

semester

3

# Information and Communication Technologies in Education

**COURSE GUIDE - DRAFT**

Associate Degree in Education/  
B.Ed. (Hons) Elementary

**2012**



Higher Education Commission

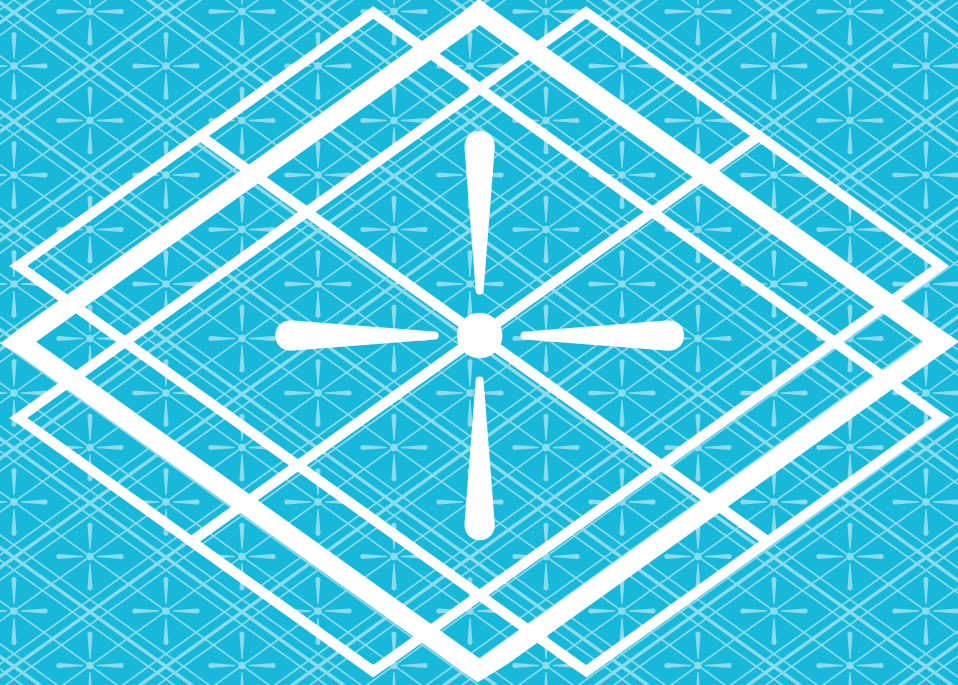




Higher Education Commission

This product has been made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of the authors, and do not necessarily reflect the views of USAID or the United States Government.

**Technical Support:** Education Development Center (EDC); Teachers College, Columbia University



# Table of contents

Syllabus.....	08
Planning guide.....	16
<b>UNIT 1</b> Technology for teaching and learning: An examination of Pakistan’s national education priorities.....	22
<b>UNIT 2</b> What do research and international standards say about teaching and learning with technology?.....	25
<b>UNIT 3</b> Technology and active learning.....	29
<b>UNIT 4</b> Teaching with technology: Using technology to find and evaluate content.....	32
<b>UNIT 5</b> Technology and instruction.....	39
<b>UNIT 6</b> Technology and assessment.....	46
<b>UNIT 7</b> Alternatives to computers and the Internet: Interactive Radio Instruction.....	49
<b>UNIT 8</b> Emerging technologies and technology trends.....	52
Course resources.....	56
Excerpt from the National ICT Strategy for Education in Pakistan	
Evaluating Educational Content on the World Wide Web	
Managing the Limited Computer Classroom	
Rubric: One-computer classroom activity	
Designing your e-portfolio	



# Syllabus

---

INFORMATION AND  
COMMUNICATION TECHNOLOGIES  
IN EDUCATION

# INFORMATION AND COMMUNICATION TECHNOLOGIES

## Year/semester

Year 2, semester 3

## Duration (hours)

32 facilitated hours; 64 essential independent study and practice hours

## Credit value

2 credits

## Prerequisites

- Successful completion of the Computer Literacy course in semester 2
- Ability to compose and send emails, search and find information online, use Microsoft Word and PowerPoint, download video and audio, and participate in social networking sites such as Facebook
- Ability to complete course assignments using a computer
- Ability to download browser plug-ins and download and install computer applications on a computer
- Access to a personal computer (at home, university, or elsewhere)
- Access to Internet (at home, university, or elsewhere)
- Access to a primary school where you can implement ideas and lessons that use technology
- A working email address that you check on a daily basis (to view many of the course videos and websites, you will need to register with a valid email address)



## Course description

This course will help you, the Student Teacher, understand, use, and apply a range of Information Communications Technologies (ICTs)—such as computers and the Internet, other audio and video equipment, mobile phones, and online resources and tools—as part of the teaching and learning process. During this course, you will collaborate with your peers to develop a learning activity that uses digital tools and resources to support student-centred learning.

NOTE: This syllabus uses the term 'teaching and learning' extensively. This is an indivisible and mutually reinforcing term that focuses on the nature of learning and how it should influence and shape teaching (instruction) and, in turn, how teaching influences student learning. Thus, by this definition, 'teaching and learning' encompasses a set of core components—content, instruction, and assessment—and the ways in which students interact with and are impacted by each core component. This course will focus on how technology promotes, supports, and enhances all of these core components.

The focus of this course is to provide you with the knowledge and skills regarding how ICTs can be used to engage students in the learning process, improve understanding of content as well as instructional and assessment practices, and enhance communication and collaboration in the classroom. By 'student', we mean here children in primary or lower secondary grades. To attain this end, Student Teachers will design and create instructional units in which technology plays a central role and implement these units with students.

The course focuses on teaching with technology. *Technology* in this course largely means computers/laptops, though instruction is largely similar whether a teacher is using a laptop or cell phone. As such, it looks at policy guidelines, the research on teaching and learning with technology, standards for teaching and learning with technology, and how technology can support content knowledge, instruction, assessment, and collaboration. The course also examines other non-computer technologies and looks at current technology trends.

This course, like the ADE/B.Ed. (Hons) curriculum, is grounded in the notion of learner-centred instruction.

The ADE/B.Ed. (Hons) programme aims to develop in its graduates the capabilities and dispositions to work as engaged professional educators in contemporary knowledge-building communities. Technology is seen as a cross-curricular tool for teachers and students in all subjects, from Islamic Studies to Classroom Assessment. As such, this course promotes the use of ICT in all subject areas.



A group of boys use a computer as part of an OLPC (One Laptop per Child) programme.  
Source: OLPC: <http://wiki.laptop.org/go/File:P1050894.JPG>. Creative Commons license to share and reuse.

## Course outcomes

Technology changes rapidly. Many technologies and their requisite skills that were common five years ago are now obsolete, and the most popular technologies of today were not even imaginable five years ago. Therefore, this course will focus not on skills development or on any one technology in particular, but on learning. Specifically, it will focus on how certain types of technologies, used in certain ways, may or may not help students with certain cognitive tasks.

After completing this course, Student Teachers will be able to:

- explain why technologies are appropriate (and not appropriate) for certain types of learning (knowledge)
- utilize a range of technologies (radio, video, computer, online tools, and others) to create, plan, and deliver instruction (application)
- model effective use of ICTs to locate, analyse, create, and evaluate information resources to support teaching and learning (application)
- engage children in using digital tools and resources as part of an authentic or collaborative learning activity (integration)
- provide a well-articulated perspective on ICTs in education informed by personal experience and critical examination of resources, curriculum, and educational practice (evaluation).

## Course outline

The following is a suggested draft of the organization of this 16-week course. A more detailed course outline may be provided by your Instructor.

**Unit 1:** Technology for teaching and learning: An examination of Pakistan’s national educational priorities

**Unit 2:** What do research and international standards say about teaching and learning with technology?

**Unit 3:** Technology and active learning

**Unit 4:** Teaching with technology: Using technology to find and evaluate content

**Unit 5:** Technology and instruction

**Unit 6:** Technology and assessment

**Unit 7:** Alternatives to computers and the Internet: Interactive Radio Instruction

**Unit 8:** Emerging technologies and technology trends

## Instructional approaches utilized in this course

**Inquiry-based.** The course is organized around a series of questions about technology for teaching and learning that will prompt you to observe, reflect, consider the evidence, and formulate ideas and beliefs based on evidence and experience.

**Experiential learning.** The course will employ a cycle of experiential learning. You will 1) learn about a particular concept, 2) apply what you have learned in an academic setting (either in micro-teaching or in schools with students), 3) reflect alone, with peers, and with the Instructor on this experience, and 4) incorporate this information into the next application.

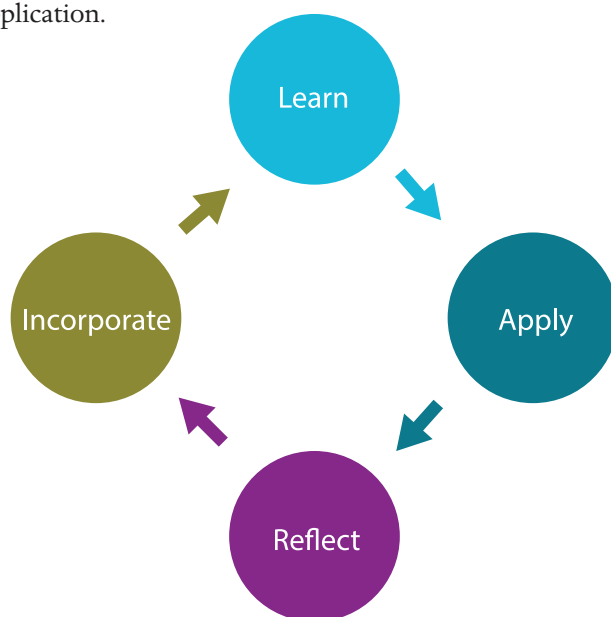


Figure: Cycle of experiential learning

**Model the use of ICTs for teaching and learning.** To better understand and experience how technology supports teaching and learning, your Instructor will model the use of ICT to support professional interaction and learning and you will use technology to learn. Discussions and reflections may take place in the free educational social networking site Edmodo (<http://www.edmodo.com>) or Yahoo Groups (<http://groups.yahoo.com>). In this manner, you will understand how technology can support collaboration and collegiality.

We also suggest the use of the web-based file-storage program Dropbox (<https://www.dropbox.com>) for this course.



*Students in Pakistan use a laptop for learning. (Source: National ICT in Education Plan, p. 9)*

**Formative assessment.** Strategies for formative assessment will involve the Instructor performing the following four tasks throughout the course:

- Clarifying and sharing learning intentions and criteria for success. The Instructor will make sure that you understand what the classroom experience will be and how your success will be measured.
- Engineering effective classroom discussions, activities, and learning tasks that elicit evidence of learning. The Instructor will develop effective classroom instructional strategies that allow for the measurement of success.
- Providing feedback that moves learning forward. The Instructor will work with you to provide the information you need to better understand problems and solutions.
- The Instructor will set up opportunities for you to formatively assess and provide feedback to one another. The Instructor will also involve you—through journaling, discussions, and the development of an electronic portfolio—in reflecting on and assessing your own individual performance.

**Peer instruction.** Throughout this course, you will serve as an ongoing learning resource for one another. By doing so, the course models the collaboration and reciprocity that is a hallmark of learner-centred instruction. Peer instruction will take place via paired and group work, discussions, peer assessment, and joint projects.

**Trust.** This course demands a good deal from you. It asks that you evaluate technologies, plan and teach a lesson, work independently and in small groups, and participate in online discussions. This course believes that you are creative and willing to try something new, and puts trust in your growing professionalism.

## Course expectations and grading

Note that for every one hour in class, you should spend at least two hours out of class practicing new skills, in online discussions, reading, and working on your portfolios.

This is an application-based course focused on practical knowledge, and as such, there will be no written exams. Rather, grades for this course will be determined by the following activities:

- Online reflections that demonstrate that Student Teachers have read the assigned readings and websites (20 per cent)
- Attendance and participation in online and in-class discussions demonstrating that Student Teachers have read the assigned readings and websites (10 per cent)
- Assignments (20 per cent)
- Micro-teaching lesson: Teaching with technology (20 per cent)
- E-portfolio (30 per cent)

## Final product: E-portfolio

As a culminating activity, you will complete a final product—a digital ‘Teaching and Learning with ICTs’ portfolio that documents your understanding of how technology can be used to support teaching and learning, as well as evidence of your ability to apply what you have learned via a sample lesson plan that demonstrates how you would use technology to promote learner-centred instruction, and photos of that implementation with students.

A portfolio is a purposeful collection of work that documents what and how a student has learned. In addition to the fruits of the learner’s labours, a portfolio documents the learner’s process of learning and progress in learning. *Purposeful* means that the work—or artefacts—assembled in the portfolio are gathered for a specific purpose—typically to document the learning process. The ‘e’ means that this collection of work is digital or electronic.

The portfolio should include photos, examples of your work, videos (if possible), your written reflections on the technologies you have studied and your implementation of technology-based activities with students, examples of lesson plans, examples of student work, and any other information you feel is relevant. The portfolio can be developed online using WordPress (<http://wordpress.com>) or Blogger or offline using Word or PowerPoint.

Your Instructor will share the weekly portfolio assignments. We strongly urge you to complete your portfolio assignments week by week so they don't overwhelm you at the end of the course.

Your Instructor will share more information with you about portfolio requirements and will discuss the portfolio process. The Instructor will also share a rubric to assess your portfolio.



*In this Indonesian madrasah, first graders draw their stories on the computer.  
(Photo: Mary Burns, EDC)*

# Planning guide

---

## About this planning guide

This planning guide provides a brief outline of ideas for teaching and learning in the various instructional units. Instructors may use them as presented here or adapt and extend them depending on their context. Many Instructors will prefer to create their own plans and will use the planning guide as an additional resource.

The course comprises 16 weeks of instruction. Student Teachers are expected to attend two sessions of instruction per week, each lasting one hour. For each hour of classroom instruction, Student Teachers should be engaged in two hours of out-of-class practice or study.

NOTE: This planning guide uses the term 'teaching and learning' extensively. This is an indivisible and mutually reinforcing term that focuses on the nature of learning and how it should influence and shape teaching (instruction) and in turn how teaching influences student learning. Thus, by this definition, 'teaching and learning' encompasses a set of core components—content, instruction, and assessment—and the ways in which students interact with and are impacted by each core component. This course will focus on how technology promotes, supports, and enhances all of these core components.

## Course outline

The following is a suggested draft of the organization of this 16-week course. Note that the information below is schematic and not intended to be comprehensive or complete. A more fully formed and detailed course guide will need to be completed by Instructors and/or university faculty based on faculty expertise, the availability and functionality of technology resources, and student abilities. Units and weeks will need to be adjusted by Instructors.

**Unit 1:** Technology for teaching and learning: An examination of Pakistan's national educational priorities

**Unit 2:** What do research and international standards say about teaching and learning with technology?

**Unit 3:** Technology and active learning

**Unit 4:** Teaching with technology: Using technology to find and evaluate content

**Unit 5:** Technology and instruction

**Unit 6:** Technology and assessment

**Unit 7:** Alternatives to computers and the Internet: Interactive Radio Instruction

**Unit 8:** Emerging technologies and technology trends

Note that for every one hour in class, Student Teachers should spend two hours out of class practicing new skills, in online discussions, reading and working on their portfolios.



## Technology

As would be expected from any course that focuses on technology, this course requires access to technology and weaves the use of technology throughout the course.

To successfully participate in a course focused on technology for teaching and learning, Student Teachers will need access to a computer, tablet, or smartphone; broadband Internet connectivity; and to a school where they can practice what they have learned. They will need to have some degree of technology proficiency in order to participate in online discussions, complete activities and assignments, and develop their portfolios.

Similarly, the course Instructor will need the same set of skills with technology. More so, the Instructor will need to be comfortable with the fact that technology, especially when integrated with learner-centred instruction, or active learning methodologies, often takes the learning and discussion in a different direction than anticipated, and that there are multiple routes, versus one, to attaining the stated learning objectives.

The course makes heavy use of video, believing that seeing models of intended practice by using technology is an optimal way for Student Teachers to learn. At the time of writing this course, access to YouTube was blocked, which has severely circumscribed the quality and quantity of educational videos available to students, teachers, and course designers. Nonetheless, the Instructor should make sure that these videos are available to Student Teachers, for example by downloading and archiving videos, so they can be viewed offline.

Because of issues with plug-ins and compatibility, it is strongly suggested that the Instructor and Student Teachers access videos via the browsers Firefox or Internet Explorer (not Chrome).

## Instructional method

A major assumption behind this course is that Instructors are familiar with, and willing to employ, learner-centred instructional methods. This is not a lecture-based, exam-oriented, theoretical course (though there are units that are more conceptual than others). It has been designed as an exploratory, collaborative, practice-based experience in which Student Teachers must demonstrate a set of practically based competencies.

Learner-centred instruction is characterized by the following practices:

- **Collaboration.** Students work together in groups, teaching and learning from one another, negotiating differing points of view, and arriving at a consensus.
- **Critical thinking.** Learning focuses on the cultivation of higher-order thinking skills—transferring information to new situations; analysing information; gathering information from a variety of sources and synthesizing it to create a cogent argument; and evaluating the veracity, worth, and merit of such statements.

- **Authentic learning.** Learning is based on real-world issues versus artificial, academic constructs. For example, students may be given real-world problems to solve, a project to create, a situation to analyse, or an overarching question, which they must answer through inquiry and research.
- **Interaction with a variety of materials.** Learner-centred instruction recognizes that students learn through a variety of tools, resources, and experiences. This demands a variety of cognitively rich learning tools, both technological (such as computers, software, applications, and content-specific Internet sites) and non-technological (such as microscopes, text-based and visual data, natural elements, people, books, and manipulatives).
- **Authentic assessment.** This is assessment that mimics a real-world task, such as making a presentation to a local government official or teaching a lesson to younger students.

## Learner-centred instruction

Learner-centred instruction is an instructional method or pedagogical approach that emerged primarily from constructivist learning theory and neuroscience. Heavily influenced by theorists such as John Dewey, Lev Vygotsky, and Jean Piaget, learner-centred instruction is essentially rooted in the notion of individual differences—awareness that learners are unique individuals who have particular and distinct ways of receiving and assimilating information, processing information, interacting with resources, and constructing knowledge.

This broad concept of individual differences states that individual learners:

- **Have different learning styles.** Learners have different aptitudes and intelligences. The process of inputting, processing, and outputting knowledge is unique to each learner (see Gardner). Thus, teachers differentiate inputs and resources (such as text-based activities, audio-based activities, and visually based learning) to better target learners' aptitudes.
- **Possess different working styles.** Some students learn better working alone, some work better collaborating, some work better in pairs. However, embedded in this framework is the notion of learning as a socially mediated construct developed through shared meaning, discussion, collaboration and negotiation (see Vygotsky, and Bell and Kozlowski). Thus, teachers differentiate activities—such as lectures, paired instruction, group work, projects, and art projects—to better target learners' different ways of learning.
- **Learn in different ways depending on learning resources and tools.** For example, individuals prefer some tools over others or learn optimally via a combination of tools; for example, via a computer, multimedia presentation, a person, or a book. Thus, teachers differentiate learning tools and experiences to better target the variety of methods and experiences by which students learn.
- **Construct knowledge in different ways.** This may occur via inductive thinking using higher-order thinking skills, such as problem-solving, analysis, identifying patterns, and application of learning to new situations (see Barak, Ben-Chaim, and Zoller). Thus, teachers help students learn to think and process information in different ways (inductively, deductively, applying, analysing, synthesizing, and evaluating information).

