

CI 587, TECHNOLOGY AND COGNITION

Technology and the Brain is a required course for the Masters of Instructional Technology Program

College of Education

Department of Curriculum and Instruction

Instructor:

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Texts:

None

Course Description:

The purpose of Technology and Cognition is to incorporate technology into teaching and learning in relation to the brain development in school-age children, emphasizing instructional techniques for enhancing learners' cognitive development through the use of technology. Students will design advanced technological applications for instruction, based upon best practices in technology and cognition

Overall Objectives for the Course:

1. Plan and design the integration of technology into learning environments and experiences, based upon the current research on the Brain.
2. Implement all forms of technology (i.e., digital technology, audio and video streaming) into best practice instructional techniques
3. Evaluate forms of technology in assessing learners' level of mastery over content to facilitate the implementation of assessment-based instruction.

Standards Matrix:

<u>Course Objectives</u>	<u>Activities</u>	<u>Performance Assessment</u>	<u>Standards</u> <u>ISTE –</u> <u>Technology</u> <u>Facilitation</u> <u>Standards</u>	<u>Conceptual Framework Goals</u>
Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners	1. Research website activities to address the learning needs of the students.	1. Review and analyze website activities addressing behaviorism, information processing, and constructivism.	TF-II.A	1
Use technology to support learner-centered strategies that address the diverse needs of students	1. Research articles addressing multiple intelligences and strategies addressing these in the classroom.	1. Design a lesson plan, demonstrating the possibilities to address all of the multiple intelligences when teaching the chosen standards.	TF-III.B	1
Use methods and strategies for integrating	1. Discuss various learning strategies commonly used in	1. Demonstrate how to incorporate technology into the various learning strategies commonly used in the	TF-III.B.1	1

technology resources that support the needs of diverse learners	the classroom.	classroom.		
Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities	1. Research website activities to address the learning needs of the students.	1. Review and analyze website activities addressing behaviorism, information processing, and constructivism.	TF-IV.B	1
Design a plan to assist teachers in selecting and applying appropriate technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities	1. Research articles addressing multiple intelligences and strategies addressing these in the classroom. 2. Research Web 2.0 tools that are appropriate to a group of learners, their learning needs, and the required standards	1. Design a lesson plan, demonstrating the possibilities to address all of the multiple intelligences when teaching the chosen standards. 2. Develop a facilitation plan that incorporates appropriate Web 2.0 tools.	TF-I.B.1 TF-IV.B.1	1
Communicate with colleagues and discuss current research to support instruction, using applications including electronic mail, online conferencing, and Web browsers	1. Review articles related to current brain research 2. Research website activities to address the learning needs of the students.	1. Synthesize the information within the articles and participate in an online discussion with the group. 2. Review and analyze website activities addressing behaviorism, information processing, and constructivism.	TF-V.D.2	1
Model the use of technology tools to assess student learning of subject matter using a variety of assessment techniques	1. Using concept mapping software, demonstrate how the understanding of a concept can be made into a visual representation	1. Working with a K-12 student, have them use an electronic concept mapping tool to provide a visual into their understanding of a concept.	TF-IV.A.1	1

Technology Facilitation Standards

International Society for Technology in Education

Technology Facilitation Standard I. (TF-I)		
Technology Operations and Concepts. Educational technology facilitators demonstrate an in-depth understanding of technology operations and concepts. Educational technology facilitators:		
Performance Indicator	Meets Standard	Exceeds Standard
A. Demonstrate knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Teachers). Candidates:		
TF-I.A.1	Assist teachers in the ongoing development of knowledge, skills, and understanding of technology systems, resources, and services that are aligned with district and state technology plans.	Conduct needs assessment to determine baseline data on teachers' knowledge, skills, and understanding of concepts related to technology.
TF-I.A.2	Provide assistance to teachers in identifying technology systems, resources, and services to meet specific learning needs.	Evaluate the effective-ness of modeling used to demonstrate teachers' knowledge, skills, and under-standing of concepts related to technology.
B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies. Candidates:		
TF-I.B.1	Model appropriate strategies essential to continued growth and development of the understanding of technology operations and concepts.	Evaluate the effectiveness of modeling appropriate strategies essential to continued growth and development of the understanding of technology operations and concepts.

