United Nations
Educational, Scientific and
Cultural Organization

ICT COMPETENCY STANDARDS FOR TEACHERS

Implementation Guidelines

Version 1.0

Published in 2008
by the United Nations Educational, Scientific and Cultural Organization
7, place de Fontenoy, 75352 PARIS 07 SP
Composed and printed in the workshops of METIA

Printed in the United Kingdom

CI-2007/WS/20

Foreword

To live, learn, and work successfully in an increasingly complex, information-rich and knowledge-based society, students and teachers must utilize technology effectively. Within a sound educational setting, technology can enable students to become:

- Capable information technology users
- Information seekers, analyzers, and evaluators
- Problem solvers and decision makers
- Creative and effective users of productivity tools
- Communicators, collaborators, publishers, and producers
- Informed, responsible, and contributing citizens

Through the ongoing and effective use of technology in the schooling process, students have the opportunity to acquire important technology capabilities. The key individual in helping students develop those capabilities is the classroom teacher. The teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, and communicate. Consequently, it is critical that all classroom teachers are prepared to provide their students with these opportunities.

Both professional development programs for teachers currently in the classroom and programs for preparing future teachers should provide technology-rich experiences throughout all aspects of the training. Standards and resources within UNESCO's project "ICT Competency Standards for Teachers" (ICT-CST) provide guidelines for all teachers, specifically for planning teacher education programs and training offerings that will prepare them to play an essential role in producing technology-capable students.

Today's classroom teachers need to be prepared to provide technology-supported learning opportunities for their students. Being prepared to use technology and knowing how that technology can support student learning have become integral skills in every teacher's professional repertoire. Teachers need to be prepared to empower students with the advantages technology can bring. Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills. Interactive computer simulations, digital and open educational resources, and sophisticated data-gathering and analysis tools are only a few of the resources that enable teachers to provide previously unimaginable opportunities for conceptual understanding.

Traditional educational practices no longer provide prospective teachers with all the necessary skills for teaching students to survive economically in today's workplace.

Foreword cont'd

Through the ICT-CST project, UNESCO is responding to: (a) its function as a standard-setting agency, (b) its mandate within the Education for All (EFA) Programme, (c) its mandate as the lead agency for action lines C4 on "capacity building" (with UNDP) and C7 on "e-learning" as decided by the Geneva Plan of Action adopted by WSIS[1] (2003) and (d) to its overarching objective of building inclusive knowledge societies through communication and information.

The ICT-CST project provides a complete framework for ICT Competency Standards for Teachers by (a) addressing the underlying "Policy Framework" (document 1 of 3), (b) examining the components of educational reform and developing a matrix of skill sets for teachers which correspond to various policy approaches and education reform components[2] (document 2 of 3), and (c) providing a detailed description of the specific skills to be acquired by teachers within each skill set/module[3] (document 3 of 3).

The second phase of the ICT-CST project involves the establishment of a UNESCO mechanism to endorse training programs for compliance with the UNESCO standards. The complete guidelines for submission, evaluation and endorsement will be published on the UNESCO website dedicated to this project: http://www.unesco.org/en/competency-standards-teachers.

Furthermore, UNESCO will map existing teacher training standards and training programs to the ICT-CST matrix of skill sets in an attempt to streamline the global efforts in this general area. We do hope that this work will contribute to the development of appropriate training programs for ICT skills of teachers with a global recognition.

Finally, it is important to note that the development of the UNESCO ICT-CST has been a true example of the power of strategic public-private partnerships for development. We are pleased to acknowledge the outstanding support of our numerous partners in both academia and the IT private sector. Most notably, we would like to express our gratitude to Microsoft, Intel, Cisco, the International Society for Technology in Education (ISTE) and the Virginia Polytechnic Institute and State University (Virginia Tech). Their contributions are greatly appreciated.

Abdul Waheed Khan
Assistant Director-General for Communication and Information
UNESCO

1. WSIS stands for the "World Summit on the Information Society" which was held in two phases. The first phase took place in Geneva from 10 to 12 December 2003 and the second phase took place in Tunis, from 16 to 18 November 2005. Check http://www.itu.int/wsis/basic/about.html for more details.
2. Such a matrix is referred to as the "Competency Standards Modules".
3. Such description is included in the "Implementation Guidelines" document. It is important to note that this document is a dynamically evolving set of guidelines which will be continuously updated and posted on the website http://www.unesco.org/en/competency-standards-teachers to reflect technology evolution on the teaching/learning processes.