## Edmodo

To better understand and experience how technology supports teaching and learning, the Instructor will model the use of ICT to support professional interaction and learning, and Student Teachers will use technology to learn. Discussions and reflections will take place in the free educational social networking site Edmodo (<http://www.edmodo.com>). In this manner, Student Teachers will understand how technology can support the collaboration and collegiality so essential to student learning. A simpler alternative to Edmodo is Yahoo Groups:

➤ <http://groups.yahoo.com>

We also suggest the use of the web-based file-storage program Dropbox for this course:

➤ <https://www.dropbox.com>

Edmodo is a free educational social networking application. It has been selected for this course for a number of reasons:

- **Cost.** It is free (and promises to remain so).
- **Educational focus.** Edmodo is designed for teachers and students and online learning. It does not have or promote commercial content.
- **Less bandwidth intensive.** It supports low-bandwidth communications so that Student Teachers and Instructors can carry on synchronous (real-time or live) and asynchronous (delayed) conversations without the need for a lot of bandwidth. Additionally, Student Teachers with smartphones can also access the Edmodo application and/or access the course via their phones, versus a computer.
- **Serves as an online classroom.** Edmodo makes for an excellent course site, allowing for readings to be housed in a library, the formation of small groups, discussions to be archived, third-party applications, and posting of photos and videos.
- **Familiar and easy to use.** Edmodo mimics Facebook in use and structure and should thus be easy for Student Teachers to use.

To learn more about getting started with Edmodo, you can read through the manual for teachers ([http://ictbyteachers.weebly.com/uploads/1/1/3/0/11303946/edmodo\\_guide.pdf](http://ictbyteachers.weebly.com/uploads/1/1/3/0/11303946/edmodo_guide.pdf)) and/or watch a video (<http://vimeo.com/14047353>).

Edmodo has a number of useful features that can help Student Teachers better organize themselves. First, you can upload all readings to the Edmodo library (see Figure 1).

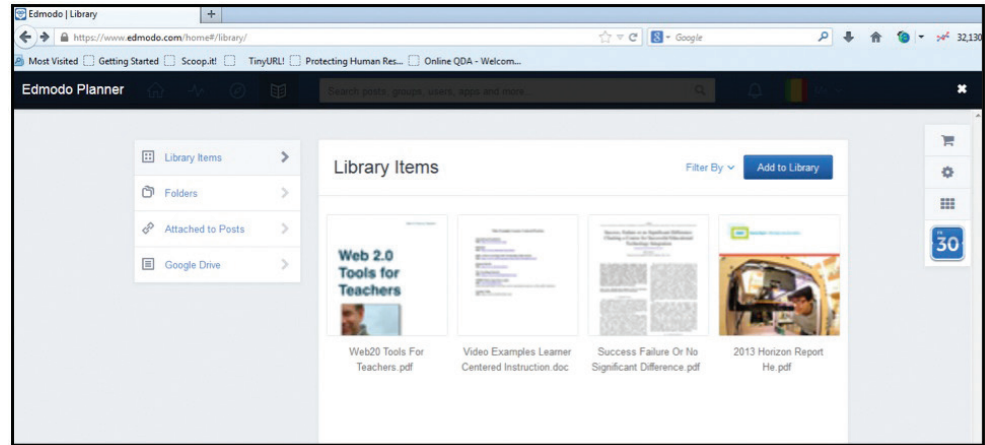


Figure 1: Edmodo library. You can post all course readings here so they are accessible to students from any place that has Internet connectivity.

Edmodo also has a course planner so that all major course events—discussions, homework, activities, announcements—can be noted in the planner (calendar) (see Figure 2). Through the planner, Student Teachers can even jump ahead in their assignments.

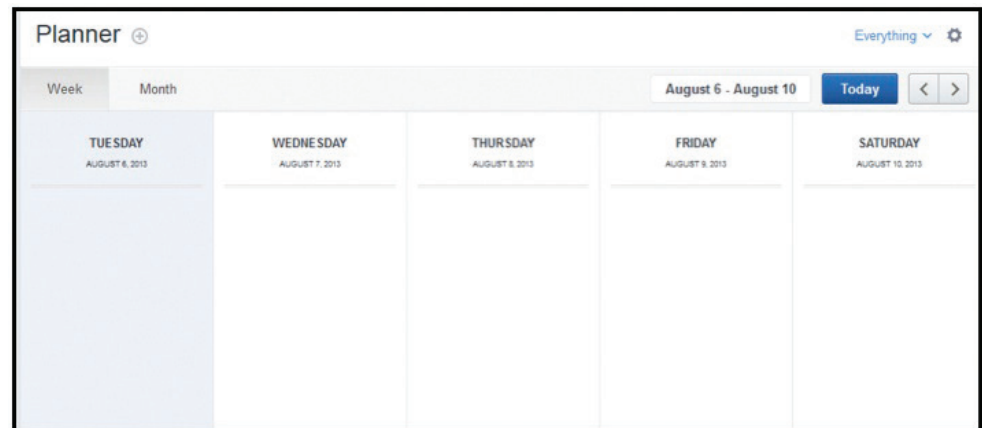


Figure 2: Edmodo's course planner/calendar.

# UNIT



TECHNOLOGY FOR  
TEACHING AND LEARNING:  
AN EXAMINATION OF  
PAKISTAN'S NATIONAL  
EDUCATION PRIORITIES

## Weeks 1 and 2 (4 hours in class)

### Unit overview

This unit prompts Student Teachers to ‘think big’ about instructional technology in the Pakistani educational context. Student Teachers will examine the Government of Pakistan’s overall educational goals (via examination of the National Educational Plan) and the performance standards it expects of Pakistani teachers (by examining the National Professional Standards for Teaching), as well as how the use of technology (as revealed through the National ICT in Education Plan) can support overall educational goals in general and quality teaching goals in particular.

### Objectives

Upon conclusion of this unit, Student Teachers will:

- understand how and why Pakistan envisions, supports, and justifies the use of technology to support teaching and learning
- understand the main elements of Pakistan’s National ICT Strategy for Education in Pakistan
- understand how technology may or may not support the goals of the National Education Policy and the standards outlined in the National Professional Standards for Teachers in Pakistan
- be able to evaluate progress in meeting the goals of its ICT in education plan and what additional supports and steps must be taken.

### Guiding question

How can the use of technology support improved teaching and learning in Pakistan?

### Readings

- National Educational Policy 2009 (NEP):
  - <http://unesco.org.pk/education/teachereducation/files/National%20Education%20Policy.pdf>
- National ICT Strategy for Education in Pakistan (excerpt included in the resources section of the course guide)
- National Professional Standards for Teaching in Pakistan (NPSTP):
  - <http://unesco.org.pk/education/teachereducation/files/National%20Professional%20Standards%20for%20Teachers.pdf>

### Suggested activity 1: Peer instruction

Assign sections of the three documents to individuals and/or small groups and ask them to lead small group discussions and/or make brief presentations to the class. The ideal way of handling this activity would be to have students teach one another via a jigsaw method.

- <http://www.jigsaw.org>

### **Suggested activity 2: Summary paper**

---

Ask Student Teachers to prepare a two- to four-page paper on the following question: What are the key points in Pakistan's three policy documents and how do they impact your work as a teacher?

### **Suggested in-class and online discussion topics**

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** Look at 'Elements and Action Recommendations' numbers 1 to 3 in the National ICT Plan. The plan outlines very basic action recommendations on ICTs for educational opportunity, strengthening the quality of teaching, and enhancing student learning. As future teachers, how would you expand on these suggestions? Make sure to include specific and detailed advice and examples.

**Online:** Read through the three documents carefully (the NICT Strategy for Education, NEP, and NPSTP). All the documents in their own way spell out a vision for teaching and learning. What is that vision? How will teaching change as a result of this vision?

### **Portfolio task**

---

How can the use of technology support improved teaching and learning in Pakistan? Ask Student Teachers to reflect on their online and classroom discussions and readings and to summarize their response in one to two paragraphs (word processed) and include it in their portfolios.

# UNIT



WHAT DO RESEARCH AND  
INTERNATIONAL STANDARDS  
SAY ABOUT TEACHING AND  
LEARNING WITH  
TECHNOLOGY?



## Weeks 3 and 4 (4 hours in class)

### Unit overview

Because of the huge costs associated with technology provision to schools and claims made about technology's potential impact, technology for teaching and learning ('educational' or 'instructional' technology) is the focus of widespread international scrutiny—by governments, donors, ministries of education, technology companies, educators, and parents. As such, arguments for and against the use of technology for teaching and learning are lively, dynamic, and constantly uncovering new evidence on the effectiveness or lack thereof about which technologies work, under what conditions, and standards for effective teaching and learning with technology.

Student Teachers should be aware of the arguments for and against the use of technology for teaching and learning ('educational technology') and the conditions under which the use of instructional technology succeeds or fails. This unit presents only a very small part of the body of evidence about educational technology, but it does introduce Student Teachers to some of the arguments for and against technology as an effective learning tool and standards for effective teaching and learning with digital technologies.

### Objectives

Upon conclusion of this unit, Student Teachers will:

- be aware of some of the arguments for and against the use of technology for teaching and learning, specifically the benefits and shortcomings of certain types of educational technology
- have analysed the strengths and weaknesses of these arguments and evidence and evaluated their merits
- have synthesized the various views on technology for teaching and learning to create a coherent argument outlining the strengths and weaknesses of using educational technology.

### Guiding question

Can technology improve teaching and learning and if so, under what conditions?

### Readings and video

- 'Success, Failure or No Significant Difference: Charting a Course for Successful Educational Technology Integration' (this is a free article but registration is required):  
➤ <http://online-journals.org/i-jet/login?source=%2Fi-jet%2Farticle%2Fview%2F2376%2F2522>
- 'Case Study: Dana Elementary School':  
➤ <http://p21.org/exemplar-program-case-studies>
- 'Framework for 21st Century Learning':  
➤ <http://www.p21.org/overview>
- 'Technology in Education: Debate between Sir John Daniel and Robert Kozma':  
➤ <http://www.economist.com/debate/days/view/120>

### Suggested activity 1: Debate

Organize Student Teachers into debate teams to argue for and against the merits of using technology to support teaching and learning. To do this, Student Teachers will need to do additional research and prepare their debates based on actual evidence about the effectiveness of instructional technology.

### Suggested in-class and online discussion topics

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** Based on the evidence you have examined, is instructional technology ‘worth it’? Should schools spend money on computers? Should technology be used for teaching and learning?

**Online:** What are 21st-century skills? How can the use of technology support, or distract from, the promotion of these skills?

### Portfolio task

Can technology improve teaching and learning and if so, under what conditions? Ask Student Teachers to briefly summarize the arguments that outline the strengths and weaknesses of technology for teaching and learning. As teachers, what strategies will they use to make sure they avoid these weaknesses? Student Teachers should provide between one and two paragraphs for their portfolio, word processed.

### Guiding questions

What skills and knowledge do learners require in an increasingly global and interconnected world? What knowledge and skills will you as future educators need to have to teach, work, and learn in an increasingly connected global and digital society?

### Readings and video

- National Educational Technology Standards for Students (NETS\*S):  
➤ <http://www.iste.org/docs/pdfs/nets-s-standards.pdf?sfvrsn=2>
- National Educational Technology Standards for Teachers (NETS\*T):  
➤ <http://www.iste.org/docs/pdfs/nets-t-standards.pdf?sfvrsn=2>
- UNESCO ICT Competency Framework for Teachers (Appendix 1 only):  
➤ <http://unesdoc.unesco.org/images/0021/002134/213475E.pdf>

### Suggested in-class and online discussion topics

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** Many Asian nations have adopted the UNESCO ICT Competency Framework for Teachers, while others have adopted the NETS\*T. Based on your careful reading of both, which standards from each do you believe are most important for teachers and why? (List 5 to 10 reasons.)

**Online:** Based on a careful reading of these three documents, what are the most important skills and knowledge your students, as learners in an increasingly global and interconnected world, will need? What are the most important skills and knowledge that you as future educators need to have to teach, work, and learn in an increasingly connected global and digital society?

### **Portfolio task**

---

Ask Student Teachers to look through the ISTE NETS\*T and UNESCO ICT Competency Framework standards again. How easy or difficult do they believe it would be to attain these competencies?

Ask Student Teachers to make a three-columned chart and label the top of each, 'Easier to attain', 'Harder to attain', and 'Hardest to attain' in their portfolio, placing the standards from each document under these column headings. When they finish, ask them quickly summarize in a paragraph where you think you are in terms of these standards.

UNIT



TECHNOLOGY AND  
ACTIVE LEARNING

## Week 5 (2 hours in class)

### Unit overview

If teachers are to effectively use technology for teaching, they cannot teach as they always have—and if students are to learn effectively with technology, they cannot learn as they always have done. As we have seen from the previous two units, policy, standards, and research demand and point to a certain set of conditions in which the use of technology can be successful. The most basic of these is instruction. Research has shown that technology, when used in learner-centred ways, can promote improved student engagement and learning more than traditional, teacher-centred uses of technology. This unit will briefly examine and set the stage for using technology to promote learner-centred instruction (or ‘active learning’, ‘child-centred learning’, or ‘student-centred learning’).

### Objectives

Upon conclusion of this unit, Student Teachers will:

- understand how the blend of technology and learner-centred instruction can support new ways of student learning
- begin to see some of the competencies teachers need to successfully use ICT for teaching and learning
- begin to brainstorm a technology-based activity they would like to carry out with students.

### Guiding question

How can technology support learner-centred instruction and active learning?

### Readings and video

- Connecting Student Learning and Technology:  
➤ <http://www.sedl.org/pubs/tec26/flash.html>
- Finland: Discovery through Technology:  
➤ <https://www.teachingchannel.org/videos/discovery-through-technology>
- Active Learning with Technology video series (watch three of the videos in this series):  
➤ <https://www.teachingchannel.org/videos/discovery-through-technology>

### Suggested in-class and online discussion topics

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** You have viewed a number of videos from the US and Finland and read about learner-centred instruction in the US. Based on the readings and video viewing, what patterns do you see across the examples that point to optimal teaching and optimal learning via technology?

**In class:** Earlier we talked about 21st-century learning and looked at a 21st-century case study (Dana Elementary School, in Unit 2). How do learner-centred instruction and 21st-century learning complement one another or blend together? Are there any ways in which they might be contradictory?

**Online:** Based on your reading of Connecting Student Learning with Technology, how would you define learner-centred instruction and active learning? How can technology support learner-centred instruction? How does technology support students' ways of working and learning?

**Online:** In the Finnish video, the teacher reports that ICT is not taught as a subject but integrated across all subject areas. What do you think of this strategy? What might be some of its pros and cons? More importantly—how does this approach (learning technology within the content area versus through an information technology class) exemplify learner-centred instruction?

### **Portfolio tasks**

---

Ask Student Teachers, based on what they have read and seen, what is their overall assessment of active learning? Is this really how children learn? Is it how they learn? Or, are there other, more effective strategies?

As Student Teachers, what concrete steps could they begin to take to set up a classroom that promotes active learning? Ask them to think about issues such as the layout of the classroom, materials, technology, communication, and how students would act, etc. Student Teachers should provide between one and two paragraphs for their portfolio, word processed.

# UNIT



TEACHING WITH  
TECHNOLOGY:  
USING TECHNOLOGY  
TO FIND AND  
EVALUATE CONTENT

## Weeks 6 and 7 (4 hours)

### Unit overview

The Internet abounds with ‘stuff’—photos, reports, text, videos, multimedia, simulations, educational applications, promotions, opinions—the list goes on. However, not all of this content is appropriate, relevant, usable, or of high quality. Evaluating the quality, accuracy, and utility of digital content (online and offline, but especially online as that is what the Student Teachers will have access to) must be a high priority for educators, particularly regarding content validity, the credibility and objectivity of the author or source, and the appropriateness of the content.

Web-based and digital content can help students grasp difficult-to-learn content topics, makes abstract information more concrete and visual, and presents information in multimodal (versus static) ways, which makes information interactive and engaging for students. In short, if teachers select high-quality digital content judiciously and base this selection on clear learning outcomes and use content as part of a well-designed lesson or unit, students are more likely attain a greater level of content mastery. *Content mastery* here means the ability to 1) organize knowledge around core concepts, or ‘big ideas’ within a particular content topic, 2) recognize meaningful patterns of information within a topic or domain and be able to communicate these clearly, 3) retrieve relevant knowledge of a particular concept or skill and apply it to new situations, and 4) solve problems within a particular domain (see Bransford, et al.).

This unit is organized around two activities. The first is finding and evaluating web content, especially considering validity, accuracy, reliability, and the ability to evaluate, triangulate, and synthesize conflicting information. (Here we are focused on web content in general, not necessarily educational content.) The second is again finding and evaluating web-based content, but this time with a narrower, educational purpose, as a way to help deepen students’ content mastery.

Because of greater access to the Internet and the constant proliferation of web-based content, the Internet has become the world’s largest research library. Critical to being a 21st-century teacher and student is the ability to find, gather, and use online information to resolve a problem or address an issue. However, not all online content is equal—much of it is poorly designed and of dubious quality and validity. Therefore, Student Teachers must be able to judge the quality and accuracy of web-based information and recognize that the web presents a lot of divergent information—so they must be able to help students reconcile varying points of view. Therefore, developing skills to distinguish and recognize the quality of online resources and thinking through conflicting information is essential.



## Objectives

Upon conclusion of this unit, Student Teachers will:

- recognize that the plethora of information as well as the contrasting viewpoints and conflicting evidence on the same topic require Student Teachers to:
  - critically examine information and arguments and evidence
  - accommodate, assimilate, or reject new information and have some framework for doing so
  - recognize that many points of view are equally valid and that many issues are characterized by complexity and lack simple points of view.
- be aware of the importance of critically reviewing and using online resources to enhance student learning
- through a review of online resources, determine which web resources may enhance students' understanding of identified content
- come up with an annotated list of 10 resources they believe are most helpful in teaching a particular content area to use as part of their practice teaching assignment.

## Guiding question

How do we begin to judge and evaluate and make sense of information from the world-wide web?

## Reading

'Developing Content' in *Distance Education for Teacher Training: Modes, Models, and Methods* (Open Educational Resources, pp. 233–241):

➤ <http://idd.edc.org/resources/publications/modes-models-and-methods>

### Suggested activity 1: Evaluating perspectives and points of view

This activity is very Internet-intensive and calls for Student Teachers to examine and search for a variety of websites. It helps Student Teachers see the diversity of opinions one can find on the Internet regarding any topic.

Organize Student Teachers in groups of three or four, depending on class size, so that each group examines one of the following webpages to answer the question: 'Does technology improve student learning?'

