6 — CURRICULUM

Technology teacher education program candidates design, implement, and evaluate curricula based upon Standards for Technological Literacy.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 6.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Identify appropriate content for the study of technology at different grade levels.
- Integrate technological curriculum content from other fields of study.
- Identify curriculum and instructional materials and resources that enable effective delivery when teaching about technology.

Performance Indicators:

- Engage in long-term planning that results in an articulated curriculum based on Standards for Technological Literacy for grades K-12 or equivalent.
- Design technology curricula and programs that integrate content from other fields of study.
- Improve the technology curriculum by making informed decisions using multiple sources of information.
- Incorporate up-to-date technological developments into the technology curriculum.
- Implement a technology curriculum that systemically expands the technological capabilities of the student.

Disposition Indicators:

- Demonstrate sensitivity to cultural, ethnic diversity, special needs, interest, abilities, and gender issues when selecting, designing, or evaluating curriculum and instructional materials.

RUBRIC FOR STANDARD 6-Curriculum

TARGET

Technology teacher education program candidates demonstrate a thorough understanding of effective teaching content identified in the standard in a way that allows them to provide multiple explanations and effective teaching decisions to maximize student learning of the subject matter standard.

ACCEPTABLE

Technology teacher education program candidates have a broad knowledge of effective teaching content as identified in the standard that can incorporate the subject matter content in a way that helps them develop quality-learning experiences for all students.

UNACCEPTABLE

Technology teacher education program candidates do not understand the relationship of content and effective teaching identified in the standard in a way that helps them develop learning experiences that integrates all the areas of technological subject matter.

Knowledge Indicators:

- Identify appropriate content for the study of technology at different grade levels.
- Integrate technological content from other fields of study.
- Identify curriculum and instructional materials that enable effective delivery when teaching about technology.

Performance Indicators:

- Engage in long-term planning that results in an articulated curriculum based on Standards for Technological Literacy for grades K-12 or equivalent.
- Design technology curricula and programs that integrate content from other fields of study.
- Improve the technology curriculum by making informed decisions using multiple sources of information.
- Incorporate up-to-date technological developments into the technology curriculum.
- Implement a technology curriculum that systemically expands the technological capabilities of the student.

Disposition Indicators:

- Demonstrate sensitivity to cultural and ethnic diversity and gender issues when selecting, developing, and evaluating curriculum and instructional materials.

STANDARD 7 — INSTRUCTIONAL STRATEGIES

Technology teacher education program candidates use a variety of effective teaching practices that enhance and extend learning of technology.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 7.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Base instruction on contemporary teaching strategies that are consistent with Standards for Technological Literacy.
- Apply principles of learning and consideration of student diversity to the delivery of instruction.
- Compare a variety of instructional strategies to maximize student learning about technology.
- Describe a variety of student assessments appropriate for different instructional materials.

Performance Indicators:

- Apply appropriate instructional technology materials, tools, equipment, and processes to enhance student learning about technology instruction.
- Assess instructional strategies to improve teaching and learning in the technology classroom by using self-reflection, student learning outcomes, and other assessment techniques.

Disposition Indicators:

- Exhibit an enthusiasm for teaching technology by creating meaningful and challenging technology learning experiences that lead to positive student attitudes toward the study of technology.

RUBRIC FOR STANDARD 7-Instructional Strategies

TARGET

Technology teacher education program candidates demonstrate a thorough understanding of effective teaching content identified in the standard in a way that allows them to provide multiple explanations and effective teaching decisions to maximize student learning of the subject matter standard.

ACCEPTABLE

Technology teacher education program candidates have a broad knowledge of effective teaching content as identified in the standard that can incorporate the subject matter content in a way that helps them develop quality-learning experiences for all students.

UNACCEPTABLE

Technology teacher education program candidates do not understand the relationship of content and effective teaching identified in the standard in a way that helps them develop learning experiences that integrates all the areas of technological subject matter.

Knowledge Indicators:

- Base instruction on contemporary teaching strategies that is consistent with Standards for Technological Literacy.
- Apply principles of learning and consideration of student diversity to the delivery of instruction.
- Compare a variety of instructional strategies to maximize student learning about technology.
- Describe a variety of student assessments appropriate for different instructional materials.

Performance Indicators:

- Apply appropriate materials, tools, equipment, and processes to enhance student learning about technology.
- Assess instructional strategies to improve teaching and learning in the technology classroom by using self-reflection, student learning outcomes, and other assessment techniques.

Disposition Indicators:

- Exhibit an enthusiasm for teaching technology by creating meaningful and challenging technology learning experiences that lead to positive student attitudes toward the study of technology.

STANDARD 8—LEARNING ENVIRONMENTS

Technology teacher education program candidates design, create, and manage learning environments that promote technological literacy.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 8.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Recognize rich learning environments that provide for varied educational experiences in the technology classroom and laboratory.
- Identify learning environments that encourage, motivate, and support student learning, innovation, design, and risk taking.

Performance Indicators:

- Design learning environments that establish student behavioral expectations that support an effective teaching and learning environment.
- Create flexible learning environments that are adaptable for the future.

Disposition Indicators:

- Exhibit safe technology laboratory practice by designing, managing, and maintaining physically safe technology learning environments.