Technology Facilitation Standard II. (TF-II)		
Planning and Designing Learning Environments and Experiences. Educational technology facilitators plan, design, and model effective learning environments and multiple experiences supported by technology. Educational technology facilitators:		
Performance Indicator	Meets Standard	Exceeds Standard
A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. Candidates:		
TF-II.A.1	Provide resources and feedback to teachers as they create developmentally appropriate curriculum units that use technology.	Model the creation of developmentally appropriate curriculum units that use technology.
TF-II.A.2	Consult with teachers as they design methods and strategies for teaching computer/ technology concepts and skills within the context of classroom learning.	Model methods and strategies for teaching computer/ technology concepts and skills within the context of classroom learning.
TF-II.A.3	Assist teachers as they use technology resources and strategies to support the diverse needs of learn-ers including adaptive and assistive technologies.	Model strategies to support the diverse needs of learners including adaptive and assistive techno-logies and disseminate information to teachers.

<p>B. Apply current research on teaching and learning with technology when planning learning environments and experiences. Candidates:</p>		
<p>TF-II.B.1</p>	<p>Assist teachers as they apply current research on teaching and learning with technology when planning learning environments and experiences.</p>	<p>Model strategies reflecting current research on teaching and learning with technology when planning learning environments and experiences.</p>
<p>C. Identify and locate technology resources and evaluate them for accuracy and suitability. Candidates:</p>		
<p>TF-II.C.1</p>	<p>Assist teachers as they identify and locate technology resources and evaluate them for accuracy and suitability based on district and state standards.</p>	<p>Model the use of technology resources reflecting district and state standards.</p>
<p>TF-II.C.2</p>	<p>Model technology integration using resources that reflect content standards.</p>	<p>Create professional development lessons integrating technology resources that reflect content standards.</p>
<p>D. Plan for the management of technology resources within the context of learning activities. Candidates:</p>		
<p>TF-II.D.1</p>	<p>Provide teachers with options for the management of technology resources within the context of learning activities.</p>	<p>Model the use of technology resources within the context of learning activities.</p>
<p>E. Plan strategies to manage student learning in a technology-enhanced environment. Candidates:</p>		
<p>TF-II.E.1</p>	<p>Provide teachers with a variety of strategies to use to manage student learning in a technology-enhanced environment and support them as they implement the strategies.</p>	<p>Model a variety of strategies to manage student learning in a technology-enhanced environment and support the teachers as they implement the strategies.</p>
<p>F. Identify and apply instructional design principles associated with the development of technology resources. Candidates:</p>		
<p>TF-II.F.1</p>	<p>Assist teachers as they identify and apply instructional design principles associated with the development of technology resources.</p>	<p>Model the use of appropriate instructional design principles associated with the development of technology resources.</p>

<p>Technology Facilitation Standard III. (TF-III) Teaching, Learning, and the Curriculum. Educational technology facilitators apply and implement curriculum plans that include methods and strategies for utilizing technology to maximize student learning. Educational technology facilitators:</p>		
<p>Performance Indicator</p>	<p>Meets Standard</p>	<p>Exceeds Standard</p>
<p>A. Facilitate technology-enhanced experiences that address content standards and student technology standards. Candidates:</p>		
<p>TF-III.A.1</p>	<p>Use methods and strategies for teaching concepts and skills that support integration of technology productivity tools (refer to NETS for Students).</p>	<p>Analyze methods and facilitate strategies for teaching concepts and skills that support integration of technology productivity tools (refer to NETS for Students).</p>
<p>TF-III.A.2</p>	<p>Use and apply major research findings and trends related to the use of technology in education to support integration throughout</p>	<p>Summarize major research findings and trends related to the use of technology in education to support integration throughout the curriculum.</p>