Group 1: 'Does ICT Improve Teaching and Learning in Schools?':

➤ <http://www.bera.ac.uk/system/files/ict-pur-mb-r-f-p-1aug03.pdf>

Group 2: 'Critical Reflections on the Benefits of ICTs in Education':

➤ <http://www.tandfonline.com/doi/abs/10.1080/03054985.2011.577938#.UgPDB9LVCS0>

Group 3: ‘Technology and Classroom Practices: An International Study’:

➤ [http://robertkozma.com/images/kozma\\_jrte.pdf](http://robertkozma.com/images/kozma_jrte.pdf)

Group 4: ‘Can Computers Help Students Learn?’:

➤ <http://siteresources.worldbank.org/EXTHDOFFICE/Resources/5485726-1288802844934/Brochure-correct-4.pdf>

Group 5: ‘Bridging the Gap: Technology Trends and Use of Technology in Schools’:

➤ [http://www.ifets.info/journals/16\\_2/6.pdf](http://www.ifets.info/journals/16_2/6.pdf)

Group 6: ‘A Retrospective on Twenty Years of Educational Technology Policy’:

➤ [http://ocw.metu.edu.tr/file.php/118/Week12/Culp\\_JECR.pdf](http://ocw.metu.edu.tr/file.php/118/Week12/Culp_JECR.pdf)

Group 7: ‘Effects of Using Instructional Technology in Elementary and Secondary Schools: What Controlled Evaluation Studies Say’:

➤ <http://citeseerx.ist.psu.edu/viewdoc/download?rep=rep1&type=pdf&doi=10.1.1.207.3105>

These articles all present varying evidence-based responses to the same question. Have Student Teachers make a brief (10-minute) presentation to the class. How credible is the evidence they found in these sites? How rigorous does the research appear to be? To what degree do authors use evidence to support their arguments? How compelling and reliable does this evidence seem to be?

Have Student Teachers take their research findings (based on their group number) and ‘triangulate’, or compare, them to the research they read in Unit 2. Ask them to find additional research online that supports or refutes this point of view and ask them again to report to the class.

As this activity concludes, ask Student Teachers, based on their findings, discussion, and new findings, to answer again the question, ‘Does technology improve student learning?’

(The answer is that the research is inconclusive. Hopefully, Student Teachers’ responses will reflect the complexity and conflicting evidence on the effectiveness of instructional technology on student learning. The point here is to help them see that there are multiple points of view and responses to what seem to be simple questions).

## Guiding questions

How can the Internet and digital content help students better learn content? As teachers, what guidelines should we have for finding and using web content?

### **Suggested activity 2: Evaluating and assessing the quality of web content**

Organize Student Teachers into jigsaw groups. Each jigsaw group is responsible for one type of web-based content—simulations, virtual learning environments, Open Educational Resources (OER), multimedia, and online lectures/lesson plans.

Provide the handout ‘Evaluating Educational Content on the World Wide Web: Evaluation Criteria’ and have Student Teachers evaluate their particular set of websites using these criteria.

As Student Teachers examine their particular set of websites, they should be prepared to answer the following questions:

- Based on what they’ve seen, how would they define this particular technology? In other words, what is a simulation? What is OER? What is a virtual learning environment? (And so on for the other types of web-based content.)
- What design elements do these sites have—such as animation, visuals, interactivity, and movement—that could help students better learn content? How do such design elements assist with learning?
- How well do the sites they examined meet the criteria for quality, validity, and accuracy (according to their handouts) and why? (They will need to use supporting evidence.)

Working in small groups, Student Teachers should examine the following sites.

#### **Simulations**

- PhET offers interactive, research-based simulations of physical phenomena (from the University of Colorado):  
➤ <http://phet.colorado.edu>
- Molecular Workbench offers visual, interactive simulations for teaching and learning science:  
➤ <http://mw.concord.org/modeler>
- Brainpop provides animated films on a variety of topics for primary and lower secondary grades:  
➤ <http://www.brainpop.com>

#### **Virtual environments**

- EcoMUVE engages students in science-based inquiry activities mobile devices:  
➤ <http://ecomuve.gse.harvard.edu>
- Google Earth is Google’s free digital atlas. It must be downloaded and installed on a computer:  
➤ <http://www.google.com/earth/index.html>
- Ruby Realm is a free online science-based virtual environment developed by the Education Development Center:  
➤ <http://cct2.edc.org/rubyrealm/bin/RubyRealmFlash.html>

### Open Educational Resources

- WikiEducator is an online community designed to help teachers plan and teach with open content:
  - [http://wikieducator.org/Main\\_Page](http://wikieducator.org/Main_Page)
- OER Commons is a database of open education content organized by subject area:
  - <http://www.oercommons.org>

### Multimedia

- National Library of Virtual Manipulatives is a library of interactive, web-based virtual manipulatives or concept tutorials, mostly in the form of Java applets, for mathematics instruction:
  - <http://nlvm.usu.edu/en/nav/vlibrary.html>
- Owl & Mouse Software offers free educational games and puzzles:
  - <http://www.yourchildlearns.com/owlmouse.htm>
- Khan Academy offers thousands of free online tutorials across a range of subject areas:
  - [www.khanacademy.org](http://www.khanacademy.org)
- The Blood Typing Game is an online game that helps students understand blood types:
  - <http://www.nobelprize.org/educational/medicine/bloodtypinggame/game/index.html>

### Lectures and lesson plans

- MIT Blossoms is a Science, Technology, Engineering, and Mathematics (STEM) video site offered by the Massachusetts Institute of Technology. There are lectures in Urdu:
  - <http://blossoms.mit.edu/>
- Academic Earth offers free lectures by professors at Yale University:
  - <http://academicearth.org/>
- Curriki includes free units and lesson plans designed by teachers across the globe:
  - <http://www.curriki.org/>
- K-12 Open Ed is a place for educators to share ideas and lessons regarding teaching with OER:
  - <http://www.k12opened.com/>

## Guiding questions

How can the Internet and digital content help students better learn content? As teachers, what guidelines should we have for finding and using web content?

### Suggested activity 3: Finding and evaluating web-based content to promote subject area mastery

*Content mastery* here means the ability to 1) organize knowledge around core concepts, or 'big ideas', within a particular content topic, 2) recognize meaningful patterns of information within a topic or domain and be able to communicate these clearly, 3) retrieve relevant knowledge of a particular concept or skill and apply it to new situations, and 4) solve problems within a particular domain.

Student Teachers must find 10 web resources or sites that they feel would be most effective to help learners master a particular content topic or generally help learners better understand a particular content area. The Student Teacher will need to evaluate the sites based on the evaluative criteria in the handout 'Evaluating Educational Content on the World Wide Web: Evaluation Criteria' and must be prepared to share online and in their portfolios ideas on using such sites in their own practice.

### **Suggested in-class and online discussion topics**

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** How can the Internet and digital content help students better learn content? As teachers, what guidelines should we have for finding and using web content?

**Online:** Based on the websites you examined as part of Assignment 2, how can the web and web-and-digital content support student's content mastery?

Possible responses include:

- Organize knowledge around core concepts or 'big ideas' within a particular content topic
- Recognize meaningful patterns of information within a topic or domain and be able to communicate these clearly
- Retrieve relevant knowledge of a particular concept or skill and apply it to new situations
- Solve problems within a particular domain

**Online:** How can these sites help you as a teacher better teach a particular content area? If you do not have technology in your classes, do they still provide information and guidance on how you might teach a particular content topic?

### **Portfolio task**

Ask Student Teachers to develop an annotated list of ten resources that they believe are most helpful in teaching a particular subject, or topic within a particular subject. Why did they choose these particular sites? What attributes do these sites have that would improve student learning?

UNIT



TECHNOLOGY  
AND INSTRUCTION

## Weeks 8 through 13 (12 hours in class)

### Unit overview

In a 21st-century world, teachers must learn how to use technology to design and carry out student learning activities. This unit—the major component of the course—focuses Student Teachers on designing and carrying out one activity with one computer in a local school. This unit represents the heart of the course. It involves a number of activities in which Student Teachers examine different types of educational technologies and the instructional factors that lead to their successful use, as well as video examples of technology integration. Student Teachers then work in pairs to brainstorm, plan, design, practice, and revise their one-computer activity, which they will then conduct with students during weeks 12 and 13, with feedback from classmates and the Instructor.

### Objectives

Upon conclusion of this unit, Student Teachers will:

- describe the ways in which various technologies support different kinds of student learning
- understand how teachers can begin to integrate technology into classroom activities in order to promote learning that is active, collaborative, constructive, authentic, and goal directed
- begin to see some of the competencies teachers need to successfully use ICT for teaching and learning
- develop a simple technology plan for a practicum school and classroom.

### Guiding question

What are some specific technologies for teaching and learning and how can they support improved student learning?

### Reading

‘Technology, Teaching and Learning: Research, Experience and Global Lessons Learned’ (pp. 56–86 only):

- <http://www.unescobkk.org/education/ict/online-resources/databases/ict-in-education-database/item/article/technology-teaching-and-learning-research-experience-global-lessons-learned/>

### **Suggested activity 1: Technologies for teaching and learning**

This activity examines the research on commonly found classroom technologies and discusses how they do or do not impact student learning.

Ask Student Teachers, based on their reading of ‘Technology, Teaching and Learning: Research, Experience and Global Lessons Learned’, to create a matrix for each of the technologies they read about. The matrix should have three columns:

- 1) Type of technology (for example, word-processing software)
- 2) Research-proven learning benefits
- 3) Ways they could use this technology with students as part of teaching and learning

Ask Student Teachers to post their matrices on Edmodo.

In a whole-class discussion, discuss which of the technologies they studied should, based on research findings and the available technologies at Pakistani schools, be their top three choices to use.

### **Suggested activity 2: Integrating technology into teaching and learning**

This activity focuses exclusively on technology integration—what technology looks like when it is being integrated into teaching and learning. This activity relies heavily on one main resource, the University of South Florida’s Technology Integration Matrix (they will need to download QuickTime unless they have an Apple computer):

➤ [www.fcit.usf.edu/matrix/matrix.php](http://www.fcit.usf.edu/matrix/matrix.php)

The University of Southern Florida’s Technology Integration Matrix (TIM) models how teachers can use technology to enhance learning for students in maths, science, social studies, and language. The TIM incorporates five interdependent characteristics of meaningful learning environments—active, constructive, goal directed (i.e. reflective), authentic, and collaborative learning—and associates these with five levels of technology integration (i.e. entry, adoption, adaptation, infusion, and transformation).

For this assignment, ask Student Teachers to do the following.

- 1) Analyse technology integration by subject area. Select one subject area (such as maths, science, etc.) and examine the integration of technology within this particular subject area along a continuum, from entry, adoption, adaptation, infusion, and transformation. Use the Technology Integration Matrix to assess the level of technology integration.
- 2) Create a similar 5-by-5 matrix (five columns that describes what each level of technology adoption looks like in practice) and the varying levels of learning (active, constructive, goal directed, authentic, and collaborative) that each level of technology integration helps to foster. (These five levels will be in rows.)
- 3) Analyse technology integration across subject areas. Return to the TIM and divide Student Teachers into groups, each of which analyses the videos across all subject areas by level of integration—entry, adoption, adaptation, infusion, and transformation. One group should look at entry only, one group at adoption, one should examine adaptation, etc. As groups analyse their level of technology integration, they should write down the characteristics that are common to each level. (For example, which characteristics does a classroom at the entry-level stage of technology integration exhibit?) Once they have done this, they make a presentation to the whole class or somehow share findings with the whole class.



### **Suggested activity 3: Teaching with technology**

In this activity, Student Teachers examine examples of teaching with technology.

#### **Videos**

- Singapore's 21st-Century Teaching Strategies:
  - <http://www.edutopia.org/education-everywhere-international-singapore-video>
- The Power of Collaborative Learning:
  - <http://www.edutopia.org/stw-collaborative-learning-tips>
- Real-world Problem Solving: Designing an iPad Case:
  - <https://www.teachingchannel.org/videos/high-school-engineering-lesson>

After watching the videos, Student Teachers will discuss the teaching competencies they need to effectively teach with technology. This can be in the form of a classroom discussion, reflective paper, or small group discussions. Probes may include:

- How do these videos illustrate effective technology integration into teaching and learning? In other words, what is technology used for? What is its function in these examples?
- Based on what you have seen in these videos, how does the use of technology promote active learning?
- Based on what you saw and heard in these videos, what do teachers do to successfully integrate technology with active learning? And what do teachers not do to allow active learning to occur?
- What common characteristics of teachers and teaching do you see in these three video examples?

### **Suggested activity 4: Teaching in the one computer classroom**

In most classrooms that Student Teachers enter, there will be no or limited technology. This activity helps Student Teachers learn how to carry out learner-centred activities with only one computer.

#### **Readings and video**

- 'Managing the Limited Computer Classroom' (resource in the course guide)
- 'One Computer Classroom: The Possibilities':
  - <http://eduscapes.com/tap/occ1.pdf>
- One-computer classroom activity with learning stations (in Indonesian):
  - <http://www.youtube.com/watch?v=LuT5w0QLodU>

Make sure that Student Teachers understand how each of the one-computer classroom models work.

Have Student Teachers begin to brainstorm a lesson plan that meets the following criteria:

- Uses a one-computer learner-centred model (navigator model, expert model, learning stations model, collaborative groups model)
- Uses one type of software or application (e.g. word processing, PowerPoint, or concept maps)
- Learner-centred (see definition in this document for learner-centred instruction)
- Lasts one class session

Student Teachers may do this in pairs, meaning they plan together and co-teach the activity. Each submits the same lesson plan as part of their portfolio.

Student Teachers will conduct this activity with students in a classroom in Weeks 12 and 13. They and the Instructor will observe and give them feedback. Examples of activities might include a game (using PowerPoint with students in teams) or a writing activity (with students in stations; each station writes a part of the story on the computer).

### **Suggested activity 5: Planning, designing, and practice teaching the computer-based activity**

For this activity, Student Teachers will need to be able to go to schools. The Instructor will need to arrange visits with schools and arrange for Student Teachers to practice teach the lesson they design.

There are no readings. However, if teachers want to use concept-mapping tools, they may use the free online concept-mapping tool Lucidchart.

➤ <https://www.lucidchart.com>

The next two to three weeks should involve Student Teachers planning the above one-computer activity. The sequence of events should follow:

- 1) **Brainstorming.** Ask Student Teachers to think back to the resources they have examined throughout this course; for example, web-based content, classroom examples from Connecting Student Learning and Technology, video examples from across the globe (Finland, Singapore, and the US), the Technology Integration Matrix, and the 'Active Learning with Technology' video series. Use these resources to begin brainstorming ideas, activities, or characteristics of their activity. During the brainstorming period, they should also choose the technology they wish to use, such as the Internet, mobile phone, concept mapping, PowerPoint).
- 2) **Learning objectives.** What two to three things do they want students to know or be able to do as a result of this activity?
- 3) **Lesson planning.** Begin sketching out a lesson plan. Include lesson objectives, the activity, what the teacher will do, what the students will do, what technology will be used, by whom, how, and for what purpose. The lesson plan should have a beginning, middle, and end and be extremely detailed.
- 4) **Instructor review and feedback on lesson plan.** This must be done in a timely fashion—during class, in face-to-face meetings or in Edmodo.

- 5) **Practice activity.** The Student Teachers should practice their activity with other Student Teachers serving as students and providing feedback. Make sure the activity is timed so they know it can be done within the allotted time period.
- 6) **Revise.** Based on feedback from Student Teachers and from the practice activity.
- 7) **Conduct lesson in school.** Each pair should be assessed by the Instructor and other students. The Instructor should develop a rubric to assess the activity. To make a rubric, see information in other course guides (e.g. Classroom Assessment and/or visit <http://rubistar.4teachers.org>. Make sure that Student Teachers take photos (or that someone takes photos) of student and teacher learning with technology. These photos will need to be included in the final portfolio.
- 8) **Debrief.** Whole-class discussion about how their first computer-based activities worked (including strengths, weaknesses, and how students reacted).

To better help Student Teachers plan their activities, distribute to them the 'One-Computer Classroom Activity' rubric, at the end of this course document.

### Suggested in-class and online discussion topics

Use the following prompts to initiate discussions with and between Student Teachers.

**In class:** Of the activities you saw or read about, which to you seemed to represent the best use of technology? Why? By what criteria did you assess these uses?

**In class:** Progress update. Where are you in the design of your lesson plan? (Have Student Teachers share.) Where do you need help? What else would you like to do during the lesson?

**In class:** Post-activity debrief. How did your activity go? What were its strengths and weaknesses? How did students react? Is there anything you would do differently the next time? Overall, on a scale from 1 to 10 (1 being lowest and 10 being highest), how would you rate this activity?

### Online

- What themes or big ideas do we see from these resources about successfully using technology to improve student learning?
- How will you begin to incorporate these big ideas into your own lesson design?
- In Unit 3, we discussed the importance of integrating technology and learner-centred instruction (active learning). Going back to the reading, what connections do you see between active learning strategies and research-proven effectiveness of certain types of technology?

**Online:** Think back to the standards we reviewed in Unit 2 (review UNESCO standards and ISTE's NETS\*S and NETS\*T). To effectively integrate technology into teaching and learning, what competencies must students and teachers have? What standards for instruction must be followed?

**Online:** Share the outline of your lesson plan. What are your learning objectives? How will technology help attain these objectives? What is your lesson (activities by which students will engage with technology)? Provide feedback to your classmates about these lesson ideas.

### **Portfolio tasks**

---

For this unit, portfolio assignments should include the following:

- Copy of Student Teacher lesson plan
- Photos and/or video of Student Teacher and students doing the one-computer classroom activity. Describe what these photos show.
- Reflection of one to two paragraphs. Ask them to consider:
  - How would you rate your one-computer activity?
  - How did it go? How did students react?
  - What went well and what would you change?

UNIT



TECHNOLOGY  
AND ASSESSMENT

## Week 14 (2 hours in class)

### Overview

This brief unit discusses technology for formative and summative assessment. Student Teachers will look at how technology can be used to check for student understanding (formative assessment) and evaluate a student's mastery of a particular content topic or unit of instruction (summative assessment). It is important to help Student Teachers understand that they have been using technology for formative and summative assessments. Their online discussions on the social media site Edmodo are a form of formative assessment. Using word processing software to create a lesson plan and write a journal reflection for their portfolio are examples of using technology for assessment. Taking photos of their classroom teaching and annotating what the photos show is another example of using technology for assessment. Finally, developing a digital portfolio and assembling their many digital artefacts are examples of using technology for summative assessment.

Specifically, this unit touches on some (but not all) types of technologies for assessment—such as digital portfolios and student response systems (clickers). More important, it tries to help Student Teachers think about how technology can help students demonstrate what they know and how various technologies can promote new ways of instruction.

### Objectives

Student Teachers will:

- be aware of the various technologies (e.g. clickers and interactive whiteboards) used to assess student learning
- understand how technology can be used for both formative and summative assessments
- understand that instruction, assessment, and technology should be intertwined if technology is to be used effectively to assess student learning
- see the various ways in which different types of technology assess different types of student learning.