Acknowledgements

UNESCO
Abdul Waheed Khan
Armelle Arrou
Elizabeth Longworth
Caroline Pontefract
Cedric Wachholz
George Haddad
Jean-Claude Dauphin
Mariana Patru
Miriam Nisbet
René Cluzel
Tarek Shawki
Yong-Nam Kim

Partners
(Cisco, Intel, ISTE, Microsoft)
Alethea Lodge-Clarke
Claudia Toth
Don Knezek
Frank McCosker
Jim Wynn
Julie Clugage
Lizzie Range
Lynn Nolan
Mark East
Martina Roth
Michelle Selinger
Paul Hengeveld
Robert Kozma
Wendy Hawkins

Reviewers
Abdel Elah Al-Ayyoub
Alan Bennett
Alex Wong
Allan Jolliffe
Ammar Alhusaini
Andrea Karpati
Astrid Dufborg
Barbara Lockee
Chirs Dede
Chris Morley
Claude Luttgens
Cristian Cox
Diogo Vasconcelos
Doug Brown
Ellie Meleisea
Gabriel Accascina
Gordon Shukwit
Hala Lattouf
Herve Marche
Hoda Baraka
Hugh Jagger
John Couch
Johnson Nkuuhe
Khalid Touqan
Kilemi Mwiria
Mostafa Naserddin
Nancy Law
Niki Davis
Ola Erstad
Osama Mimi
Oskar Sandholt
Pascal Cagni
Paul Nicholson
Pornpun Waitayangkoon
Rita Ellul
Ronald Owsten
Soon Fook Fong
Theo Teeder
Tim Unwin
Yosri El-Gamal

All names are listed alphabetically by first name.
Please contact Mr Tarek Shawki (Project Director) at t.shawki@unesco.org for further information.

Introduction

The goal of the UNESCO ICT Competency Standards for Teachers (ICT-CST) project[1] is to improve teachers' practice in all areas of a their work. By combining ICT skills with emergent views in pedagogy, curriculum, and school organization, the Standards are designed for the professional development of teachers who will use ICT skills and resources to improve their teaching, collaborate with colleagues, and perhaps ultimately become innovation leaders in their institutions. The overall objective of the project is not only to improve teacher practice but to do it in a way that contributes to a higher quality education system which can, in turn, produce a better informed citizenry and higher quality workforce that, as a result, advances a country's economic and social development.

More specifically, the objectives of the UNESCO ICT Competency Standards for Teachers project are:

- To constitute a common set of guidelines that professional development providers can use to identify, develop or evaluate learning materials or teacher training programs in the use of ICT in teaching and learning.
- To provide a basic set of qualifications that allows teachers to integrate ICT into their teaching and learning, to advance student learning, and to improve other professional duties.
- To extend teachers' professional development so as to advance their skills in pedagogy, collaboration, leadership and innovative school development using ICT.
- To harmonize different views and vocabulary regarding the uses of ICT in teacher education.

The goal of this paper is to provide professional development partners with information needed to consider their participation in the UNESCO ICT-CST project and to revise or prepare their curriculum and course offering proposals. The paper presents the overall structure of the Standards by:

- Identifying three complementary approaches that a policymaker can take to connect education reform and teacher professional development with a county's economic and social development policies.
- Listing six components of the ICT-CST framework.
- Describing the contents and specifying the levels of the modules that correspond to the six components of each approach.
- Detailing the objectives and suggested methods that a professional development provider may use to design learning materials that would support the goals of the UNESCO ICT-CST project.

The paper also identifies and discusses issues that providers should consider as they develop or revise their materials. Subsequent materials will detail the mechanism by which professional development providers can submit their curriculum and learning materials for participation in the UNESCO ICT-CST programme.

1. This document follows a companion UNESCO document whose title is "UNESCO ICT Competency Standards for Teachers – Competency Standards Modules".

Three Approaches

The intent of the UNESCO ICT-CST project is to connect education reform to economic growth and social development that can improve the quality of education, reduce poverty and inequity, advance the standards of living, and prepare a country's citizens for the challenges of the 21st century.
The Standards are based on three approaches to education reform that correspond to alternative, somewhat overlapping approaches to improve a country's workforce and fostering economic growth:

- Increasing the technological uptake of the workforce by incorporating technology skills in the curriculum—or the technology literacy approach.
- Increasing the ability of the workforce to use knowledge to add value to economic output by applying it to solve complex, real-world problems—or the knowledge deepening approach.
- Increasing the ability of the workforce to innovate and produce new knowledge and of citizens to benefit from this new knowledge—or the knowledge creation approach.