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

Technology Facilitation Standard IV. (TF-IV)		
Assessment and Evaluation. Educational technology facilitators apply technology to facilitate a variety of effective assessment and evaluation strategies. Educational technology facilitators:		
Performance Indicator	Meets Standard	Exceeds Standard
A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques. Candidates:		
TF-IV.A.1	Model the use of technology tools to assess student learning of subject matter using a variety of assessment techniques.	Analyze methods and facilitate the use of strategies to assess student learning of subject matter using a variety of assessment techniques.
TF-IV.A.2	Assist teachers in using technology to improve learning and instruction through the evaluation and assessment of artifacts and data.	Analyze methods and facilitate the use of strategies to improve learning and instruction through the evaluation and assessment of artifacts and data.
B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning. Candidates:		
TF-IV.B.1	Guide teachers as they use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.	Examine the validity and reliability of technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.
C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity. Candidates:		
TF-IV.C.1	Assist teachers in using recommended evaluation strategies for improving students' use of technology resources for learning, communication, and productivity.	Recommend evaluation strategies for improving students' use of technology resources for learning, communication, and productivity.
TF-IV.C.2	Examine and apply the results of a research project that includes evaluating the use of a specific technology in a P-12 environment.	Analyze data from a research project that includes evaluating the use of a specific technology in a P-12 environment.

Technology Facilitation Standard V. (TF-V)		
Productivity and Professional Practice. Educational technology facilitators apply technology to enhance and improve personal productivity and professional practice. Educational technology facilitators:		
Performance Indicator	Meets Standard	Exceeds Standard
A. Use technology resources to engage in ongoing professional development and lifelong learning. Candidates:		
TF-V.A.1	Identify resources and participate in professional development activities and professional technology organizations to support ongoing professional growth related to technology.	Use resources and professional development activities available from professional technology organizations to support ongoing professional growth related to technology.
TF-V.A.2	Disseminate information on district-wide policies for professional growth opportunities for staff, faculty, and administrators.	Implement policies that support district-wide professional growth opportunities for staff, faculty, and administrators.

B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning. Candidates:		
TF-V.B.1	Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.	Continually evaluate professional practice to make informed decisions regarding the use of technology in support of student learning and disseminate findings to district administrators.
C. Apply technology to increase productivity. Candidates:		
TF-V.C.1	Model advanced features of word processing, desktop publishing, graphics programs, and utilities to develop professional products.	Model the integration of advanced features of word processing, desktop publishing, graphics programs, and utilities to demonstrate professional products.
TF-V.C.2	Assist others in locating, selecting, capturing, and integrating video and digital images, in varying formats for use in presentations, publications, and/or other products.	Facilitate activities to help others in locating, selecting, capturing, and integrating video and digital images, in varying formats for use in presentations, publications and/or other products.
TF-V.C.3	Demonstrate the use of specific-purpose electronic devices (such as graphing calculators, language translators, scientific probeware, or electronic thesaurus) in content areas.	Facilitate the use of specific-purpose electronic devices (such as graphing calculators, languages translators, scientific probeware, or electronic thesaurus) in content areas.
TF-V.C.4	Use a variety of distance learning systems and use at least one to support personal and professional development.	Use a variety of distance learning systems to support personal/professional development.
TF-V.C.5	Use instructional design principles to develop hypermedia and multimedia products to support personal and professional development.	Apply instructional design principles to demonstrate hypermedia/multimedia products to support professional development.
TF-V.C.6	Select appropriate tools for communicating concepts, conducting research, and solving problems for an intended audience and purpose.	Model the use of appropriate tools for communicating concepts, conducting research, and solving problems for an intended audience and purpose.
TF-V.C.7	Use examples of emerging programming, authoring, or problem solving environments that support personal and professional development.	Use examples of emerging programming, authoring or problem solving environments that support personal/professional development.
TF-V.C.8	Set and manipulate preferences, defaults and other selectable features of operating systems and productivity tool programs commonly found in P-12 schools.	Set and manipulate preferences and defaults of operating systems and productivity tool programs, and troubleshoot problems associated with their operation.
D. Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning. Candidates:		
TF-V.D.1	Model the use of telecommunications tools and resources for information sharing, remote information access, and multimedia/ hypermedia publishing in order to nurture student learning.	Stay abreast of current telecommunications tools and resources for information sharing, remote information access, and multimedia/ hypermedia publishing in order to nurture student learning.
TF-V.D.2	Communicate with colleagues and discuss current research to support instruction, using applications including electronic mail, online conferencing and web browsers.	Communicate with colleagues and apply current research to support instruction, using applications including electronic mail, online conferencing and web browsers.
TF-V.D.3	Participate in online collaborative curricular projects and team activities to build bodies of	Investigate and disseminate online collaborative curricular projects and team activities to build