### Guiding question

**How can technology be used to assess student learning?**

### Web resources

- Tools for Assessment:
  - <http://tep.uoregon.edu/technology/assessment/assessment.html>
- Rubistar is an online rubric maker:
  - <http://rubistar.4teachers.org/>

## Reading and video

- ‘Technology and Learning: Defining What You Want to Assess’:
  - <http://net.educause.edu/ir/library/pdf/eli3005.pdf>
- ‘From Questions to Concepts’ (clickers and peer instruction):
  - <http://www.youtube.com/watch?v=LBYrKPoVFwg>

### Suggested activity

---

Engage in whole-class discussions using the in-class discussion prompts.

### Suggested in-class and online discussion topics

**In class:** Let’s focus on Professor Erik Mazur’s class in the video example, ‘From Questions to Concepts’. This is an example of formative assessment using clickers (or student response systems). How exactly would you explain the sequence of his class? How is technology used as part of formative assessment? What does he mean when he says, ‘You can teach facts but you can’t teach understanding’?

**In class:** Of the various technologies for assessment that you examined, which seem most effective as assessment tools? Why?

**Online:** In this course, we have used technology for assessment throughout the course. What are these technologies? How have they assessed learning? How have they promoted learning?

### Portfolio tasks

---

Explain to Student Teachers that technology is only a tool, but assessment is a practice designed by teachers. Ask Student Teachers to consider the following:

Based on what they have read, examined, and watched, how can technology used as part of assessment check for student understanding, monitor student progress, and ultimately improve student learning? They should provide examples from the resources they have accessed, in addition to any other relevant resources. Student Teachers should write between one and two paragraphs for their portfolio, word processed.

# UNIT



---

## ALTERNATIVES TO COMPUTERS AND THE INTERNET: INTERACTIVE RADIO INSTRUCTION



## Week 15 (2 hours in class)

### Unit overview

Although this course has focused almost exclusively on the most dominant type of instructional technologies—computers and the Internet—there are numerous alternatives. In this unit, Student Teachers will examine one alternative: Interactive Radio Instruction (IRI). First developed by Stanford University in the 1970s, IRI is the most successful of all educational technologies and has a long history of proven impact on student learning. IRI is used exclusively in low-resource environments where radio infrastructure is good but computers and Internet connectivity are lacking. In this unit, Student Teachers will briefly examine IRI from the point of view of a teacher.

### Guiding question

How might you use Interactive Radio Instruction or Interactive Audio Instruction (IAI) as alternatives to computers and the Internet?

### Videos

- Interactive Radio Instruction (IRI) Improves Indian Student Learning:
  - <https://edutechdebate.org/ict-tools-for-south-asia/interactive-radio-instruction-iri-improves-indian-student-learning/>
- Tuned In To Student Success: Assessing the Impact of Interactive Radio Instruction for the Hardest-to-Reach:
  - [http://www.equip123.net/JEID/articles/4\\_2/HoThukral.pdf](http://www.equip123.net/JEID/articles/4_2/HoThukral.pdf)
- Clips of IRI from several countries, including Pakistan
  - [http://idd.edc.org/resources/audio?field\\_topic\\_nid=236&field\\_region\\_nid=All](http://idd.edc.org/resources/audio?field_topic_nid=236&field_region_nid=All)
- Interactive Radio Instruction (watch videos from India and Zanzibar):
  - <http://vimeo.com/channels/238742>

### **Suggested activity: IRI or computers for Pakistani classrooms?**

IRI, unlike computers and the Internet, has a long body of research proving its effectiveness as a learning tool. Yet it is regarded as an old technology, and is not as multimodal or multipurpose as a computer or online learning. Organize Student Teachers to prepare for and debate the question: Which technology should Pakistani classrooms invest in, and why?

### **Suggested in-class and online discussion topics**

Use the following prompts to initiate discussions with and between Student Teachers.

***In class:*** Based on the readings and videos, how do you think a teacher might use IRI/IAI to promote learner-centred instruction?

***Online:*** How does IRI exactly work? Based on what you have read and seen, as a teacher, how would you assess its strengths and limitations as a teaching tool?

### **Portfolio task**

---

Ask Student Teachers to reflect on the debate. Ask them what ideas IRI and IAI give them about using technology for their own teaching practice. Do they see any learning advantages of audio over video? How might they incorporate audio into your teaching? Student Teachers should write between one and two paragraphs for their portfolio, word processed.

UNIT



EMERGING TECHNOLOGIES  
AND TECHNOLOGY TRENDS

## Week 16 (2 hours in class or longer if time allows)

### Unit overview

School is changing. Learning is changing. The role of the teacher is changing. New technologies and ways of using technology are radically transforming schools as we know them across the globe. To conclude this course, Student Teachers will examine several of these new technologies—tablets and digital gaming—and emerging technology trends—flipped learning and blended learning. They will then discuss how these trends could impact their own teaching and what must change in the current education system to accommodate new technologies in the classroom.

Student Teachers should note that their portfolio will be due in one to two weeks (depending on the Instructor's decision) after the conclusion of the course.

### Guiding questions

How might these new technologies and new ways of technology use impact student learning (for better or worse)? What do teachers need to know and be able to do to prepare for these changes?

### Reading and video

'The NMC Horizon Report: K-12 Edition' provides an overview of emerging technologies and technology trends:

➤ <http://www.nmc.org/horizon-project/horizon-reports/horizon-report-k-12-edition>

### Emerging trends

#### Robotics: Videos

- A teacher talks about middle school robotics:  
➤ <http://www.schooltube.com/video/984468bef2bbbe866696/>
- Changing Classrooms with Robotics:  
➤ <http://www.schooltube.com/video/079bc2fffdca43ba8cd8/Changing%20Classrooms%20with%20Robotics>

### Tablets: Video and website

- A teacher talks about using the iPad in her classroom (some commercial content):
  - <http://vimeo.com/51486168>
- Teachers Guide on the Use of the iPad in Education:
  - <http://www.educatorstechnology.com/2012/06/teachers-guides-on-use-of-ipad-in.html>
- The Best Education Apps for iPad:
  - <http://www.educatorstechnology.com/2012/12/a-list-of-all-best-ipad-apps-teachers.html>
- The Best Education Apps (Android):
  - <http://www.edudemic.com/best-education-technology/the-best-education-apps-android/>

### Mobile phones: Videos

- Cell phones for learning:
  - <http://depts.washington.edu/etuwbltblog/?p=1553>
- SmartPhones for literacy:
  - <http://www.youtube.com/watch?v=Z2ADAnJo4XQ>
- Mobile learning for adult education:
  - <http://www.youtube.com/watch?v=6JbN16oL3Ho>

### Digital games: Websites

- Educational Games from Canada's Centre for Digital and Media Literacy:
  - <http://mediasmarts.ca/digital-media-literacy/educational-games>
- PBS Kids: Games
  - <http://pbskids.org/lab>

### Flipped learning: Websites

- What is 'flipped learning'?
  - <http://www.youtube.com/watch?v=ojiebVw8O0g>
- Flipped Learning Network:
  - <http://flippedlearning.org/site/default.aspx?PageID=1>
- Flipped learning: TED talk:
  - [http://www.youtube.com/watch?v=etQJPG\\_CY78](http://www.youtube.com/watch?v=etQJPG_CY78)

### Blended learning: Videos

- The basics of blended learning:
  - <http://www.youtube.com/watch?v=3xMqJmMcME0>
- Blended learning and math:
  - <http://www.youtube.com/watch?v=wAvWvP7jvRI>

### Massively Open Online Courses (MOOCs): Websites and video

- What is a MOOC?:
  - <http://www.youtube.com/watch?v=eW3gMGqcZQc>
- Success in a MOOC:
  - <http://www.youtube.com/watch?v=r8avYQ5ZqM0>

### Optional resource (Web 2.0)

Web 2.0 Tools for Teachers:

- [https://docs.google.com/file/d/0Bww9YyVv1C\\_MMmhyQUM3V1BQWFE/edit](https://docs.google.com/file/d/0Bww9YyVv1C_MMmhyQUM3V1BQWFE/edit)

### Suggested activity: Small group exploration and peer instruction

Because of the number and diversity of websites to be examined, the Instructor may wish to assign certain sets of websites to small groups and ask Student Teachers to teach one another about these different types of emerging technologies in an in-class setting. This may involve straightforward peer instruction, small group presentations to the whole class, a jigsaw method, or having students hold an online lesson in Edmodo where they teach one another.

### Suggested in-class and online discussion topics

Use the following prompts to initiate discussions with and between Student Teachers.

#### *In class*

Student Teachers will participate based on their assigned group.

As a teacher having viewed these emerging technology trends, what do you think these trends will hold for the role and function of a teacher? What will you need to do or change in your own teaching as a result of these trends?

#### *Online*

In this week's discussion, Student Teachers will do the following:

- Share their emerging technology. What is it? Ask them to briefly describe how it is used for teaching and learning.
- What value does it add to teaching and learning?
- What is it about this particular technology that helps students learn in ways that are different from traditional technologies (e.g. IRI, computers, stand-alone software)?

### Portfolio task

Ask Student Teachers to think of the emerging technologies they have seen and read about. Ask them to discuss in a one- or two-page paper which they believe to hold the most promise for improved student learning, and why.

# Course resources

---



### III. Elements of the NICT Strategy

The NICT Strategy contains the following six elements:

- 1) Use ICT to extend the reach of educational opportunity.
- 2) Apply ICT to strengthen the quality of teaching and educational management.
- 3) Employ ICT to enhance student learning.
- 4) Develop complementary approaches to using ICT in education.
- 5) Build on the current experiences of existing and successful ICT programmes.
- 6) Develop capacity at the federal and provincial department of education levels.

In the pages that follow, we explore each of these six elements in depth. For each element, we provide a description, focus areas, action recommendations, and related resources. Throughout this section, we will *highlight* terms that we define in the Glossary.

#### ELEMENT 1: Use ICT to Extend the Reach of Educational Opportunity

##### 1.1. Description

Millions of children in Pakistan have little or no access to education. Improving school infrastructure and teaching quality are obvious elements of a comprehensive solution to this problem. They are also the two areas where *ICT* can best supplement the MoE's efforts. Around the globe, successful deployment of ICT has dramatically increased access to high quality education. Countries are using ICT not only to overcome distance barriers, but also to make education accessible to children and adults with special needs. Thus, Pakistan should explore all possible, efficient, and affordable ways of increasing access to high quality education using ICT alone or in combination with other tools.

##### 1.2. Focus Areas

**Geophysical Barriers:** Use a number of technology-based alternatives where schools are inaccessible. ICT works well where educational opportunities are limited due to geophysical problems or lack of schools. The following ICT approaches can be used to overcome geophysical barriers:

- **Open and Distance Learning (ODL):** Equip community centres with televisions and computers that have *Internet* facilities, so that local people can access information and benefit from on-line instruction. Pakistani educational institutions like the Allama Iqbal Open University and the Virtual University are already making use of innovative ODL techniques. The scope of ODL approaches can be extended to the areas of education as yet untouched by them.
- **Educational Television (ET):** Establish viewing centres where televisions are otherwise not widely available and combine the hardware with ODL approaches. This will ensure that educational programmes are available in remote areas in the form of video-based training (via Internet, satellite, VCR/television, or *DVDs*). Allow students and teachers to “see and learn” by



observing others in action. They can also benefit from activities and virtual field trips that present rich content as practicable, procedural knowledge.

- **Radio Instruction (RI):** Use *interactive radio instruction (IRI)* to facilitate instruction for groups of students when qualified teachers are not available. Also, utilize IRI to provide ongoing professional development and support to help teachers practice *student-centred techniques* in their classrooms. One can also use non-interactive radio programmes to mobilise communities and to provide ongoing access to students and adults who might not be able to attend formal schools for social, economic, or physical reasons. Radios are ubiquitous throughout Pakistan in both rural and urban sectors, and a “free to air” educational broadcast can reach a large population.
- **Computer Assisted Instruction (CAI):** Offer computer-based training either in ODL format or locally, via standalone applications. One can use CAI to upgrade teacher qualifications and provide access to rich content. CAI can also standardise assessment and allow teachers and students to network, exchange, and learn from peers in different geographic locations.

**Context-Based Differences:** Use ICT creatively to assist teachers and students with a wide range of abilities and from varied socio-economic backgrounds. Cost-effective technologies for children with special needs—blind, deaf, and physically handicapped learners—exist and should be used in the public and private school settings in Pakistan. Similarly, ICT can help overcome gender bias, age, financial status, and other social or cultural factors that might otherwise impede access to quality educational services.

## ICT IN ACTION: Educational Television in China

With its focus on economic development in the 1980s, China, too, turned to education as a mechanism to promote economic development. The Chinese government’s passage of the 1986 Law on Compulsory Education guaranteed nine years of basic education to all children.

In an effort to train millions of teachers to meet the obvious demand, and to upgrade the skills of in-service teachers, China turned to television as a vital tool in its nationwide training efforts. Using satellite technology, China has now established the largest educational network in the world—the Central Educational Television (CETV)—and offers educators access to over 200 courses towards diploma and subject area certification. As a result, academically unqualified teachers can upgrade their professional skills, and school principals can access a rigorous in-service management training curriculum. In addition to its teacher training courses, CETV offers Chinese citizens access to a host of programs across a variety of disciplines—successfully promoting the concept of life-long learning on a national scale.

China has also made its CETV broadcasts available on DVD through the use of video compression techniques. Viewers can obtain several hours of good quality television and have the ability to stop, rewind, and review selected frames. An hour of video holds nearly 100,000 stills; DVD technology offers enormous storage potential, allows for anytime/anywhere viewing, and can be easily disseminated or shared by practitioners.

## EXPLORING ICT: The Benefits of Interactive Radio Instruction

Interactive radio instruction (IRI) is an instructional approach suitable for formal and non-formal settings because it uses a one-way audio medium to reach a dual audience (i.e., teacher and students). In IRI, a radio “teacher” delivers content and guides the instructor in the application of interactive techniques to reinforce that information. Students “learn” by singing songs, doing individual and group work, answering questions, and performing tasks.

Content and pedagogy in an IRI series are based on the national curriculum and respond to specific teacher training needs determined through assessments and focus group sessions. In-country scriptwriters, artists, and producers create the programmes. Given the variance of multi-grade conditions or class sizes, each lesson undergoes a *formative evaluation* in a classroom setting before it is finalized.

In areas where human and financial resources are few, IRI has proven to be an inexpensive, portable, one-to-many technology. It requires minimal training to use, and it is often in keeping with traditional oral practices of imparting information. The use of IRI can help improve access where there are no formal schools or schools without teachers, and quality by providing on-the-job instruction for teachers or facilitators.

Because radio is cost-effective and scalable, donors are often willing to assist with up-front production expenses. While development costs can be high, the reach and repeated use of IRI results in an overall per-student cost that is much lower in comparison to other ICT.

### 1.3. Action Recommendations for Stakeholders

- 1) **Determine the context and needs of the students, educators, and/or citizens whom you seek to serve:** Gain a deeper understanding of your target audience. Who are your underserved populations? Where are they located? How might you use ICT to reach these groups? How feasible is this? What kinds of ICT might you use to reach these groups? You must also address the issue of language. In what language(s) will you develop these ICT interventions? Examine human capacity needs, especially among teachers. Do they need greater subject area knowledge or help with new instructional strategies?
- 2) **Research uses of ICT including, and other than, computers:** Gather information about how you might use desktops, laptops, *handheld digital devices*, and Internet access to meet the needs of your target audience. Beyond researching computers, also consider opportunities for using radio, television, or video-based instruction using DVD players. Many countries have found these latter technologies to be more useful, particularly where computers are not available or cannot be connected with global networks. Also, investigate technologies from the perspective of their potential to cater to individual learners with varying abilities and levels of access.
- 3) **Invest in needs-based and best practice ICT models:** Develop a minimum needs based approach to building technology capacity at the District, Union Council, and School levels. Establish model resource centres and technology clubhouses to serve areas where there are insufficient schools and economically underprivileged areas.

- 4) **Develop funding mechanisms to cut the cost of ICT for education:** Develop a repertoire of information about cost-effective ways to procure a wide range of ICT. Explore options such as aggregating market demand, introducing good public policies, creating public-private partnerships, and creating/supporting alternative business models.
- 5) **Initiate an awareness campaign:** Design and launch an ICT in education awareness campaign. Such a campaign will help increase understanding of and support for the use of ICT in education. It will also help you garner support from private donors and NGOs. By melding educational issues with ongoing economic initiatives, you can disseminate information about job opportunities, encourage life-long learning, and promote skills enhancement.



#### 1.4. Resources

- **Improving Educational Quality through Interactive Radio Instruction: A Toolkit for Policy Makers and Planners.**  
Development Research Group. (2005). Washington, DC: World Bank. This is an excellent resource for policy-makers wishing to investigate the use of IRI as an educational tool. It provides guidelines for when, how, and where to use radio, as well as numerous case examples of IRI instruction, practical implementation guidelines, and information on cost, sustainability, and going to scale.  
➤ <http://www-wds.worldbank.org> (type title into website's search engine)
- **Interactive Radio Instruction: Impact, Sustainability, and Future Directions.**  
Dock, A., & Helwig, J. (Eds.). (1999). Washington, DC: The World Bank, United States Agency for International Development, and Education Development Center, Inc. This study of IRI presents the accessibility and effectiveness of radio as a tool for *active learning* inside and outside of the classroom. It synthesises the knowledge and experience accumulated over the past 25 years in the use of IRI in more than 20 developing countries, providing a balanced account of the successes and failures of IRI.  
➤ <http://www-wds.worldbank.org> (type title into website's search engine)

## ELEMENT 2: Apply ICT to Strengthen the Quality of Teaching and Educational Management

### 2.1. Description

The quality of any system is only as good as its human resources. To improve education in Pakistan, the needs of our teachers, head teachers, and administrators must be addressed holistically. ICT can enhance teaching quality by supporting and reinforcing the use of innovative teaching practices. It can allow educators to access a wide array of materials, reducing isolation and permitting peer-exchanges. Administrators can also benefit from ICT by using technology tools to access management resources and data that can, in turn, strengthen their decision-making processes.

### 2.2. Focus Areas

- **Continuous Learning:** Maximise opportunities for professional development through IRI, television, ODL, and on-line resources that provide teachers with access to ongoing professional development including follow-up support. Such access is particularly valuable for traditionally underserved groups, such as schools in mountainous and remote areas where face-to-face professional development can be difficult, if not impossible. Teachers will learn ICT skills as well as how to teach ICT as a subject or integrate it within the curriculum.
- **Instructional Practice:** Help teachers understand and effectively use innovative instructional approaches and constructivist techniques. Support them in applying a particular technology in a learner-centred context by modeling lessons in live classroom situations that other educators can hear or observe via radio or through taped/broadcasted television modules (on DVD or Web-based TV).
- **Content Knowledge and Curriculum Support:** Distribute **CD-ROM**-based software (including items from and links to relevant websites and education **portals**) to schools, professional development centres, and teacher training institutions to help pre- and in-service teachers expand their content knowledge. If appropriately integrated into the existing professional development regimen, these resources can help teachers obtain sound content knowledge. Provision of Internet access/CD-ROM-based software in teacher resource centres can also bring great benefits to teachers.
- **Local Resource Materials:** Provide teachers and educators with the ICT tools that enable them to produce their own materials in local or regional languages. Teachers can take advantage of ICT skills to produce customised instructional resource materials that are relevant for them. Where computers are available in a resource centre, teachers can prepare materials, and they can make and share printouts of essential templates that supplement the traditional text-based methods.
- **Practitioner Communities:** Encourage the use of ICT for professional networking, mentoring, and even monitoring. By using **E-mail, blogs, LISTSERVS, bulletin boards, chat**, and on-line learning opportunities, educators can engage in reflective, analytic learning activities and discussions about specific teaching practices with national or international colleagues. Furthermore, by placing their thoughts in distributable media (e.g., on-line, CD-ROM), teachers create an archived body of knowledge that others can access.