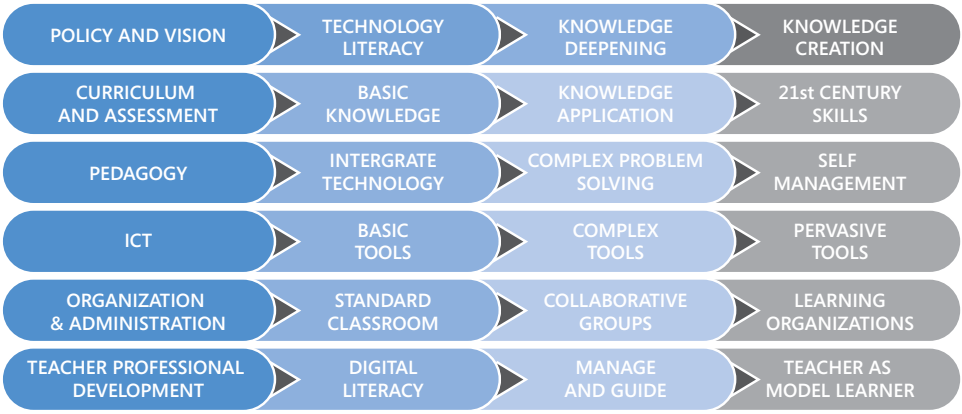
Taken as a set, these alternative approaches provide a developmental trajectory by which education reform supports increasingly sophisticated ways of developing a country's economy and society: from technology uptake, to a high performance workforce, to a knowledge economy and information society. Moving across the approaches, a country's students and ultimately its workforce and citizenry acquire increasingly sophisticated skills needed to support economic growth and an improved standard of living.

Six Components

The UNESCO ICT Competency Standards for Teachers also address six components of the educational system. It is important to note that the Standards do not merely focus on ICT skills. Rather, they include training on ICT skills as part of a comprehensive approach to education reform that includes: policy, curriculum and assessment, pedagogy, the use of technology, school organization and administration, and teacher professional development.

Crossing these six components with the three approaches to form a matrix forms the UNESCO ICT-CST framework. The detailed rationale for this structure is presented in a companion document.
Each of the cells of the matrix constitutes a module in the framework, illustrated below.

Within each of these modules, there are specific curricular goals and teacher skills. Attached to this document are descriptions of the modules and teacher competencies, as well as detailed objectives and suggested methods for achieving these objectives within a professional development program. The intent is that providers will use the framework, the detailed objectives and methods, and the guidelines in this document to develop new learning materials or revise current materials so as to support one or more of the three approaches.



On Implementation Guidelines

The intent of the UNESCO ICT-CST project is to supply professional development providers with a framework that they can use to develop or revise their professional development offerings. Providers who are interested in participation in the ICT-CST framework are allowed a considerable amount of flexibility in their implementation of these standards. However, the way in which this flexibility is used is subject to review by the ICT-CST Endorsement Board. That is, interested professional development providers will be asked to describe and justify their course offerings with reference to the standards and the project rationale, subject to the approval of the Endorsement Board. Providers can use the following guidelines in preparing their application.

Articulate standards. Interested providers should present the Endorsement Board with a detailed description of their course structure and training materials. The application should identify which modules and standards correspond to each component of the training and describe how the methods are designed so as to accomplish these standards. The provider should also specify any prerequisites for the materials. The intent is to not only provide the Endorsement Board with the rationale behind the design but to provide ministries and other client agencies with the information that they need to map the provider's offerings onto their professional development goals and to assemble a set of complementary offerings that accomplish these goals. Additionally, use of the map can help a Ministry of Education to minimize its expenditure on professional development by reducing or avoiding duplication.

Modular structure. As implied above, the ICT-CST framework is meant to be used in a modular fashion. That is, professional development providers will not be expected to comprehensively address all of the modules and competencies with their curriculum and course offerings. Rather, they can design offerings for approval that address only certain phases of professional development, certain components of the educational system, or one of the particular educational change approaches. In being modular, however, the proposals should be consistent with the overall goals and rationale of the Standards project. That is, proposals will not be approved that merely pick and choose a small number of disconnected competencies. The provider should describe the rationale for the modules they have selected. Acceptable rationales include a "breadth" tact, in which a provider addresses all of the components (policy, curriculum, pedagogy, etc.) for one particular approach (technology literacy, knowledge deepening, knowledge creation), a "depth" tact in which at least one component is developed across approaches, and a "role" tact, in which assembled modules are tailored for a specialized school-level audience, such as technology coordinators, curriculum coordinators, or principals. Other structures and rationales will be considered.