	knowledge around specific topics.	bodies of knowledge around specific topics.
TF-V.D.4	Design and maintain Web pages and sites that support communication between the school and community.	Design, maintain, and facilitate the development of Web pages and sites that support communication between teachers, school, and community.

<p>Technology Facilitation Standard VI. (TF-VI) Social, Ethical, Legal, and Human Issues. Educational technology facilitators understand the social, ethical, legal, and human issues surrounding the use of technology in P-12 schools and assist teachers in applying that understanding in their practice. Educational technology facilitators:</p>		
Performance Indicator	Meets Standard	Exceeds Standard
<p>A. Model and teach legal and ethical practice related to technology use. Candidates:</p>		
TF-VI.A.1	Develop strategies and provide professional development at the school/classroom level for teaching social, ethical, and legal issues and responsible use of technology.	Analyze rules, policies, and procedures to support the legal and ethical use of technology.
TF-VI.A.2	Assist others in summarizing copyright laws related to use of images, music, video, and other digital resources in varying formats.	Plan activities that focus on copyright laws related to use of images, music, video, and other digital resources in varying formats.
<p>B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities. Candidates:</p>		
TF-VI.B.1	Assist teachers in selecting and applying appropriate technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.	Analyze and recommend appropriate technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.
TF-VI.B.2	Identify, classify and recommend adaptive/assistive hardware and software for students and teachers with special needs and assist in procurement and implementation.	Analyze and recommend appropriate adaptive/assistive hardware and software for students and teachers with special needs and assist in procurement and implementation.
<p>C. Identify and use technology resources that affirm diversity. Candidates:</p>		
TF-VI.C.1	Assist teachers in selecting and applying appropriate technology resources to affirm diversity and address cultural and languages differences.	Recommend appropriate technology resources to affirm diversity and address cultural and language differences.
<p>D. Promote safe and healthy use of technology resources. Candidates:</p>		
TF-VI.D.1	Assist teachers in selecting and applying appropriate technology resources to promote sage and healthy use of technology.	Recommend appropriate technology resources to promote sage and healthy use of technology.
<p>E. Facilitate equitable access to technology resources for all students. Candidates:</p>		
TF-VI.E.1	Develop a summary of effective school policies and classroom management strategies for achieving equitable access to technology resources for all students and teachers.	Conduct research to determine effective strategies for achieving equitable access to technology resources for all students and teachers.

Sam Houston State University College of Education Conceptual Framework Goals

The strategic goals of the College of Education are:

1. Enhance quality and effectiveness in academic programs by:
 - Providing credible evidence of candidate preparedness for the field,
 - Securing and maintaining accreditation in every program,
 - Matching curriculum to national, regional, state and specialty program standards, and
 - Providing resources to support program growth.

2. Promote faculty excellence in teaching, scholarship and service, through
 - Providing resources for professional development,
 - Recruiting and hiring high quality faculty and lecturers,
 - Addressing diversity among faculty and the students we serve, and
 - Clarifying expectations for career advancement.