## 2.3. Action Recommendations for Stakeholders

- 1) **View teachers' professional development as a top priority:** Articulate, implement, and routinely evaluate professional development goals. Both technical knowledge and the ability to integrate ICT into the curriculum are important. If you are a leader of a provincial focal team for ICT integration, engage your team in examining how you can use ICT components to augment professional development and pre-service training.
- 2) **Match ICT selection to teachers' specific needs:** Assess the needs of teachers before deciding which technology can best address those needs. For example, IRI might be a particularly cost-effective way of providing regular outreach and support to teachers in remote areas of Pakistan. This ICT could easily be tailored to upgrade these teachers' subject knowledge, pedagogical practices, and language abilities. Once you have assessed teachers' needs, ICT can further strengthen the "core" areas of teaching by providing educators with access to experts in their field and the ability to retrieve resources containing up-to-date curricular and extra curricular information.
- 3) **Set guidelines for ICT training for teachers:** Explore international standards for ICT education for teachers. You will find resources such as material published by the International Society for Technology in Education (ISTE) to be very useful. After you have reviewed these materials, adapt the guidelines to suit local requirements and context.
- 4) **Select a strategic blend of professional development models based on research of innovative educational practices:** When you use ICT to augment professional development, you must consider the overall goals of professional development, constraints to providing training, and research-based models. It is often best to use a blend of professional development approaches. Ground professional development involving ICT in research on cognition and learning. Provide/model activities that allow for a variety of learning experiences, all focussed on curriculum-specific applications. For example, face-to-face training can support rich explorations of teaching and learning, and ICT can function as an extension and follow up tool. For large-scale professional development, ICT tools such as radio and television are more appropriate. Depending upon the availability of the technology, on-line learning and video and conferencing can also be viable solutions.
- 5) **Provide training and resources for teachers to produce their own materials:** Train teachers to develop their own materials or to access easy-to-adapt templates, which they can distribute in print form. Tools such as computer resources at community centres or even a one-computer classroom concept would enable teachers and students to access and explore particular topics. Digital cameras or audio tapes can allow students and teachers to capture concepts and practical examples to share with larger groups.
- 6) **Provide follow-up and support:** Enquire about factors that may impede teachers' adoption of ICT following training and find ways to resolve these. Many schools might lack technology, electricity, or space. Computers might be located in labs instead of in each teacher's classroom, and Internet connections (when available) might be limited to certain designated computers. Then, too, school administrators might not provide adequate time and resources for high-quality technology implementation and might see professional development as a one-shot training session in which skills are imparted using specific equipment. The school climate might not be supportive of changes in traditional pedagogy or, conversely, an administrator might

expect change too quickly. Special challenges might face female teachers' and students' participation in ICT training. ICT training for administrators and education managers should be part of a planned programme to make school environments conducive to maximum use of innovative ICT.

- 7) **Ensure that teachers know how to teach with ICT:** Professional development should give teachers an understanding of the curricular potential of ICT. It should also support teachers in developing new instructional methodologies (e.g., project oriented, *problem-based learning*, and collaborative learning). While skill training in ICT is essential, it should never be just a single, separate course. It is more important for teachers to know how to teach with ICT than how to use ICT, and such instruction should be integrated within the basic courses at teacher training colleges.
- 8) **Create a system of incentives and support for teachers to use ICT:** Identify and reward innovative uses of technology in the classroom. Incentives can be both internal (enhanced self-esteem and pride) and external (tangible rewards), including: stipends, recognition, a chance to win ICT equipment, and/or salary increases or promotions.
- 9) **Establish a national educational portal:** Encourage educators to consult the national education portal to find resources. Like the *SchoolNets* established in other countries, Pakistan's education portals should provide teachers and administrators at all levels of the system with access to experienced educators (perhaps in a tele-mentoring relationship). They should also allow teachers to link to a community of learners with whom they can share ideas, and they should enable teachers to contact content area experts (similar to "Ask an Expert" sites). Portals can also offer video examples of good instruction, lesson plan databases where teachers can find and post lesson plans that use ICT, and/or audio files or podcasts that include lectures from teacher college faculty. For widespread access, these resources can be stored in an on-line and distributable version of a digital library that necessitates Internet access in local community centres.



## EXPLORING ICT: ICT Education for Female Teachers and Students

The key to a nation's development rests with its women. Educated women are more likely to delay fertility, have fewer children, and provide better health care for themselves and their families. Even a small increase in education levels for women can have a powerfully favourable effect on a nation's overall socio-economic development.

Therefore, it is important that girls are provided not just access to schools but also to powerful learning tools in the form of ICT. This can often be difficult as technology, even in wealthier nations, is often seen as a man's domain; there are fewer women involved in software programming, gaming, and technical support than men.

Yet, research demonstrates that while men enjoy the problem-solving aspects of ICT, women also enjoy problem-solving when results are communicated and used for an authentic purpose. As SchoolNet Namibia's "Kids on the Block" technology squads show, girls (who comprise over half of the "Kids") make excellent tech support staff.

In rural and traditional areas, education in general and ICT in particular may be viewed as not being appropriate for girls and women. Any national and provincial ICT policy must ensure that females are provided equal access to, and equal opportunities to, learn from and with ICT.

## 2.4. Resources

- **Active Learning with Technology Professional Development Portfolio:**  
Developed for educators who work with K–12 teachers, the materials and activities in the Active Learning with Technology portfolio were field tested and carried out in a variety of settings by more than 1,000 teachers. In December 2001, the portfolio earned the "Exemplary Use of Technology Award" from the National Staff Development Council. The ALT Portfolio includes 18 modules, including: Active Learning Environments, Applications for Learning, Creating Electronic Presentations, Analyzing Lesson Plans, Using Web-Based Resources, Managing Growth, Connections, and Sharing Lessons.  
➤ <http://www.sedl.org/pubs/catalog/items/tec30.html>
- **ICT Portal for Teachers**  
This site provides a comprehensive range of useful ICT in education information for teachers and educators, particularly those in the Asia-Pacific region, including: teaching guidelines, lesson plans, and links to on-line ICT teacher training courses.  
➤ <http://www.unescobkk.org/index.php?id=787>
- **World Review of Distance Education and Open Learning Series Volume 3: Teacher Education through Open and Distance Learning.**  
Robinson, B., and Latchem, C. (Eds.), London: COL/RoutledgeFalmer Press, 2002 and the Commonwealth of Learning. Geared toward former Commonwealth nations, this is a comprehensive resource on ODL. The guide looks at all aspects of ODL—advantages, availability, appropriateness, adaptability to local situations, content, and infrastructure—and examines current, successful ODL programmes in former Commonwealth nations.  
➤ <http://www.col.org/colweb/site/pid/3349>

- **Using Technology to Train Teachers: Appropriate Uses of ICT for Teacher Professional Development.**

Gaible, E., & Burns, M. (2005). Washington, DC: World Bank Group. An extensive guide for policy-makers on using ICT to help teachers gain basic skills or upgrade basic skills, particularly in countries attempting to meet Education for All requirements. The guide looks at best practices in professional development, models of professional development, and the pros and cons of various technologies such as radio, television, computers, and video. It also profiles strategies for effectively integrating ICT into schools.

➤ [www.infodev.org/files/2947\\_file\\_infoDev\\_one\\_pager\\_Train\\_Teachers.pdf](http://www.infodev.org/files/2947_file_infoDev_one_pager_Train_Teachers.pdf)



## ELEMENT 3: Employ ICT to Enhance Student Learning

### 3.1. Description

Technology alone is seldom transformational. Rather, ICT requires the active participation of learners, and the choices of educators determine ICT's efficacy in the classroom. When used appropriately, ICT tools can support educators in promoting *critical thinking* and analytical skills. They can increase student motivation and render learning relevant by connecting concepts and theories to real-world examples. They can also boost deep processing of ideas and free up time for quality classroom interaction. In sum, technology enables a teacher to improve pedagogy by providing the framework to create a constructivist, learner-centred environment. For students, technology offers access to self-paced learning. It provides a chance to explore, investigate, reflect, learn social skills (such as collaboration, logical reasoning, and creative expression), and enhance self-esteem.

### 3.2. Focus Areas

- **Curriculum Enrichment:** Review current curricula to determine how appropriate integration of ICT can enrich primary, secondary, and vocational education. ICT can broaden, deepen, and bring to life curricular goals and outcomes. For example, students might develop a deeper understanding of linear and exponential growth by participating in a project-based activity



that examines the link between Pakistan's post-Independence population and economic growth. Using the Internet to gather population and economic data, students and teachers could graph these data both numerically and visually using a spreadsheet application and analyse the relationship between the two.

- **Supplementary Materials:** Use ICT to supplement, enhance, or provide access to content—particularly when textbooks and supplementary materials are scarce. CD-ROM-based content (internationally or nationally produced) and Web-based activities provide students with access to digital resources and on-line collections that might otherwise be unavailable. Further, ICT can present content in a manner that is interactive as well as multimodal. Radio/ audio and TV/ video programmes also offer a similar multichannel approach through dramas, game shows, and interactive lectures.
- **Alternative Assessment:** Find ways to use ICT to adopt more authentic ways to evaluate student work. ICT tools can help move assessment away from paper/pencil tests to more sophisticated, richer modes of assessing learning. They can assess *higher order thinking skills* not easily captured in traditional forms of testing. They can focus assessment on particular topics, or they can assess students' comprehension of multiple topics (e.g., through a project that covers numerous subjects). Because ICT opens up opportunities for self-expression, students can demonstrate depth of understanding through research projects. Depending upon learner style, ICT can allow for graphic presentations, report writing, or analytical charts. Performance-based assessment on such projects can measure students' ability to carry out a real-world task as opposed to grading memorised facts. ICT can also provide for more frequent assessment.
- **Instructional Methods:** Use ICT to show teachers ways to move away from the whole-class lecture mode towards more active, student-centred methods of learning. Teachers can utilise ICT tools in making learning an engaging, motivating experience for students. An ICT-rich environment can provide more independent and collaborative, team-based learning in which students assume greater initiative and responsibility. To take advantage of the rich opportunities presented by ICT, pedagogical methods must change, giving students freedom to interact with ICT in ways that promote creativity and problem-solving.

## ICT IN ACTION

### iEARN: Using ICT to Promote Student Awareness and Social Responsibility

iEARN (<http://www.iearn.org>) is a non-profit global network in which teachers and students work together on global issues, using ICT in a project-based approach that enhances learning, increases communication among students across the globe, and benefits society as a whole.

iEARN CIVICS Community Voices Collaborative Solutions has operated in selected schools in Pakistan through the Aga Khan Educational Program. The project, centred on issues such as the environment and war, involves students in project-based activities, encourages peer-to-peer learning among students through collaborative projects, and provides students with the opportunity to publish their projects on the World Wide Web.

### 3.3. Action Recommendations for Stakeholders

- 1) **Reform curriculum guidelines:** Set standards for ICT skills that are based on guidelines from established international bodies, such as ISTE. Review student career tracks in regular and vocational programmes to develop specific ICT career pathways, and to create appropriate curricula and media-rich resources. Invest in a broad range of technology options from computers and Internet to radio programmes and audio-tapes to still cameras for use by teachers and students in different categories of schools. Ensure that curriculum has scope for integration of all levels of technology into student projects.
- 2) **Seek and develop content resources:** Research learning resources in multi-media formats (Internet sites, CD-ROMS, audio material, broadcast shows) as well as locally created materials based on MoE requirements and curriculum guidelines. Ministries, education departments, and district education offices can establish Limited Area Search Engines—on-line database collections of appropriate content for use by students.
- 3) **Improve national examination systems:** Reform the current system of examinations. The exam system is one of the greatest impediments to full realization of the kinds of learning that ICT promote. Instead, align examinations with the outcomes of an ICT-based education. Outcomes-focused examinations will centre on communication, problem-solving, creating, and presenting information in multiple formats, to multiple audiences, and in real-world situations. Some components of testing can be automated for easy data entry and scoring.
- 4) **Make learner-centred instruction the focus:** Place powerful ICT into the hands of students and teachers to avail them of greater opportunities for creativity and self-expression. The computer will not replace the teacher, but computers—particularly when linked to the Internet—can vastly expand access to resources, thereby allowing students to interact with content in less traditional ways. Only pedagogies that are learner-centred can create the kind of environments in which students can use ICT as a powerful learning tool. Teachers must reflect on ways in which ICT can change activities in classrooms. They must be provided with concrete examples to inspire them, so that they, in turn, can provide opportunities for students to explore, problem-solve, and think critically. ICT, if used effectively, can move students from lower order cognitive skills (identification, recall, and recitation of information) to higher order ones (application, analysis, synthesis, and evaluation of information).

## ICT IN ACTION:

### USING RADIO DRAMA TO ADDRESS CONTEMPORARY ISSUES: THE SILK-ROAD RADIO PROJECT

The Silk-Road Radio Soap program uses a modern medium—radio—to build on and preserve a centuries' old medium—story-telling—to address contemporary national issues in Tajikistan and Uzbekistan.

Funded by, among others, the Swiss Agency for Development and Co-Operation (SDC) and UNESCO, the Silk-Road Radio Soap uses drama and storytelling to address such issues as family and reproductive health, agricultural themes, and contemporary national issues (e.g., human rights).

Though formal evaluation data are not yet available, by most accounts, the program is successful. By the end of 2002, 200 episodes in Tajik and Uzbek had been completed. And, a Silk-Road Radio Soap website is currently under development. Radio broadcasters in Tajikistan and Uzbekistan have provided free studio and air-time to the programs. Most critically, in an area that has seen animosities between the two groups—and in testimony to the potential reach and scope of ICT—dual language broadcasting of the radio dramas has occurred so that minority Tajik-speakers in Uzbekistan and minority Uzbek-speakers in Tajikistan can listen to the radio dramas in their own mother tongues.

## 3.4. Resources

- **The Development Gateway Foundation's Open Educational Resources**

This portal features free course materials and other educational content offered by respected international educational institutions such as the Massachusetts Institute of Technology, the Johns Hopkins School of Public Health, Chinese Open Resources for Education, and other institutions around the world. While content on the Open Educational Resources portal is particularly geared to educators, students, and self-learners in developing countries it is available for everyone. The portal will also facilitate communication among the growing on-line community of providers and users of free, on-line educational resources.

➤ <http://topics.developmentgateway.org/openeducation>

- **South African Curriculum (Wiki Book)**

This is an example of a **Wiki**—a website that allows users to update and edit content collaboratively—that contains South Africa's national curriculum. All information may be accessed for free, commented upon, and modified as necessary. Urdu, English, and local language versions could be developed for Pakistan, and by keeping all information on a publicly accessible Wiki, content could be updated and upgraded constantly.

➤ [http://en.wikibooks.org/wiki/South\\_African\\_Curriculum](http://en.wikibooks.org/wiki/South_African_Curriculum)

## ICT IN ACTION: MALAYSIAN SMART SCHOOL INITIATIVE

The Malaysian Smart School Initiative is a learning institution that has been systematically reinvented to prepare teachers to teach and students to learn to assume their role in the Information Age. The project aims to establish ICT-enabled schools and to introduce technologies into the education system, which will be eventually used for the transfer of knowledge in an effective manner.

“Smart schools” are designed to introduce technology and deliver quality education, enhancing learning institutions through enriched curriculum, pedagogy, assessment, and teaching/learning materials. Pilot applications of the Smart Schools program developed teaching and learning materials, a more accurate assessment system, and an integrated management system. The government envisions that all schools will be converted into “Smart Schools” by the year 2010.

## ELEMENT 4: Develop Complementary Approaches to Using ICT in Education

### 4.1. Description

Developing complementary approaches to ICT in education implies a two-pronged strategy. Given the strategic goal of mainstreaming ICT into the education system, ICT must be introduced and used in service of educational goals. However, ICT must also be treated as a school subject; skills to use ICT tools effectively are a prerequisite for their meaningful use in education.

### 4.2. Focus Areas

- **Learning About Technology (*Information Literacy*):** Support students in becoming technically literate. They must know how to use available ICT to find, create, present, and communicate information. Technology literacy should enable the use of technology to develop higher order thinking skills in which students are not just users of technology but creators and informed consumers of information.
- **Learning Through Technology:** Integrate ICT tools into classrooms so that their use becomes part of the learning process in all subject areas. ICT can become a lever to reform and transform education. However, for this to happen, teachers and administrators must understand how it can help extend and deepen content learning, curriculum, instruction, and assessment in ways that would otherwise be impossible.

### 4.3. Action Recommendation for Stakeholders

- 1) **Establish competency-based curricula and certification:** Innovate the curricula to allow students and teachers to learn about technology and learn with technology. Such innovation can only be achieved through the MoE’s support of new curriculum guidelines for ICT competencies and for curricular competencies that are on a par with international standards. With the MoE’s leadership, teachers and learners at the primary, higher secondary, and vocational education levels will benefit from these new guidelines. The MoE can support the adoption of these guidelines by establishing mechanisms to monitor the development of competencies required by the guidelines. The MoE and DoEs should provide necessary time, resources, and support to school

administrators, teachers, and students to ensure their adoption. Given that schools will have varying levels of infrastructure to support ICT, integration plans should call for both sophisticated and basic ICT tools.

#### 4.4. Resources

- **The European Computer Driving Licence® (ECDL):** The internationally recognised qualification enables people to demonstrate their competence in computer skills. ECDL is designed specifically for those who wish to gain a benchmark qualification in computing to enable them to develop their IT skills and enhance their career prospects.
  - <http://www.ecdl.com/publisher/index.jsp>
- **The International Computer Driving Licence® (ICDL):** ICDL is the world's leading programme providing individuals with basic computer skills training and validation/certification testing.
  - <http://www2.icdlus.com/icdlus-lms-webclient/homepage/about/program.html>
- **International Society for Technology in Education (ISTE) Educational Technology Standards:** The International Society for Technology in Education (ISTE) has created the most comprehensive set of ICT standards for teachers, students, and administrators. The standards are the product of a collaboration of more than 2,000 educators who wrote, tested, and revised learning activities and multidisciplinary units to support classroom teachers preparing students to become technology-capable learners. The hands-on activities focus on subject matter and show how appropriate technology can be employed as part of the learning experience.
  - <http://www.iste.org> (select "NETS" to go to the standards section)

#### ICT IN ACTION: USE OF ICT BY AGA KHAN EDUCATION SERVICE SCHOOLS

The Aga Khan Education Service (AKES) is one of the major driving forces for ICT dissemination in schools. AKES operates 187 schools and 5 hostels throughout Pakistan and serves 37,000 students, mainly in rural parts of the country.

On average, Aga Khan Schools possess 20 computers per school. Most are used for computer studies, but they are also used for data collection and management and language studies. Approximately half of AKES teachers report that they use ICT as part of their teaching, and the AKES is attempting to help teachers use ICT for more learner-centred approaches. These schools could serve potentially as "professional development schools" for their lower resource neighbouring schools.