Developmental rationale. Training across or within the approaches and components should be designed to accommodate the emergent skills of pre-service or beginning teachers, master teachers, and innovative or advanced teachers or other school-level actors or roles. The providers should describe how their offerings are structured to address the developmental needs of their target audience.

Future improvements. While the current set of competencies is meant to be comprehensive, the Standards are intended to be a living, dynamic document. A mechanism will be in place to not only review and approve specific curriculum and course offering proposals but to periodically review the structure and contents of the standards, as the development context changes and new knowledge evolves about educational processes and structures. Professional development providers are encouraged to offer suggestions about how the content, structure, and review process of the ICT-CST project might be improved in the future.

Syllabus for the "Technology Literacy Approach"

I. Technology Literacy Approach		
Policy & Vision	The policy goal of this approach is to prepare a workforce that is capable of taking up new technologies so as to improve economic productivity. Related educational policies goals include increasing school enrollments and improving basic literacy skills, including technology literacy.	
	Objectives	**Example Methods**
II.A. Policy	Teachers should be able to:	
	I.A.1. Identify key characteristics of classroom practices and specify how these characteristics serve to implement policies.	Engage participants in a discussion of both national policies and common classroom practices. Identify the characteristics of practices that support policy. Have participants identify and analyze their own classroom practices in terms of policy.
II.B. Curriculum & Assessment	Teachers should be able to:	
	I.B.1. Match specific curriculum standards to particular software packages and computer applications and describe how these standards are supported by these applications.	Select a range of subject-specific software packages in the subject area; have participants identify specific curriculum standards that are associated with these packages and discuss how these are supported by the applications.
	I.B.2. Help students acquire ICT skills within the context of their courses.	Have participants prepare a subject lesson plan that includes teaching on the use of ICT, such as word processors, web browsers, email, blogs, wikis, and other emerging technologies. Have participants demonstrate and teach the ICT skills to others.
	I.B.3. Use ICT to assess students' acquisition of school subject matter knowledge and to provide students with feedback on their progress using both formative and summative assessments.	Have participants incorporate ICT and certain kinds of software for formative and summative assessment into their lesson plans, then share these plans to receive recommendations from other educators in a professional learning community.
II.C. Pedagogy	Teachers should be able to:	
	I.C.1. Describe how didactic teaching and ICT, can be used to support students' acquisition of school subject matter knowledge.	Describe how the use of ICT and specific types of software can support students' acquisition of school subject matter knowledge and demonstrate ways in which the use of this technology can supplement didactic (i.e., lecture and demonstration) classroom teaching.
	I.C.2. Incorporate appropriate ICT activities into lesson plans so as to support students' acquisition of school subject matter knowledge.	Have participants design lesson plans that incorporate tutorial and drill and practices software, e-resources and e-content. Have participants share these plans and receive recommendations from peers.
	I.C.3. Use presentation software and digital resources to support instruction.	Demonstrate the use of presentation software and other digital media to supplement a lecture; provide a variety of examples of instructional presentations; have participants create a lesson plan that includes the use of presentation software; have participants use presentation software to design a presentation.