RUBRIC FOR STANDARD 8-Learning Environments

TARGET

Technology teacher education program candidates demonstrate a thorough understanding of effective teaching content identified in the standard in a way that allows them to provide multiple explanations and effective teaching decisions to maximize student learning of the subject matter standard.

ACCEPTABLE

Technology teacher education program candidates have a broad knowledge of effective teaching content as identified in the standard that can incorporate the subject matter content in a way that helps them develop quality-learning experiences for all students.

UNACCEPTABLE

Technology teacher education program candidates do not understand the relationship of content and effective teaching identified in the standard in a way that helps them develop learning experiences that integrates all the areas of technological subject matter.

Knowledge Indicators:

- Recognize rich learning environment that provide for varied educational experiences in the technology classroom and laboratory.
- Identify learning environments that encourage, motivate, and support student learning, innovation, design, and risk taking.

Performance Indicators:

- Design learning environments that establish student behavioral expectations that support an effective teaching and learning environment.
- Create flexible learning environments that are adaptable for the future.

Disposition Indicators:

- Exhibit safe technology laboratory practice by designing, managing, and maintaining physically safe technology learning environments.

STANDARD 9 — STUDENTS

Technology teacher education program candidates understand students as learners, and how commonality and diversity affect learning.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 9.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Design technology experiences for students of different ethnic, socioeconomic backgrounds, gender, age, interest, and exceptionalities.
- Identify how students learn technology most effectively by integrating current research about hands-on learning and learning about the content of technology.

Performance Indicators:

- Create technology experiences for students with different abilities, interests, and ages about the content of technology.

Disposition Indicators:

- Develop productive relationships with students so that they become active learners about technology and enhance their human growth and development.

RUBRIC FOR STANDARD 9-Students

TARGET

Technology teacher education program candidates demonstrate a thorough understanding of effective teaching content identified in the standard in a way that allows them to provide multiple explanations and effective teaching decisions to maximize student learning of the subject matter standard.

ACCEPTABLE

Technology teacher education program candidates have a broad knowledge of effective teaching content as identified in the standard that can incorporate the subject matter content in a way that helps them develop quality-learning experiences for all students.

UNACCEPTABLE

Technology teacher education program candidates do not understand the relationship of content and effective teaching identified in the standard in a way that helps them develop learning experiences that integrates all the areas of technological subject matter.

Knowledge Indicators:

- **Design technology experiences for students of different ethnic, socioeconomic backgrounds, gender, and exceptionalities.**
- **Identify how students learn technology most effectively by integrating current research about hands-on learning and learning about the content of technology.**

Performance Indicators:

- **Create technology experiences for students with different abilities, interests, and ages about the content of technology.**

Disposition Indicators:

- **Develop productive relationships with students so that they become active learners about technology.**

STANDARD 10 — PROFESSIONAL GROWTH

Technology teacher education program candidates understand and value the importance of engaging in comprehensive and sustained professional growth to improve the teaching of technology.

INDICATORS:

The following knowledge, performance, and disposition indicators provide guidance to better understand the scope of Standard 10.

The program prepares technology teacher education candidates who can:

Knowledge Indicators:

- Demonstrate a continuously updated and informed knowledge base about the processes of technology.
- Continuously build upon effective instructional practices that promote technological literacy.

Performance Indicators:

- Apply various marketing principles and concepts to promote technology education and the study of technology.
- Collaborate with other candidates and professional colleagues to promote professional growth and professional development activities.
- Become actively involved in professional organizations and attend professional development activities to become better prepared to teach technology education.
- Develop a professional development plan for self-improvement in curriculum and instruction in technology education.

Disposition Indicators:

- Value continuous professional growth through involvement in a variety of professional development activities.
- Demonstrate the importance of professionalism by promoting technology organizations for students in the technology classroom.
- Reflect upon their teaching to improve and enhance student learning.

RUBRIC FOR STANDARD 10-Professional Growth

TARGET

Technology teacher education program candidates demonstrate a thorough understanding of effective teaching content identified in the standard in a way that allows them to provide multiple explanations and effective teaching decisions to maximize student learning of the subject matter standard.

ACCEPTABLE

Technology teacher education program candidates have a broad knowledge of effective teaching content as identified in the standard that can incorporate the subject matter content in a way that helps them develop quality-learning experiences for all students.

UNACCEPTABLE

Technology teacher education program candidates do not understand the relationship of content and effective teaching identified in the standard in a way that helps them develop learning experiences that integrates all the areas of technological subject matter.

Knowledge Indicators:

- Demonstrate a continuously updated and informed knowledge base about the processes of technology.
- Continuously build upon effective instructional practices that promote technological literacy.

Performance Indicators:

- Apply various marketing principles and concepts to promote technology education and the study of technology.
- Collaborate with other candidates and professional colleagues to promote professional growth and professional development activities.
- Become actively involved in professional organizations and attend professional development activities to become better prepared to teach technology education.
- Develop a professional development plan for self-improvement in curriculum and instruction in technology education.

Disposition Indicators:

- Value continuous professional growth through involvement in a variety of professional development activities.
- Demonstrate the importance of professionalism by promoting technology organizations for students in the technology classroom.
- Reflect upon their teaching to improve and enhance student learning.

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