## ELEMENT 5: Build on the Current Experiences of Existing and Successful ICT Programmes

### 5.1. Description

Planners will need to keep abreast of current developments in ICT for education on an ongoing basis. Pakistan's ICT efforts can benefit from and build on the experiences of other programmes. Leaders will want to keep an eye on local initiatives, as well as monitoring current news from thriving economies with leading-edge technology and research. It will be especially worthwhile to track successful models of success in developing countries with an infrastructure comparable to that of Pakistan.

### 5.2. Focus Areas

**International and National ICT and Education Best Practices:** Take a systematic approach to researching models of ICT use in education, both in terms of success stories and problems encountered. Numerous on-line resources are available to provide current information about examples of ICT in school education around the globe. Some will routinely provide the latest updates on a periodic (monthly or weekly) basis. In terms of local research, Pakistan has the following ongoing ICT efforts that planners should study, expand upon, or partner with:

- **Ministry of Information Technology:** Installation of over 1,400 computer laboratories in secondary schools.
- **Pakistan Education and Research Network (PERN):** A university-level research-based network with a digital library of on-line resources to serve as a model for collecting and distributing educational resources (established at the university level).
- **Allama Iqbal Open University (AIOU):** College coursework through television and radio broadcasts and multimedia CD-ROMs.
- **Virtual University:** Distance education coursework. The AIOU is expanding to include Internet-based instruction to supplement video and audio offerings, whereas the Virtual University has been based from its very inception on broadcast television coupled with comprehensive interaction over the Internet.
- **Intel/Ministry of Education Teacher Training Programme:** Training over 80,000 teachers to use technology with their students and an additional programme for professional development of education college faculty teachers.
- **Adult Basic Education Society (ABES)** and PTV telecast tele-lessons for the adult illiterate and neo-literates since 1980s. For several decades, ABES has provided programming for homes and also for a set of two hundred viewing centres established in rural areas.
- **Sesame Street in Urdu:** Educational television broadcast that reaches children and their parents in homes and child care facilities.
- **Innovative computer projects** by NGOs, such as iEARN—which seeks to network teachers and young people globally using the Internet—and new technologies to collaborate on projects that enhance learning and have a social impact. Examples include a global Web school for environmental awareness (ENO Project), a videoconferencing project for teachers (Global Leap), and an interactive, educational on-line site that helps students and teachers improve their mathematics skills (Mathematics Virtual Learning Circle), amongst others.

- **Scale-Up and Replication of Local Models:** Foster a progressive attitude towards pilot-testing new ideas. Support innovation, seek opportunities to expand and replicate existing projects, and set standards for evaluating ICT projects. Experts should evaluate local ICT projects, based on established criteria. Schools (public and private) and community centres should be able to apply for grants for upscaling projects. Leaders should consider replicating successful projects on a large scale.



### 5.3. Action Recommendations for Stakeholders

- 1) **Establish an official clearinghouse system to gather and distribute information on effective ICT programmes:** Document, monitor, evaluate, and capture “lessons learned” from ICT initiatives in an MoE-supported clearinghouse. The findings of this clearinghouse will serve as the basis for stakeholders to build on current ICT efforts in education. The white paper An Environmental Scan of Past and Present “ICT for Education” Activities in Pakistan may be used as the starting point. The system should identify successful projects or elements in projects that are promising and worth replicating, while noting activities that are proving difficult to implement successfully or that ultimately fail to have educational impact.
- 2) **Ensure that information from the clearinghouse system reaches stakeholders:** Disseminate information through this clearinghouse to policy-makers, teachers, and all members of the education community via on-line Web portals, periodic newsletters, and journals that cater to both English- and Urdu-speaking readers.
- 3) **Encourage an international exchange of information about effective ICT programmes and best practices:** Establish mechanisms to encourage participation in International ICT conferences and exhibitions. Also, hold national conferences to facilitate learning from each others’ experiences. Identify model initiatives at the school level, and arrange study tours for teachers and administrators from other sites to observe activities firsthand.
- 4) **Monitor and evaluate Pakistan’s ICT projects in order to identify and replicate effective models:** Monitor projects based on clearly established standards. Require projects to produce data about their progress. Review their status, and make recommendations regarding their future implementation. Examine the technology products of initiatives using appropriate criteria. Evaluators can collect descriptive data (classroom observations, participant

surveys, or interviews of key players) about the impact of implementation. Evaluators can also monitor certain selected ICT programmes on a long-term basis, gathering *longitudinal data* over a period of several years to capture the systemic impact of an ICT innovation. Long-term studies typically have higher validity as they allow for more extensive data collection and analysis.

- 5) **Facilitate the initiation and growth of ICT projects/approaches that evaluation results prove to be effective:** Establish systems for public and private sector projects to be considered for eligibility to receive local or foreign grants that will enable the projects to be up-scaled or to support large-scale roll-outs.

### EXPLORING ICT: How Can a Central Clearinghouse of Information Help Pakistan's ICT in Education Efforts?

IA clearinghouse could provide stakeholders with easy access to a wealth of vital, ICT-related data:

- 1) Present and past ICT in education projects—where they are active geographically and program details such as evaluation information. Not having an easy way to find out what has been done already and where, leads to redundant, overlapping efforts or demonstration projects that do not extend knowledge of what works and why.
- 2) Infrastructure information from a variety of existing sources—which would be kept current in order to understand which ICT might be most effective in specific geographic areas. This could include the following data:
  - Schools with labs, one or more computers, Internet access, and electricity
  - Cities, towns, and villages with Internet access
  - Areas with land-line, mobile telephone, and distance learning viewing/resource centre access

Providing this information helps ensure better use of limited funds and identifies areas that can utilise specific technologies and areas that are underserved.

- 3) Institutions and businesses that have ICT capacities and interests that might be utilised.
- 4) A “best and promising practices in ICT and Education” website and CD series for use in teacher development at the pre-service and in-service levels, available in Urdu and major regional languages.

## 5.4. Resources

- **eSchool News On-line**  
eSchool News is a monthly print/electronic newspaper providing the news and information necessary to help K–20 decision-makers successfully use technology and the Internet to transform North America's schools and colleges and to achieve educational goals.  
➤ <http://www.eschoolnews.com/>
- **ICT Indicators for Education**  
A set of indicators developed by UNESCO Bangkok that assesses ICT in terms of policy, infrastructure and access, budget, ICT use in the curriculum, professional development, and student outcomes.  
➤ <http://www.unescobkk.org/index.php?id=662>



- **INSIGHT Instrument Library**

The INSIGHT Instrument Library provides a centralised collection of Webenabled educational evaluation surveys and instruments, many focussing on ICT in education, available for programme/project evaluators in K–16 education. All evaluation instruments are available for free download and use and can be tailored for local needs.

➤ <http://insight.southcentralrtec.org/index.php>



## ELEMENT 6: Develop Capacity at the Federal and Provincial Department of Education Levels

### 6.1. Description

There will be organised, ongoing efforts to ensure capacity building at the Federal and Provincial Levels to help ensure proper planning, management, support, and monitoring and evaluation of ICT initiatives. It is essential for ICT in education to be organised at the Federal and also the Provincial levels. In addition to expertise and resources within the MoE, it is vital to have an external body that can represent the cause of ICT in education and advise the MoE.

### 6.2. Focus Areas

- **Establish a Technical Implementation Unit (TIU) for ICT in Education:** Set up a specialised unit with resources, experts, and a clear sense of direction to work at the Federal Level and support the Provincial Departments. The purpose of the TIU will be to spearhead the integration of ICT in education, communicating a clear vision and goals and building infrastructure. The TIU will develop the technical, planning, monitoring, and evaluation capacity of policy-makers, planners, and administrators at national, provincial, district, and school levels. The TIU will also liaise with teacher training institutes, oversee the implementation of the NICT Strategy, and support the overall monitoring of education through the national *Education Management Information System (EMIS)*.
- **Establish a National ICT in Education Council:** Form a council to assist the nation's efforts to leverage technology for improving education. This group of interested stakeholders would come from educational institutions, private sector corporations, other government agencies, and NGOs.



### 6.3. Action Recommendations for Stakeholders

- 1) **Set up an office of ICT integration—a Technical Implementation Unit (TIU)—within the Ministry of Education:** Such an office should oversee the integration of ICT into Pakistan’s schools and work with existing units within the Ministry to develop specific ICT implementation plans based on need. This unit would: be empowered to work with existing offices/wings and institutions of the MoE and the Ministry of Information Technology and Telecommunication (MoIT) to develop specific ICT implementation plans based on need; coordinate across the various units to ensure coherence and avoid duplication of existing functions; and work with the MoE and the MoIT to develop private and public sector partnerships around ICT in education initiatives. To establish the TIU, it will be necessary to respond to the following set of sub-recommendations.
  - 1A. **Create a position for the Head of the TIU:** The TIU should have as its head an educational leader who is: knowledgeable and passionate about the role of ICT in reforming education; authorised to work with other units in creating programme plans; responsible for holding those units accountable for implementing those plans; able to guide other ministries such as MoIT, Pakistan Telecommunications Authority (PTA), and Pakistan Electronic Media Regulatory Authority (PEMRA) in implementing specific policies; prepared to make sure the other ministries consider the MoE’s requirements in their policies and planning; and equipped to prepare funding proposals for future budgets.
  - 1B. **Make vision building/goal setting the first priority of the TIU:** Articulate a vision and set goals with the support of all stakeholders. Encourage participation and collaboration of government offices and other partners to help all stakeholders understand the vision and goals, why they are using ICT, the needs it will address, and the circumstances under which it can operate most successfully.
  - 1C. **Plan budgets for annual funding for the TIU:** Allocate funds to cover staff, operations, and liaison work with the various wings in the Federal MoE. Funding should also cover work with, and support for, the ICT

planning efforts at the Provincial DoE level. Additionally, there needs to be a fund for specific pilot projects that will demonstrate model programmes in rural as well as isolated urban communities. Financing sources can be ministry allocations, telecommunications licencing fees, donations from companies, or international assistance.

**1D. Form a TIU Advisory Board composed of educators with expertise in**

**ICT:** The Advisory Board will help the MoE and Provincial Departments plan and administer ICT-based activities in schools. Such advisors would be national experts in both the public and private sector on whom the MoE and Provincial Departments could call upon as needed. While the role of the Education Council will be to provide support and assistance culled from outside the government, the cadre of advisors will be drawn from within different levels of the public sector and from across different ministries to increase information exchange and streamline planning.

2) Authorise the TIU to carry out key functions to advance the mission of the MoE. These key functions will include the following:

**2A. Categorise schools in terms of e-readiness for technology:** The TIU will establish categories ranging from “no infrastructure” for technology in some rural areas, to “high-level” infrastructure in many urban schools. Thousands of non-electrified, rural primary schools might only be able to use battery-powered devices and fall into a low-technology category. Urban schools might be able to support a laboratory of new computers with high bandwidth Internet connections through a local area network, and thus fall into a high-technology category. Schools will receive ICT “packages” in accordance with the “readiness” category. Ultimately, the goal must be for low-technology schools to move upwards to higher technology categories.

**2B. Research and adopt innovative ICT:** The TIU will encourage “thinking outside” the traditional purchasing box. Handheld digital devices, *open source software*, and *wireless* networks might be cost-effective, alternatives to computers, proprietary software, and fixed landlines. Public/private partnerships can help in this arena by providing access to innovative, cost-effective, and context relevant hardware and software solutions or by creating for-profit solutions that also remove barriers to access such as the Macedonia Connects program.

**2C. Build technical support capacity:** The TIU will help the MoE, Provincial Departments, and schools to develop sufficient expertise to keep technology viable. This means going beyond hiring technology experts to providing support to the schools and training teachers and students (so called “tech squads”) to develop the skills and confidence to troubleshoot and fix basic ICT problems. One option might be the creation of a national training centre for this purpose.

**2D. Liaise with teacher training institutes to integrate ICT into their coursework:** Partnerships with these teacher training institutes should be formalized to prepare pre-service teachers to use ICT and to integrate ICT into subject areas in ways that improve curriculum, instruction, and assessment. Specific strategies might include strengthening the

qualifications for teacher certification to include proficiency in ICT use and demonstrated ability to teach with ICT and developing mentoring programmes to provide novice teacher graduates with ongoing support during their first year of teaching.

**2E. Assist Ministries and schools to use Educational Management**

**Information Systems (EMIS):** EMIS can effectively and easily collect, manipulate, aggregate, analyse, and synthesise data to drive school improvement efforts. Examples of such data might include test scores, attendance and attrition rates, attitude surveys, and classroom observations. Data collection helps educational entities accumulate evidence, reflect on this evidence, make assessments, and begin to make informed decisions about school improvement.

**2F. Support administrators to use ICT for supervision and reporting:**

Train administrators to effectively use digital data sources. If they have supervisory responsibilities that require them to travel to schools, providing them with handheld digital devices can help their job performance. Supervision and evaluation of staff can be digitally documented for future reference and assist in addressing difficulties with teachers who are chronically absent, generally incompetent, or whose conduct might be inappropriate.

## 6.4. Resources

- **BECTA Schools Sector Toolkit**

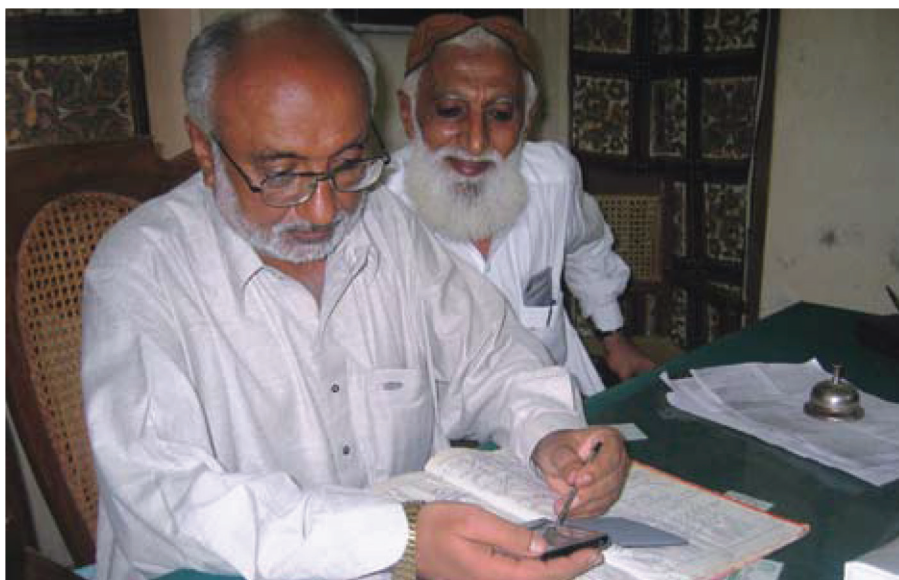
The British Educational Communications and Technology Agency (BECTA) provides practical policy, planning, and organisational assistance for using ICT in schools. This on-line site helps to support the recruitment, training, and retention of ICT technicians for schools and features ICT skills for teachers, “ask an expert” articles and best practices on integrating ICT into the classroom, and a series of self-evaluation and planning tools for ICT. Though the site is directed at UK schools, most of the content is valuable from an informational perspective and much of it can be adapted to non-UK settings.

➤ <http://schools.becta.org.uk/>

- **Collective Case Study of Six Asian Countries: Indonesia, Malaysia, Philippines, Singapore, South Korea, Thailand**

From the UNESCO Asia and Pacific Regional Bureau for Education, this package of “Lessons Learned” consists of eight components of ICT integration in education, providing the key foundation and framework in setting up ICT for education programmes. A synthesis of lessons learned from selected countries in the region provides the basis for the development of tools and blueprints to guide policy for emulation and programme improvements.

➤ <http://www.unescobkk.org/index.php?id=1793>



## Unit 4

# Evaluating Educational Content on the World Wide Web: Evaluation Criteria



The important thing to remember is that anyone with an Internet connection can put content on the Internet—and that content doesn't need to be fair, accurate, or of any degree of quality. The Internet is by and large unregulated and unmonitored and for every great website there are many more that are of abysmal quality.

### A. Credibility and objectivity of the author or source

*The site should:*

- 1) Clearly list the individual(s) or organization(s) that created or contributed to the site and provide information about them and the purpose of the site (such as on an "About" page)
- 2) Provide information regarding the qualifications or expertise of the individual(s) or group(s) that created the site
- 3) Provide a means of making comments, asking questions, or communicating with the author(s)? Does the site give or cite sources for information where appropriate?
- 4) Does the content reflect an explicit or hidden bias?
- 5) Limit or eliminate advertising (if there is advertising, it should be minimal, non-invasive, and appropriate to the audience)

NOTE: Anyone can produce a website, but the address can help indicate the nature of the source. A site with a tilde (~) in the address usually indicates that it was created by an individual, and ".com" usually indicates a commercial business. Federal government sites often end in ".gov" and educational sites often include "k12" or ".edu" in the address. Country-specific sites, other than the US, have their initials in the URL (.pk-Pakistan; .uk\_United Kingdom; .za-South Africa, etc.)

### B. Accuracy of the content

*The content on this site should:*

- 1) Be consistent with other resources (other websites, print documents, news reports, etc.)
- 2) Be based on the input of several sources and experts, not just one
- 3) Contain the qualifications of the source noted
- 4) Not contain inconsistencies and mistakes in the content (Sometimes spelling and grammar may be an indicator of quality and accuracy.)
- 5) Avoid inflammatory language, accusations, drawing inferences without documenting supporting evidence, or being overly emotional (versus rational)

### **C. Currency of the information**

*Content should:*

- 1) Be developed within the last 4-5 years (maximum). (For some subjects, like science or technology, the content should be produced in the last year)
- 2) Be updated regularly
- 3) Contain dates that show when content was added and updated
- 4) Contain fully functional links that work and that connect to relevant, updated content

### **D. Appropriateness and relevance of the content**

*Content should:*

- 1) Clearly express and reflect the purpose of the site
- 2) Be easily read and easily understood by the intended audience
- 3) Be age appropriate (if it is for primary age children, it should use appropriate language, tone, etc.)
- 4) Be relevant enough to make visiting the site worth the effort
- 5) Contain interactive elements, such as animations, videos, and activities that go beyond text and images to engage and enhance learning

### **E. Access, format, and ease of use**

- 1) If the site contains large amounts of content, is there an index of topics or a search function to help users find topics and information easily?
- 2) Is the site text only or a balance of text and images?
- 3) Can users navigate the site easily?
- 4) Is the site cluttered with graphics, fonts, and backgrounds that may distract from reading and understanding?
- 5) Does the site present content in any way that may limit access to viewing it?
- 6) Are there clear instructions for any interactive features, such as games, animations, and assessments?
- 7) Is the site consistently available, and does it load without problems?
- 8) Does the site require users to provide personal information or pay for use?
- 9) Are accessibility and ease of use helped by features on the site, such as transitional pages, searchable databases, and animations?
- 10) Does the site contain a “Help” section or link where users can ask questions regarding use, navigation, contents, and so on?