Syllabus for the "Technology Literacy Approach" cont'd

I.D. ICT	Teachers should be able to:	
	I.D.1. Describe and demonstrate the use of common hardware technologies.	Discuss and demonstrate the basic operation of various hardware technologies, such as desktop workstations, laptops, printers, scanners, and hand-held devices.
	I.D.2. Describe and demonstrate the basic tasks and uses of word processors, such as text entry, editing text, formatting text, and printing.	Discuss and demonstrate the basic tasks of word processors, demonstrate how they are used in instruction. Have participants create a text document in which they use these in generating a text document.
	I.D.3. Describe and demonstrate the purpose and basic features of presentation software and other digital resources.	Discuss the purpose of presentation software and demonstrate its general features and function. Have participants create a presentation on a topic of their choice using digital resources.
	I.D.4. Describe the purpose and basic function of graphic software and use a graphic software package to create a simple graphic display.	Discuss the purpose of graphics software and demonstrate the creation of a graphics display. Have participants create and share a graphic display.
	I.D.5. Describe the Internet and the World Wide Web, elaborate on their uses, and describe how a browser works and use a URL to access a website.	Discuss the purpose and structure of the Internet and the World Wide Web and participants' experiences with these. Demonstrate the use of a browser; have participants use a browser to access popular websites.
	I.D.6. Use a search engine to do a keyword Boolean search.	Demonstrate the use of a search engine; discuss and demonstrate simple keyword and Boolean searches; have participants search for websites on their favorite topics and discuss the keyword strategies they used with the group for discussion.
	I.D.7. Create an email account and use it for a sustained series of email correspondence.	Demonstrate the creation and use of an email account; have participants create an email account and create and send a series of email messages.
	I.D.8. Describe the function and purpose of tutorial and drill and practice software and how they support students' acquisition of knowledge of school subjects.	Demonstrate a variety of tutorial and drill and practice packages in the subject domains of the participants and describe how they support the acquisition of subject matter knowledge. Have participants analyze specific packages in their subject area and describe how they support the acquisition of specific subject matter knowledge.
	I.D.9. Locate off-the-shelf educational software packages and Web resources and evaluate them for their accuracy and alignment with curriculum standards and match them to the needs of specific students.	Have participants search websites and catalogs to identify appropriate software for specified learning objectives or standards and analyze these packages for accuracy and curriculum alignment. Have participants discuss the criteria they used for analyzing and evaluating the software.

	I.D.10. Use networked record keeping software to take attendance, submit grades, and maintain student records.	Discuss the purposes and advantages of a networked recording keeping system, demonstrate the use of such a system, and have participants enter record keeping data for their class.
	I.D.11. Use common communication and collaboration technologies, such as text messaging, video conferencing, and web-based collaboration and social environments.	Discuss the purposes and advantages of various communication and collaboration technologies; and have participants use these technologies to communicate and collaborate with others in the group.
I.E. Organization and Administration	Teachers should be able to:	
	I.E.1. Integrate the use of a computer laboratory into ongoing teaching activities.	Discuss and give examples of different ways that computer laboratories (or a set of classrom laptops) can be used to supplement classroom teaching, have participants create lesson plans that include the use of computer laboratory activities
	I.E.2. Manage the use of supplemental ICT resources with individuals and small groups of students in the regular classroom so as not to disrupt other instructional activities in the class.	Discuss and give examples of different ways that limited classroom ICT resources can be use by individual students, pairs, or small groups to supplement teaching; have participants create lesson plans that include the use of ICT to supplement classroom teaching.
	I.E.3. Identify the appropriate and inappropriate social arrangements to use with various technologies.	Identify different hardware and software technologies and discuss corresponding social arrangements for their instructional use, such individuals, pairs, small groups, and large groups.
I.F. Teacher Professional Development	Teachers should be able to:	
	I.F.1. Use ICT resources to enhance their productivity.	Discuss different tasks that occupy participants' time during the work day; discuss how ICT resources can be used to help with these tasks and enhance productivity; have participants use desktop computers, laptops, hand-held devices, and software, such as a word processor, blogs, wikis, or other productivity and communication tools to help with one of the identified tasks.
	I.F.2. Use ICT resources to support their own acquisition of subject matter and pedagogical knowledge.	Discuss different ICT resources that participants can use to increase their subject matter and pedagogical knowledge; have participants identify a personal professional development goal and create a plan for the use of various ICT tools to accomplish this goal, such as web browsers and communication technologies.