3. Ensure satisfaction among the various constituencies served by the College, through
 - Providing accurate and timely program information to students,
 - Providing personalized service,
 - Building capacity in unit staff and student workers, and
 - Providing opportunities for staff collaboration and knowledge-sharing.

4. Promote quality programs and developing partnerships through
 - Developing partnerships through improved communications,
 - Enhancing state, regional, national and international recruiting and advertising

5. Promote Institutional effectiveness and operational excellence by
 - Collecting and sharing data that is measurable, time-bound and actionable,
 - Systematic evaluation and improvement of procedures and processes,
 - Analyze and improve delivery systems,
 - Recognize faculty and staff service to the College, the University and the Profession

Course Requirements:

1. **Articles on New Brain Research, Technology and Cognition -- Research and read three professional articles about new brain research and learning. Synthesize information into a written paper, and then share with opinions with classmates via a blog.**
2. **The Brain and Technology – Learning about the parts of the brain and how it can affect an individual’s learning, research online activities that can enhance the learning of students with various instructional needs.**
3. Multiple Intelligences – Determine how to implement various forms of technology into daily instruction so as to help address the various multiple intelligences of the students.
4. Instructional Strategies and Technology – Demonstrate how to incorporate technology when implementing various instructional strategies.
5. Assessing Learners with Technology – Using concept mapping software, assess a learner over his/her level of knowledge of some chosen concept.
6. Develop Learning Opportunities for Students – Considering the needs of students and the standards to be addressed, design a facilitation plan that incorporates appropriate Web 2.0 tools.

Evaluation

Articles on new brain research	60 Points
The Brain and Technology	60 Points
Multiple Intelligences	60 Points
Instructional Strategies and Technology	60 Points
Assessing Learners with Technology	80 Points
Facilitation Plan with Web 2.0	80 Points
TOTAL	400 Points

Grading Scale

	<u>Points</u>
A =	358 - 400
B =	318– 357.4
C =	278– 317.4

*With a grade below a “C”, the student will have to re-take the course.

Time Requirement

For each hour attempted, you will be expected to commit at least three additional hours. It is expected that if you enroll in this course, you can meet the time requirements.

Late Work

Scheduled assignments are due by midnight electronically on the due date. If assignments are one day late, there will be a reduction in possible points earned on that assignment of 50%. Second day late, the assignment receives a zero. Recognizing that “extenuating circumstances” may occur, documentation of reason for late work may be submitted to instructor for consideration of reinstating original possible points.

Professionalism

Professionalism is expected. If individual assignments possess a striking similarity to another student’s work, penalty may be, minimally, the drop of one letter grade. Attendance, punctuality, the quality of your interactions with colleagues and supervisors, and the quality and timeliness regarding completing assignments all determine your professionalism, which in turn, signals your readiness to advance in the teacher certification process.

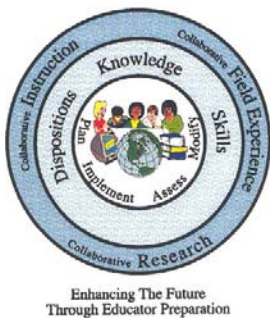
Additional Information

Please visit the following website for additional Sam Houston State University syllabus information:

<http://www.shsu.edu/syllabus/>

Bibliography:

1. How People Learn: Brain, Mind, Experience, and School: Expanded Edition -- by John Bransford (Editor)
2. Computers in the Classroom: Mindtools for Critical Thinking – D. H. Jonassen
3. Educational Psychology: A Cognitive View – D. P. Ausubel, J.D. Novak, H. Hanesian



Through programs dedicated to **collaboration in instruction, field experience, and research**, the candidates in **Sam Houston State University's Educator Preparation Programs** acquire the **knowledge, dispositions, and skills** necessary to create a positive learning environment. Employing a variety of **technologies**, these candidates learn to **plan, implement, assess, and modify instruction** to meet the needs of our communities' **diverse learners**.