Note that a website does not have to meet every one of these criteria to be a good resource. Of course, the more criteria a site meets, the better and the more reliable it will be as a teacher or student resource.

Note too that a website can meet ALL of the above criteria and NOT be appropriate for your particular lesson. In choosing web content, think through the educational criteria for use:

- **Learning outcomes:** Is this site and the content here aligned with the learning objectives/outcomes of your lesson?
- **Added value:** Does this web site/content help students learn a particular topic better or in more multimodal ways (visually, orally, interactively, audio-visually) than another type of content? Does it present information in a way that would otherwise be impossible?
- **Engagement:** Does the web content engage and motivate students?
- **Appropriateness:** Is the web content appropriate in language, tone, style and the development of the learner?
- **Deeply embedded:** Is this web content deeply embedded in your content topic? Is it really relevant and germane to the topic or do you want to use the content/site because it's "cool" or different or because it's on the web?
- **Educational value:** Does the web site appear to have a high degree of educational—versus entertainment—value?



## Managing the Limited Computer Classroom: Strategies and Models for Integrating ICTs into the Classroom



### Overview

How can teachers use one or two computers with 40 students? How can teachers help their students learn how to use ICTs without devoting precious classroom time to technology training? These management issues are often the biggest concerns teachers face when attempting to get started with ICTs. Yet all over the world, teachers can and do use one or two computers with large groups of students--and do it well.

This guide provides some answers to these commonly asked teacher questions. The guide introduces four classroom management models for the limited computer classroom (a classroom with one computer or four computers and 40 students). These models are:

- The Learning Centers Model
- The Navigator Model
- The Collaborative Groups Model
- The Expert Model

Additionally, we offer suggestions for other classroom activities that be developed and conducted using only one computer.

The management models listed above also describe ways that students can teach each other how to use ICTs. In the *Learning Stations* model, students work together to learn how to use a piece of software. In the *Navigator* model, the teacher may show one student from each team no more than 5 commands for a particular piece of software. These students return to their teams and teach their fellow students. In the *Expert* model, a teacher-designated “expert” teach his/her classmates how to use the computer as they need to use it. Finally, the *Collaborative Groups* model shows that not every activity involves students using computers all the time---and that computer use among students can vary according to tasks.

## Multiple Learning Centers

**Model type:** one computer classroom

**Objective:** team work

**Time:** 1 class period or less

**Work mode:** groups of 4-6 students

### Description:

The multiple learning centers model demonstrates one more way to use one computer to support the curriculum. Students, working in teams, rotate through different learning centers (or stations) one of which is a computer station. During their time at the learning station or center, students gather what they can from its particular set of resources. Each center focuses on a different technology, skill, or type of resource.

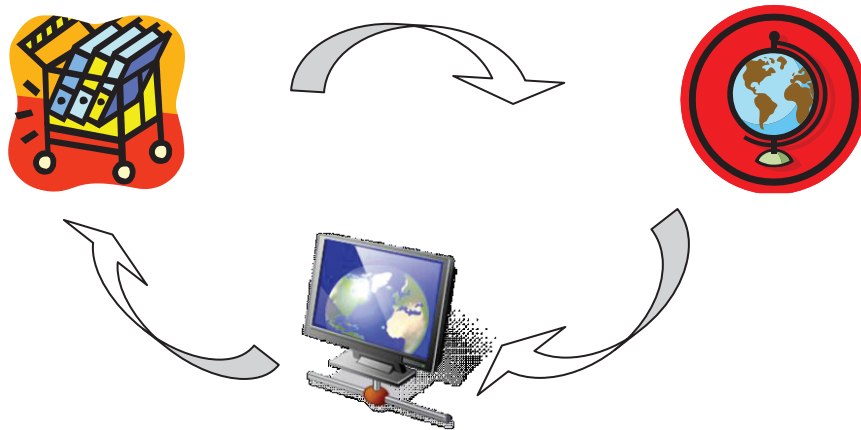
For example, if researching the origins of a local historical building, one station could print resources that students read (newspaper articles); another station might involve students taking photos of the local materials in which the building was constructed (granite, concrete) at the third station—perhaps the only computer station—students could transfer their photos from a cell phone camera or digital camera to the computer. Each team of students rotates through all 3 stations at different times so by the end of the class period, or activity, everyone has completed the same activities—though not at the same time.

In addition, students assume various roles and responsibilities in their team and carry out these roles while they are at the different learning centers or stations so that every person has a specific task to complete.

**Here are some commonly assigned group roles:** All group members rotate the use of the computer.

- **Computer Manager** - Ensures that each group member has equal time on the computer. Reminds the group to save information.
- **Materials Manager** - Informs the group of available materials, gathers materials as needed, returns materials, and organizes the learning station neatly in preparation for the next group.
- **Facilitator** - Encourages all group members to participate and to remain on topic.
- **Time Keeper** - Notes the starting and ending times of the activity, checks the time periodically, gives a time warning 5 minutes before the end of the activity, and ensures that group is back at the learning station on time.
- **Technology “expert”** – May have knowledge of the particular technology being used. Guides others in the use of the technology without doing it for them.
- **Recorder** - Records all information and ideas.
- **Other Roles** - As suggested by the students or a teacher

**Diagram for a setting up learning stations with one (or two) computers:** Each station or center is comprised of 5 students and contains written directions about an activity or task students must complete. Only one station is the computer station. After a set period of time, students rotate to the next station and then the next. By the end of the activity (week, a class period, etc.) all students will have gone through all 3 stations.



## The Navigator Model

**Model type:** one computer classroom

**Objective:** student centered multilevel team work

**Time:** 1 class period or less

**Work mode:** groups of 4

### Description:

The Navigator Model works well when it is necessary to mix people with different levels of technology skills using one computer.

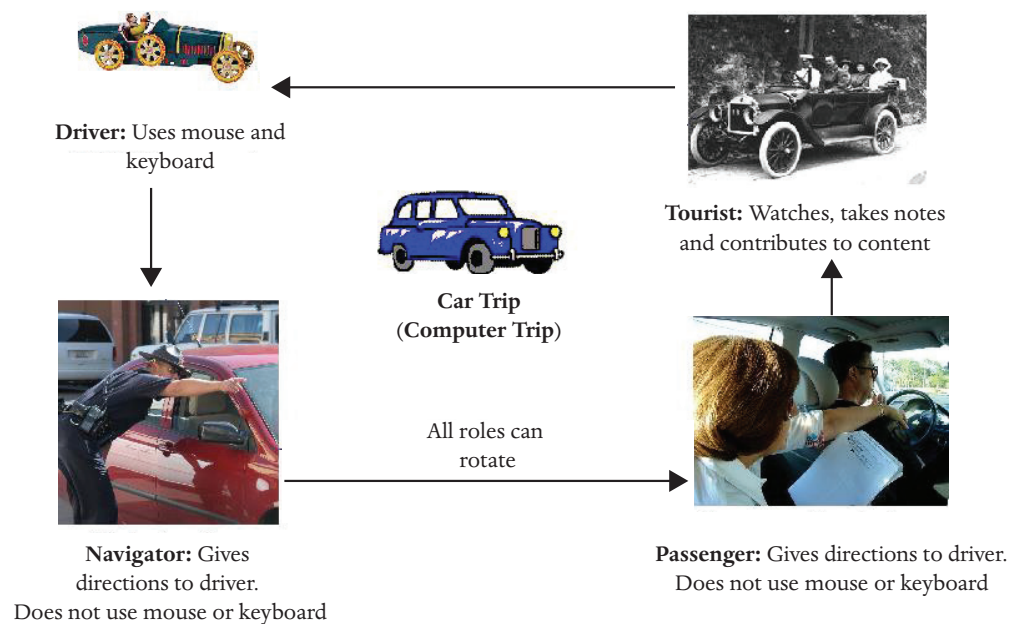
One way to think of this activity is to imagine a car trip. Imagine you are taking a trip by car. You know your destination and various people in the car help you reach the destination. For example, there is one driver (the person who operates the car), though there may be a navigator (the person giving directions) or a passenger (who provides other information).

In the Navigator model, the computer works the same way as the car. Imagine a team of 4 students must create a PowerPoint presentation about the major islands of Indonesia: (The team has already brainstormed and written out on paper its main ideas for the presentation.)

- **The Navigator** is the person who knows the most about the computer. He or she will train the driver to use the computer but must do so without touching the mouse or keyboard. He/she can only talk and point.
- **The Driver** is the only person who “drives” the computer. He/she is in charge of using the mouse and keyboard to input this geography information.
- **The Passenger** may have very little technology experience. He/she watches and learns from the navigator and driver until it is his/her turn to use the computer. He/she directs the content—reading the team’s notes and main points—which will be included in the *PowerPoint* presentation.

- **The Tourist** also watches and learns how to use the computer. He/she has a notebook and pencil and writes down all directions and steps for future use of the computer. He/she also makes suggestions about the content.

Just like on a long trip, the driver needs to take a break and others need to drive. After 15 minutes or so, roles should rotate. For example, the passenger may become the new driver, while the driver becomes the tourist. Depending on the level of ICT expertise, the Navigator may continue to be the same person or also rotate. This system of rotations allows everyone the opportunity to use the mouse and keyboard.



## Collaborative Teams Model

**Model type:** one computer classroom

**Objective:** team work, each student tries out different tasks

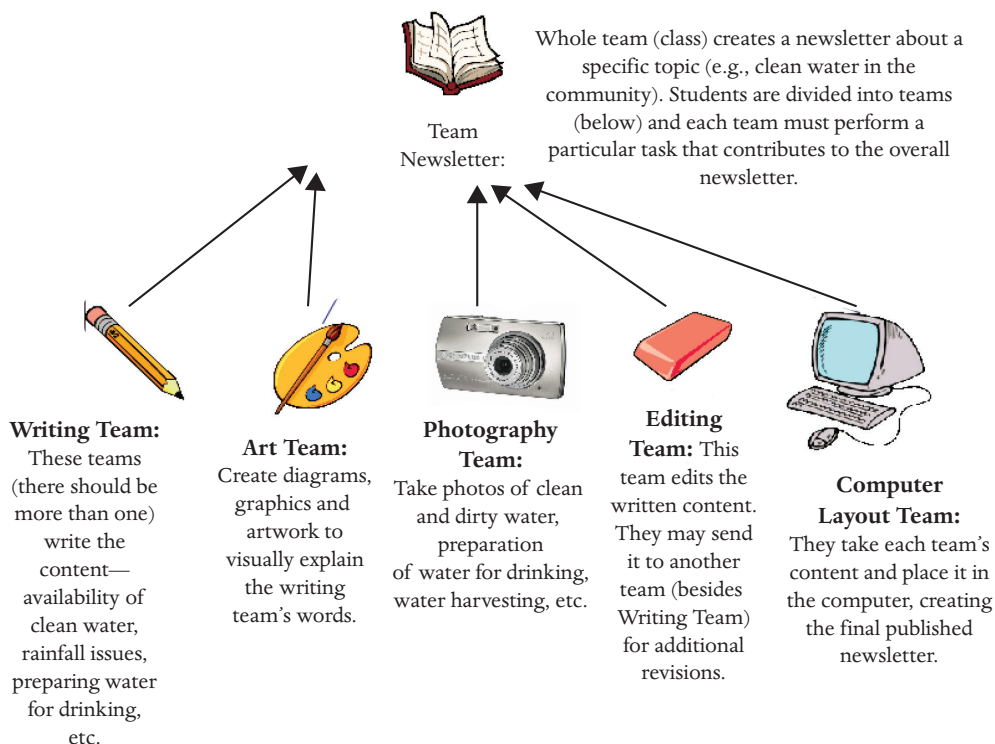
**Time:** each task – 30 minutes per group

**Work mode:** groups of 4-6 students

### Description:

Each small team is responsible for contributing their work to create a single product for the whole class. Instead of each small team doing the same thing, at the same time, each small team is doing something different, to contribute to one whole team product—essentially a division of labor.

The example below demonstrates creating a newsletter. Each oval in the web is the topic for a small team. Students' roles can rotate across teams too (so that each student gets the opportunity to write, take photos, edit, use the computer, etc.)



### Example: Classroom Newsletter:

The whole class creates a newsletter about a specific topic (e.g., clean water in the community). Students are divided into teams (below) and each team must perform a particular task that contributes to the overall newsletter.

- **Photography Team:** Take photos of clean and dirty water, preparation of water for drinking, water harvesting, etc.
- **Writing Teams:** These teams (there should be more than one) write the content—availability of clean water, rainfall issues, preparing water for drinking, etc.
- **Editing Team:** This team edits the written content. They may send it to another team (besides Writing Team) for additional revisions.
- **Art Team:** Create diagrams, graphics and artwork to visually explain the writing team's words.
- **Computer Layout Team:** They take each team's content and place it in the computer, creating the final published newsletter.

## The Expert Model

**Model type:** one computer classroom

**Objective:** student centered group work, peer learning

**Time:** each task – 30 minutes per group

**Work mode:** groups of 4-6 students

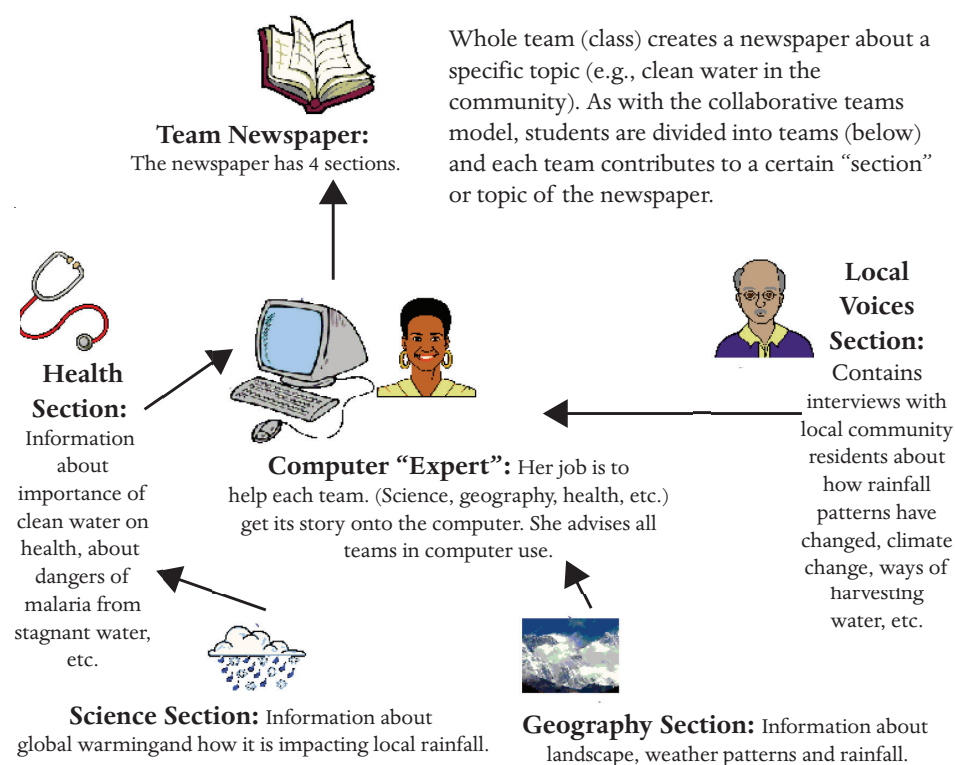
### Description:

In the Expert Model, participants are divided into teams of 3-6 students. The teacher designates one “expert” (the person in class who knows the most about the particular software) who will work with all teams helping them use the computer.

Each team is responsible for researching and gathering materials for a particular topic related to the overall issue that the class is discussing. For example, the teacher decides students will create a newspaper in MS *Publisher* that focuses on the issue of clean water in the community. She divides students into teams of 6 with each team focusing on a particular topic related to water—science of water, geography (where bodies of water are found), Bahasa (interviewing elderly community members about climate change), etc. Within each team, students share roles—gathering data, interviewing their neighbors, taking photos or finding photos of bodies of water, etc.

As teams finish different sections of their story, they go to the computer station (the teacher may have to create a schedule for computer use) where an “expert”—a student designated by the teacher—will help students get their written words on paper into *Publisher*. The Expert familiarizes the rest of the group with the software so that they understand its capabilities, and helps students do this without doing it for them—without touching the mouse/keyboard. The Expert works with each team and may do the final editing and layout of the newspaper.

The Expert can be one student for the whole class. Likewise, each team may have its own Expert.



## Strategies for the One-Computer Classroom: Integrating ICT in Classroom

### Strategy One

**Demonstration/Teacher-Lead Whole Class Activities:** *Use computer as multi-media chalk board.* In this scenario—the most familiar to teachers—the teacher stands as the computer and projection device and “leads” whole class through steps, procedures, demonstrations, essentially using the computer as a high end chalkboard. Gradually, encourage teachers to appoint students to operate the computer so that teacher may circulate among the students. Help teachers move away from this strategy as quickly as possible as it reinforces traditional “stand and deliver” modes of instruction.

*Some activities under such a strategy may include:*

- *Reading groups:* Draw story webs. Display stories and vocabulary words illustrated through photos and clip art and using MS Word’s speech tool—students see, hear the story or vocabulary and see associated visual images
- *Demonstrate concepts:* For example, add descriptive words to a sentence or rearrange the sequence of words in a sentence to change the meaning
- *Record information from a group brainstorming session:* Use concept mapping software to introduce a new unit or topic of study
- *Demonstrate writing or editing skills:* Use Track Changes in MS Word to show editing procedures
- *Demonstrate math concepts:* Use Excel to create numeric data and display those same data in a graph (visualizing math concepts)
- *Literacy techniques:* Color parts of speech or vocabulary words in different color and font sizes (Research shows that these “visual cues” help students better remember information)
- *Games and Quizzes:* PowerPoint Jeopardy, with possible quizzes
- **Group writing:** Color text for demonstrating patterns in language; participatory revision and editing, etc.
- *View skills and procedures:* Watch videos, demonstrations of how to solve equations, perform science experiments, etc.
- Where possible: Access a selected Internet site to gather information
- Where possible: Demonstrate online simulations/Java-enabled activities (e.g., National Library of Virtual Manipulatives, the human body, science games, etc.)

#### **Tips:**

- Connect computer to TV or projector
- Burn materials to VCDs/CDs that can be used with students/teachers
- Allow students and teachers to take turns setting up computer and display device; using the mouse and keyboard and adding content (builds gradual familiarization with and confidence in using technology)

## Strategy Two

**Computer as Stand-Alone Individual Input Workstation:** *Use computer as “input station” as part of a larger group or class project.* In this scenario, the whole class works on some task (piece of writing, answering questions, doing math problems, etc.). The computer is turned on and placed in a central location in the classroom. Students—either through an individual sign up sheet (perhaps signing up for 10 minute increments), or chosen by teacher, or going in order of seating, go to the computer. Students can use the computer on an individual basis or in pairs. This strategy allows the teacher to carry on with an activity while students use the computer in an unobtrusive manner.