Syllabus for the "Knowledge Deepening Approach" cont'd

II. Knowledge Deepening Approach

Policy & Vision	The policy goal of this approach is to increase the ability of the workforce to add value to economic output by applying the knowledge of school subjects to solve complex problems encountered in real world situations of work and life.	
	Objectives	**Example Methods**
II.A. Policy	Teachers should be able to: **II.A.1.** Identify key concepts and processes in content areas; describe the function and purpose of simulations, visualizations, data collection tools, and data analysis software and how they support students' understanding of these key concepts and processes and their application to the world outside the classroom.	Demonstrate a variety of software packages (and/or applets, interactive applications, learning objects) and describe how they support student understanding of key concepts and their application to solve complex problems. Have participants analyze specific packages in their subject area and describe how they support concepts and complex problem solving
II.B. Curriculum & Assessment	Teachers should be able to: **II.B.1.** Identify key concepts and processes in the subject area, describe the function and purpose of subject-specific tools and how they support students' understanding of these key concepts and processes and their application to the world outside the classroom.	Demonstrate a variety of software packages in the subject area (such a visualizations in science, data analysis packages in mathematics, role-play simulations in social studies, and references resources in language) or engaging with an expert online, visiting an online museum, or running a web based simulation and describe how they support student understanding of key concepts in the subject and their application to solve complex problems. Have participants analyze specific packages in their subject area and describe how they support concepts and complex problem solving in a learner-centered environment.
	II.B.2. Develop and apply knowledge- and performance-based rubrics that allow teachers to assess students' understanding of key subject matter concepts, skills, and processes.	Discuss characteristics of student responses and products of different levels of quality and develop rubrics that convey these characteristics; examine examples of such assessment rubrics; have participants generate and apply rubrics to sample products, such as student reports of results of a chemistry experiment.
II.C. Pedagogy	Teachers should be able to: **II.C.1.** Describe how collaborative, project-based learning and ICT can support student thinking and social interaction, as students come to understand key concepts, processes, and skills in the subject matter and use them to solve real-world problems.	Describe how the use of ICT and specific types of software can support students' understanding and application of subject matter knowledge and ways in which the use of this technology can support project-based learning. Generate and discuss different cases, in this regard, such as student teams becoming marine biologists or oceanographers using the Web and applying concepts to identify ways of protecting ecological systems or student teams in social studies using presentation software and applying concepts of government to advocate a position with the local council. Include collaboration via online dialogues or real time communication with experts.
	II.C.2. Identify or design complex, real-world problems and structure them in a way that incorporates key subject matter concepts and serves as the basis of student projects.	Discuss characteristics of authentic-world problems that incorporate key concepts; examine examples of such problems; have participants generate examples, such as the need to improve crop productivity or market a product.

	II.C.3. Design online materials that support students' deep understanding of key concepts and their application to real world problems.	Analyze online materials to identify key features of the materials that support deep understanding. Have participants work in groups to design an online unit that supports the understanding of key concepts and the development of related skills in the subject area.
	II.C.4. Design unit plans and classroom activities so that students engage in reasoning with, talking about, and using key subject matter concepts while they collaborate to understand, represent, and solve complex real-world problems, as well as reflect on and communicate solutions.	Discuss characteristics of activities that engage student in project-based learning; examine examples of such activities have participants generate units and activities in their subject area, such as the use of physics concepts to strengthen homes against earthquakes or the use of fractions to create an equitable distribution of resources. Conduct a small group facilitation of a unit with other participants.
	II.C.5. Structure unit plans and classroom activities so that open-ended tools and subject-specific applications will support students in their reasoning with, talking about, and use of key subject matter concepts and processes while they collaborate to solve complex problems.	Discuss characteristics of activities that employ open-ended digital tools and applications to engage student in project-based learning; examine examples of such activities, tools and applications; have participants generate and demonstrate units in their subject area, such as the use of a computer simulation and social studies concepts to understand the factors and dynamics involved in the expansion of a colony or the use of a graphics package to illustrate ideas expressed in a poem.
	II.C.6. Implement collaborative, project-based unit plans and classroom activities, while providing guidance to students in support of the successful completion of their projects and their deep understanding and key concepts.	Discuss the role of teachers and the strategies they use during the implementation of collaborative, project-based units. Have participants demonstrate the use of strategies and digital resources to support the implementation of their units.
II.D. ICT	Teachers should be able to:	
	II.D.1. Operate various open-ended software packages appropriate to their subject matter area, such as visualization, data analysis, role-play simulations, and online references.	Demonstrate the use of a variety of software packages in the subject domain; have participants explore and demonstrate these packages.
	II.D.2. Evaluate the accuracy and usefulness of Web resources in support of project-based learning with the subject area.	Have participants search websites and catalogs to identify appropriate software for project-based learning in their subject field. Have participants develop evaluation criteria and rubrics and justify their selections based on effectiveness for the intended purpose.
	II.D.3. Use an authoring environment or tools to design online materials.	Demonstrate the use of an authoring environment or tools. Have participants work in groups to design an online unit.
	II.D.4. Use a network and appropriate software to manage, monitor, and assess progress of various student projects.	Demonstrate the use of networked project software that allows the teacher to manage, monitor, and assess student project work; have participants enter project data for their students' work.

Syllabus for the "Knowledge Deepening Approach" cont'd

	II.D.5. Use ICT to communicate and collaborate with students, peers, parents, and the larger community in order to nurture student learning.	Discuss the use of online communication and collaboration environments by teachers to support student learning; have participants keep a log, share printouts, and demonstrate examples of their online interactions, in this regard.
	II.D.5. Use the network to support student collaboration within and beyond the classroom.	Discuss the use of online communication and collaboration environments by students to support their collaborative project work and learning; have participants keep a log, share printouts, and demonstrate examples of student online interactions, in this regard.
	II.D.6. Use search engines, online databases, and email to find people and resources for collaborative projects.	Discuss the use of search engines, online databases, and email to find people and resources for collaborative projects; have participants conduct searches related to a project for their course; engage in an online collaborative project; have participants reflect on their experiences, share with others, and discuss these.
II.E. Organization and Administration	Teachers should be able to:	Examine and discuss different classroom arrangements of computers and other digital resources in terms of the ways these configurations support or inhibit student participation and interaction; have participants design arrangements of classroom resources and discuss the rationale for their designs.
	II.E.1. Place and organize computers and other digital resources within the classroom so as to support and reinforce learning activities and social interactions.	
	II.E.2. Manage student project-based learning activities in a technology-enhanced environment.	Discuss ways to manage student technology-based classroom activities during project work; have participants discuss their unit plans in terms of classroom management with a focus on the advantages and disadvantages of various configurations.
II.F. Teacher Professional Development	Teachers should be able to:	Discuss the various sources of online information and other resources that can be used to support professional development; have participants conduct online searches for materials that support their professional development goals; have them share and discuss the results of these searches and plans for implementation.
	II.F.1. Use ICT to access and share resources to support their activities and their own professional development.	
	II.F.2. Use ICT to access outside experts and learning communities to support their activities and their own professional development.	Discuss the various sources of online experts and communities that can support professional development; have participants conduct online searches for experts and communities that support their professional development goals; have them communicate with experts and participate in communities and then share and discuss the results of these activities.
	II.F.3. Use ICT to search for, manage, analyze, integrate, and evaluate information that can be used to support their professional development.	Discuss the importance of developing knowledge management skills related to the analyzing of online resources, integrating them into practice, and evaluating their quality; have participants describe, discuss, and demonstrate examples of their practices in this regard.

III. Knowledge Creation Approach

Policy & Vision	The policy goal of this approach is to increase productivity by creating a workforce that is continually engaged in and benefits from knowledge creation and innovation.	
	Objectives	**Example Methods**
I.A. Policy	Teachers should be able to:	
	III.A.1. Design, implement, and modify school-level education reform programs that implement key elements of national education reform policies. Teachers should be able to:	Discuss the intentions of national education reform policies and ways that they could be implemented in school level programs. Have participants work in teams to design a school-level program that would implement a component of national reform policy. Have participants implement an initial phase of this program, evaluate progress, and share challenges and strategies for overcoming challenges.
III.B. Curriculum & Assessment	**III.B.1.** Identify and discuss how students learn and demonstrate complex cognitive skills, such as information management, problem solving, collaboration, and critical thinking.	Discuss the characteristics of complex cognitive thought processes and how students acquire and demonstrate these. Have participants identify the use of these skills in their own work. Have participants explicitly incorporate the acquisition and demonstration of one or more of these skills in a lesson plan. Have participants reflect on the lesson plan implementation and offer suggestions for improvement.
	III.B.2. Help students use ICT to acquire the skills of searching for, managing, analyzing, integrating, and evaluating information.	Discuss characteristics of effective information search and management skills and how technology-based learning activities can support the development and demonstration of these skills; have participants generate examples of such activities.
	III.B.3. Design units and classroom activities that integrate a range of ICT tools and devices to help students acquire the skills of reasoning, planning, reflective learning, knowledge building, and communication.	Discuss characteristics of reasoning, planning, and knowledge building skills and how technology-based learning activities can support these skills; have participants generate and share examples of such activities. Have participants critique units and offer suggestions for additional resources.
	III.B.4. Help student use ICT to develop communications and collaboration skills.	Discuss characteristics of communication and collaboration skills and how technology-based learning activities can support these skills; have participants generate examples of such activities. Have participants model effective communication and collaboration through participation in virtual professional learning communities.

Syllabus for the "Knowledge Deepening Approach" cont'd

	III.B.5. Help students develop both knowledge- and performance-based rubrics and apply them to assess their own understanding of key subject matter and ICT skills and concepts and the understanding of other students, as well as use these assessments to refine their products and learning.	Discuss characteristics of self- and peer-assessment and of the knowledge and performance-based rubrics used to reflectively assess one's own learning and that of others; have participants generate and evaluate examples of such activities and rubrics. Have participants develop knowledge- and performance-based rubrics that increase expectations for extending and expanding learning of key subject matter and ICT skills and concepts through the integration of emerging technologies.
III.C. Pedagogy	Teachers should be able to:	
	III.C.1. Explicitly model their own reasoning, problem solving, and knowledge creation while teaching students.	Have participants build on the discussion of their own cognitive skills to externalize and overtly demonstrate the use of these skills to solve problems in their subject area. Have participants share their strategies and processes for solving problems and creating new knowledge with peers while considering other models.
	III.C.2. Design online materials and activities that engage students in collaborative problem solving, research, or artistic creation.	Discuss characteristics of online materials that support students in the design and planning of their own learning activities; have participants work in teams to generate and evaluate online materials. Have participants model online collaborative problem solving, research, or artistic creation in a professional learning community.
	III.C.3. Help students design project plans and activities that engage them in collaborative problem solving, research, or artistic creation.	Discuss characteristics of teacher activities that support students in the design and planning of their own learning activities; have participants generate and demonstrate examples of such activities.
	III.C.4. Help students incorporate multimedia production, web production, and publishing technologies into their projects in ways that support their ongoing knowledge production and communication with other audiences.	Discuss characteristics of teacher activities that support students in the use of various production technologies in their own learning activities; have participants generate examples of such activities; have participants demonstrate examples of multimedia production, web production, and publishing technologies to support student publishing in online professional learning communities.
	III.C.5. Help students reflect on their own learning.	Discuss characteristics of teacher activities that support students' reflective learning; have participants generate examples, share their reflections, and critique other's work in a professional leaning community.
III.D. ICT	Teachers should be able to:	
	III.D.1. Describe the function and purpose of ICT production tools and resources (multimedia recording and production equipment, editing tools, publication software, web design tools) and use them to support students' innovation and knowledge creation.	Demonstrate a variety of software packages and digital production resources and describe how they support and advance students' innovation and knowledge creation practices. Have participants analyze specific examples of use of these resources in their subject area and describe how they support student innovation and knowledge creation. Have participants use and evaluate these tools in a unit that they design.

III.E. Organization and Administration	**III.D.2.** Describe the function and purpose of virtual environments and knowledge building environments (KBEs) and use them to support increased knowledge and understanding of subject matter and the development of online and face-to-face learning communities.	Demonstrate a variety of virtual and knowledge building environments and describe how they support student learning communities. Have participants analyze specific examples of use of these resources in their subject area and describe how they support student learning communities. Have participants use and demonstrate the effectiveness of these tools in a unit that they design.
	III.D.3. Describe the function and purpose of planning and thinking tools and use them to support students' creation and planning of their own learning activities and their continuous reflective thinking and learning.	Demonstrate a variety of planning and thinking tools and describe how they support students' creation and planning of their own learning activities. Have participants analyze specific examples of use of these resources in their subject area and describe how they support the development of students' self-regulated learning. Have participants use and evaluate these tools in a unit that they design.
III.F. Teacher Professional Development	Teachers should be able to: **III.E.1.** Play a leadership role in creating a vision of what their school might be like with ICT integrated into the curriculum and classroom practices.	Discuss various types of visions of schools that integrate ICT into the curriculum and classroom for educational improvement; have participants design and share action plans in which they will take the lead in working with colleagues and administrators to create such a vision for their school. Have participants implement an initial phase of this program, evaluate progress, and share challenges and strategies for overcoming challenges.
	III.E.2. Play a leadership role in supporting innovation in their school and continuous learning among their colleagues.	Discuss the types of social support that is needed by teaching professionals to engage in and sustain innovation in schools; have participants design and share action plans in which they work with administrators and colleagues to create a supportive environment for innovation. Have participants provide strategies for implementing innovative tools and resources in their schools.
	Teachers should be able to: **III.F.1.** Continually evaluate and reflect on professional practice to engage in ongoing innovation and improvement.	Discuss professional practices that support ongoing innovation and improvement; have participants give examples of and demonstrate these from their own experience.
	III.F.2. Use ICT resources to participate in professional communities and share and discuss best teaching practices.	Discuss how ICT resources can be used to support ongoing innovation and improvement through professional learning communities; have participants give examples of these ICT based practices from their own experience.

ICT COMPETENCY STANDARDS FOR TEACHERS

United Nations
Educational, Scientific and
Cultural Organization

For further information please visit:
www.unesco.org/en/competency-standards-teachers