*Some activities under such a strategy may include:*

- *Lists:* Each student adds one item related to a topic that will be used for discussion
- *Science:* Students type questions of things they want to know about a new subject. The questions may be used to introduce a lesson
- *Writing:* Student writes one type of sentence—a topic sentence for example, and use this information for a class discussion on that type of sentence or students compose a group letter. Or students can correct grammar/spelling of an incorrect sentence
- *Reading:* Students take turns reading a short article/story on the computer (This way, the teacher does not need to make multiple handouts)
- *Continuing story:* One student starts a story (one sentence). Each student continues the story by adding a sentence. At the end of class, the teacher displays the story to the class. Each student takes turns reading his/her part of the story
- *Finding pictures:* Teacher creates a file with a list of vocabulary words (nouns, adjectives, verbs and adverbs). Students must find image (in photos or clip art) or quickly draw in Paint some image that visually defines that vocabulary word.
- *Survey:* Student adds information in a spreadsheet that teacher can graph and display to class. (Or students create the graph of whole class information and responses)
- *Record information:* Using an external microphone and Windows Sound Recorder, student can record a short story or some information that the teacher can later check
- *Quiz:* Students take an individual quiz

### **Tips:**

- A few students should be shown how to do basic typing (i.e., finding letters on the keypad, moving the mouse, and saving a file). They can teach the others
- Teacher may want to appoint—on a rotating basis—a “computer manager:” student who is assigned to be near computer and help other students in case they have difficulties. (This frees the teacher from having to manage the computer)
- “Computer manager” cannot touch mouse or keyboard. He/she can only verbally, or by pointing, help the student
- Create a daily “sign up” sheet (10-minute increments) and place next to computer. Students must sign up to use computer and keep track of their time. This way, students, not teacher, can manage computer use.



## Strategy Three

**Computer as Whole Group Research Station:** This is similar to Strategy Two (see above) but groups—versus individuals—use the workstation, not to input information, but to gather information. This strategy assumes that students are working in groups. The computer is set up and group by group, students go to the computer to access information or check their work.

*Some activities under such a strategy may include:*

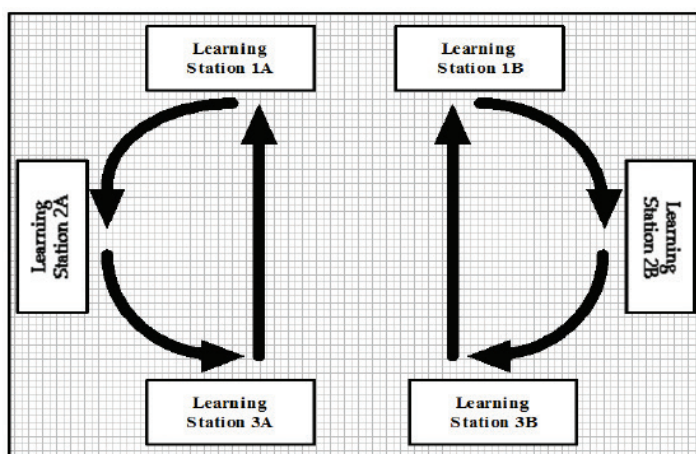
- *Research:* Atlas or encyclopedia. Groups find some type of information (e.g., main rivers in Sumatra, location of countries in SE Asia)
- *Reinforcement:* Use one component of commercial software/VCD that goes along with curriculum topic (e.g., video to check for procedures or see a demonstration)
- *Calculations:* Groups use Windows calculator to check their math work
- *Spelling/Vocabulary:* Groups open MS Word and use Spell Check or Thesaurus to check spelling of word or look for synonyms or antonyms for word

### Tips:

- Use either a time or a defined task to determine the length of a group's turn at the computer.
- Construct a chart to organize which students have had a turn on the computer
- Use computer with manipulatives or worksheet.
- Assign a few students as “computer managers” to assist children who are working on the computer, so teacher is not disturbed when a student has a question related to the operation of the computer.

## Strategy Four

**Computer as Cooperative Learning Station: Distributed learning activity:** The best way to utilize the one-computer classroom is to use a project-based learning



approach in which students work on a project—a scheme or set of procedures that results in some sort of student-created product (e.g., a student-created book on the main characters of Wayang). The project is organized into 3 “stations”—areas where groups of

students work on a particular piece of the final product. For example, one station can be the “research” station where students use printed materials to gather information about their book. The second station can be a “writing” station where students use the computer to write their story. The third station can be the “editing” station where

students meet with the teacher to go over their book. Larger classrooms and more complex projects may have more stations.

Student teams of four to five rotated through three different “learning stations” to gather data and information for their project.

**Tips:**

- Student teams may be at a station for a set period of time (30 minutes) or the whole class period.
- Make sure that computer station is a task for which computer is absolutely needed.
- Make sure each student has a group role (researcher, writer, group leaders, editor, spell checker, timekeeper) so he/she is not just sitting at the computer reader, editor, spell checker, etc.

## Strategy Five

### **Five-Minute Activities: Use computer for “5 minute” whole or small group activities**

Pre-download web sites (Examples provided below: many of the activities can be done without a computer). At beginning of class, divide students into groups of 4 (Roles: Spokesperson, Time keeper, Decider, Problem Solver). Teacher directs learning but students work together in small groups to find a word, make a prediction, and make change. Advantage of activity is that it’s a quick, interactive way of getting students engaged in an activity. Doesn’t require intensive use of computer—just a little taste.

The web sites presented here are designed to give MTTs examples of 5-minute activities. These activities don’t require Internet and can be done on the computer or off. (These web sites may also be downloaded and saved to CD-ROM for use with teachers and students.)

### **Kids Corner - Beatrix Potter**

Read story to whole class. Help students develop higher order skills by asking them to verbally summarize sections, analyze character personalities, predict the ending of the story and evaluate story.

➤ <http://www.tcom.ohiou.edu/books/kids.htm>

### **Addition Concentration**

Uncover matching pairs of cards. Some of the cards have the equations and others have the answers. This can be done as a whole group activity or as a learning center. Can also be done as *PowerPoint* template.

➤ <http://www.quia.com/custom/39conc.html>

### **A Plus Math Timed Flash Cards**

Students “compete” with other students across the globe by answering math problem in a certain number of seconds. Each student in the class can participate by displaying his/her answers with the correct number of fingers or a number card. Choose one student to be the person who selects the answer that a majority of the class thinks is correct.

➤ <http://www.aplusmath.com/Flashcards/TimedFlashcards.html>

In addition to the instructional uses of the one-computer classroom, the teacher can also use the computer as administrative tool to:

- Keep records, produce reports, calculate grades
- Produce a training/PD newsletter
- Create customized follow-up work for lessons.
- Make personalized certificates of achievement.
- Create customized graphic organizers and direction sheets.
- Create charts, student lists and name tags.
- Create student worksheets

**Tips:**

- Use Template files in Word, Excel and PowerPoint
- Use spreadsheets for class lists and charts and calculations

Finally, students can use the computer—without using the computer. The teacher can print out many of the computer’s resources (information, worksheets, puzzles, etc) at an Internet café, make copies and provide to students.

**Things to Remember about One-Computer Classroom:**

- Use cooperative learning groups (teams) instead of putting individual students at the computer
- Ask for community help: Use trained students, volunteers, parents to help students and teachers learn to use and manage the computer
- Create “trained experts” from the students in your class
- Plan your activities carefully. You can’t just put students at a computer—have a specific learning purpose so students use time on computer wisely
- Use templates (they come with MS Word, MS PowerPoint). That way you have pre-made files and documents.
- Print out clipart/ fonts from programs students will be using
- Break project into small parts so students can work on different sections
- Team with other teachers to borrow and group computers together

# S

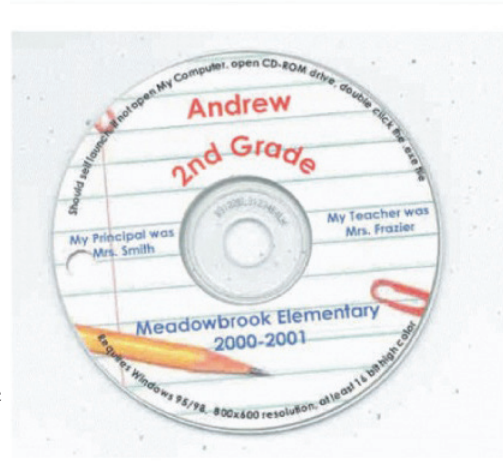
## Designing your e-portfolio

### Overview

You will create an e-portfolio as a final product of this course in which you will purposefully and selectively display your efforts, learning, and accomplishments as a result of this course. Your portfolio is worth 30 per cent of your final grade.

### What is an e-portfolio?

A portfolio is a purposeful collection of your work. Portfolios are comprised of artefacts: a representative collection of your work that best shows your skills, competencies, evidence of your professional accomplishments, and achievements. Artefacts could include written text, visuals (photographs or videos), animation or audio clips. A portfolio should be customized for a specific purpose or audience. It should be engaging, self-guided, and self-contained. (The 'e' in portfolio means it is electronic or digital.)



Your portfolio will mainly consist of written journal reflections, examples of teacher work (also written), photos, and your lesson plan that incorporates technology. It will be assessed by your Instructor using a rubric, which the Instructor will share with you.

### What program should I use for my portfolio?

You can use any electronic format you want: WikiSpaces, WordPress, Google Apps, Google Docs, Google Sites, SlideShare, PowerPoint, Publisher, or Word.

### Where can I find examples of e-portfolios?

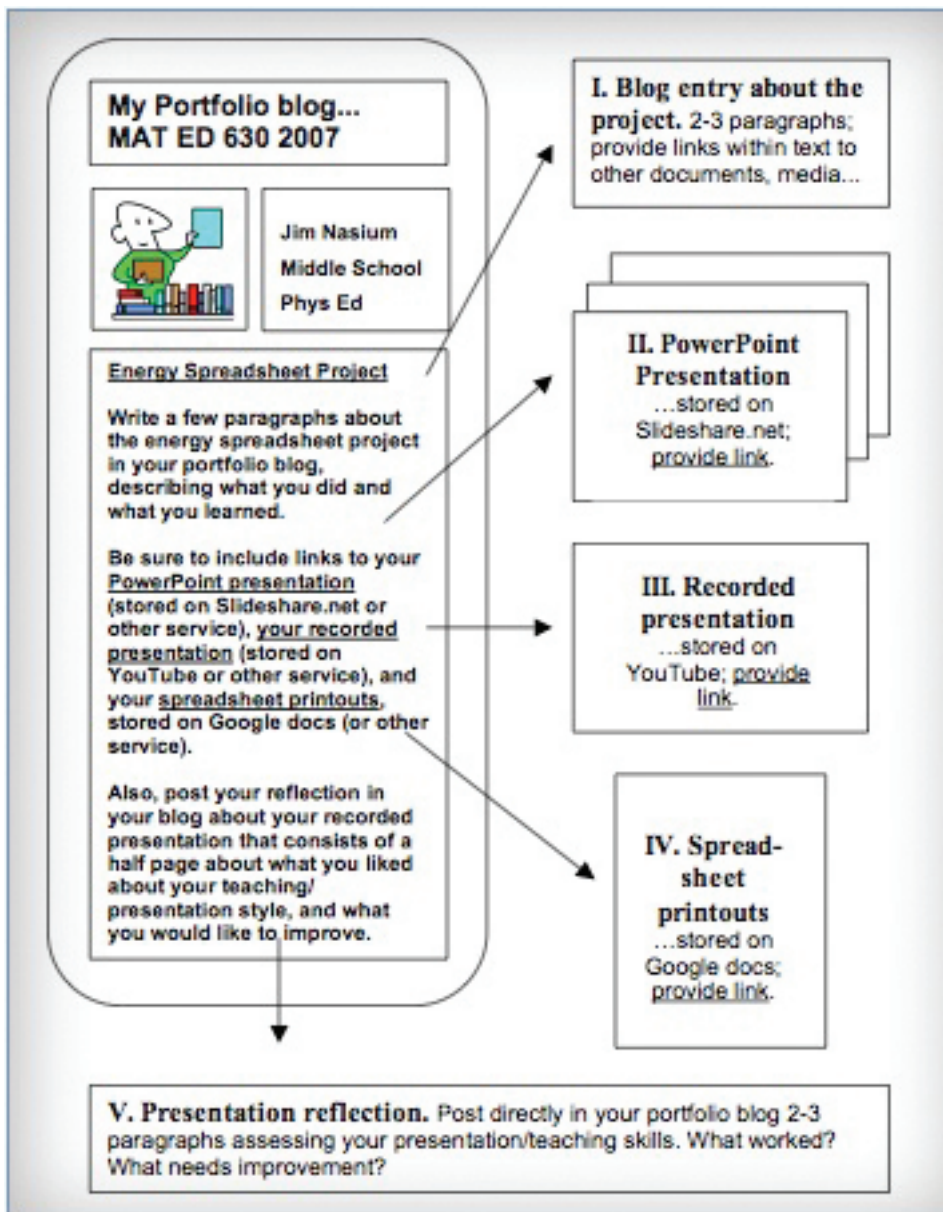
The Internet is full of examples of e-portfolios. Simply search 'teacher e-portfolios' and you will find many examples (mainly in English). Other good resources include:

- <http://electronicportfolios.org/>
- <http://reta.nmsu.edu/Lessons/digital/>
- <http://mediaspecialistsguide.blogspot.com/2012/06/create-your-own-digital-portfolio-22.html>

You should not copy others' portfolios, but you should search the Internet to find examples of how people have built portfolios. Look at their designs and how they arrange information.

## What do I need in my portfolio?

- Cover page (your name, the school where you worked, date)
- Table of contents
- Journal reflections (weekly written assignments)
- Homework assignments
- Photos of you and students teaching and learning with technology
- Technology lesson plan



If you finish your portfolio before the course ends—and you can—feel free to turn it in ahead of time.

## Portfolio assignments

The following table presents all of your portfolio assignments.

Unit	Product	Assignment
1	Journal reflection	How can the use of technology support improved teaching and learning in Pakistan?
2	Journal reflection	Briefly summarize the arguments that outline the strengths and weaknesses of technology for teaching and learning. As teachers, what strategies will they use to make sure they avoid these weaknesses? Student Teachers should provide between one and two paragraphs for their portfolio, word processed.
2	Journal reflection	<p>Look through the ISTE NETS*<sup>T</sup> and UNESCO ICT Competency Framework standards again. How easy or difficult do you believe it would be for you to attain these competencies?</p> <p>In your portfolio, make a three-columned chart and label the top of each 'Easier to attain', 'Harder to attain', and 'Hardest to attain'. Place the standards from each document under these column headings. When you finish, quickly summarize in a paragraph where you think you are in terms of these standards.</p>
3	Journal reflection	<p>Based on what you have read and seen, what is your overall assessment of active learning? Is this really how children learn? Is it how you learn? Or are there other, more effective strategies?</p> <p>As a Student Teacher, what concrete steps could you begin to take to set up a classroom that promotes active learning? (Think about the layout of the classroom, materials, technology, communication, how students would act, etc.)</p>
4	Annotated web links	Develop an annotated list of 10 resources you believe are most helpful in teaching a particular content area or topic area within a particular content area. Why did you choose these particular sites? What attributes do these sites have that would improve student learning?
5	Lesson plan Images and video Journal reflection	<p>1) Copy of Student Teacher lesson plan</p> <p>2) Photos and /or video of Student Teacher and students during the one-computer classroom activity. Describe what these photos show.</p> <p>3) Reflection in one to two paragraphs: How would you rate your one-computer activity? How did it go? How did students react? What went well, and what would you change?</p>

Unit	Product	Assignment
6	Journal reflection	Technology is only a tool, but assessment is a practice designed by teachers. Based on what you have read, examined, and watched, how can technology used as part of assessment check for student understanding, monitor student progress, and ultimately improve student learning? Provide examples from the resources you have accessed, in addition to other resources you have come across.
7	Journal reflection	What ideas does IRI/IAI give you about using technology for your own teaching practice? Do you see any learning advantages of audio over video? How might you incorporate audio into your teaching?
8	Paper or Journal reflection	Think of the emerging technologies you've seen and read about. Which do you believe hold the most promise for improved student learning and why? As a teacher, which of these technologies would help you most with content, instruction and assessment?

## Managing your time

Many of your portfolio assignments correspond to weekly activities or discussions. To help you get a head start—so you are not doing your portfolio at the last minute—spend some time each week preparing your portfolio. First, decide on the software you will use—such as WordPress, Publisher, or PowerPoint (use any presentation software that allows linking). Then build a shell to store each portfolio requirement—perhaps one page for each portfolio requirement. Then start to assemble your materials week by week. This way you are working on your portfolio concurrently with—not after—the course.



## Rubric: One-computer classroom activity

Category	5	3	1	Total points
Organization	<p>Lesson shows a <b>high degree</b> evidence of effective organization, including:</p> <ul style="list-style-type: none"> <li>• stated learning objective</li> <li>• beginning, middle, and end</li> <li>• summary of learning</li> <li>• organized sequence of activities</li> </ul>	<p>Lesson shows <b>some</b> evidence of effective organization, though one of the following may be missing OR all of the following are included but not well developed:</p> <ul style="list-style-type: none"> <li>• stated learning objective</li> <li>• beginning, middle, and end</li> <li>• summary of learning</li> <li>• organized sequence of activities</li> </ul>	<p>Lesson shows <b>little</b> evidence of effective organization. Many of the following are missing OR are incomplete or undeveloped:</p> <ul style="list-style-type: none"> <li>• stated learning objective</li> <li>• beginning, middle, and end</li> <li>• summary of learning</li> <li>• organized sequence of activities</li> </ul>	
Learner-centred approaches	<p>The activity embodies <b>all</b> tenets of learner-centred instruction:</p> <ul style="list-style-type: none"> <li>• Collaboration</li> <li>• Variety of working styles</li> <li>• Variety of use of learning tools</li> <li>• Variety of ways of constructing knowledge</li> </ul>	<p>The activity embodies <b>some (two or three)</b> tenets of learner-centred instruction:</p> <ul style="list-style-type: none"> <li>• Collaboration</li> <li>• Variety of working styles</li> <li>• Variety of use of learning tools</li> <li>• Variety of ways of constructing knowledge</li> </ul>	<p>The activity embodies <b>few to no (zero to one)</b> tenets of learner-centred instruction:</p> <ul style="list-style-type: none"> <li>• Collaboration</li> <li>• Variety of working styles</li> <li>• Variety of use of learning tools</li> <li>• Variety of ways of constructing knowledge</li> </ul>	



Category	5	3	1	Total points
Use of technology	Students are <b>actively</b> engaged with the technology either by using it or by engaging with the learning that the technology promotes	Students are <b>somewhat</b> engaged with the technology either by using it or by somewhat engaging with the learning that the technology promotes	Students are <b>not</b> engaged with the technology or with learning	
Communication with students	Throughout the <b>whole class</b> , teacher communication style is: <ul style="list-style-type: none"> <li>• Clear and concise</li> <li>• Directions are clear and understandable</li> <li>• The teacher allows students to communicate and ask questions</li> </ul>	Throughout <b>some of the class</b> , teacher communication style is: <ul style="list-style-type: none"> <li>• Clear and concise</li> <li>• Directions are clear and understandable</li> <li>• The teacher allows students to communicate and ask questions</li> </ul>	Teacher's communication style is not clear or concise. Directions are not clear or understandable. Teacher does not allow students to communicate or ask questions.	

**Total Number of Points:**

To get a per cent total, multiply the total number of points by five.

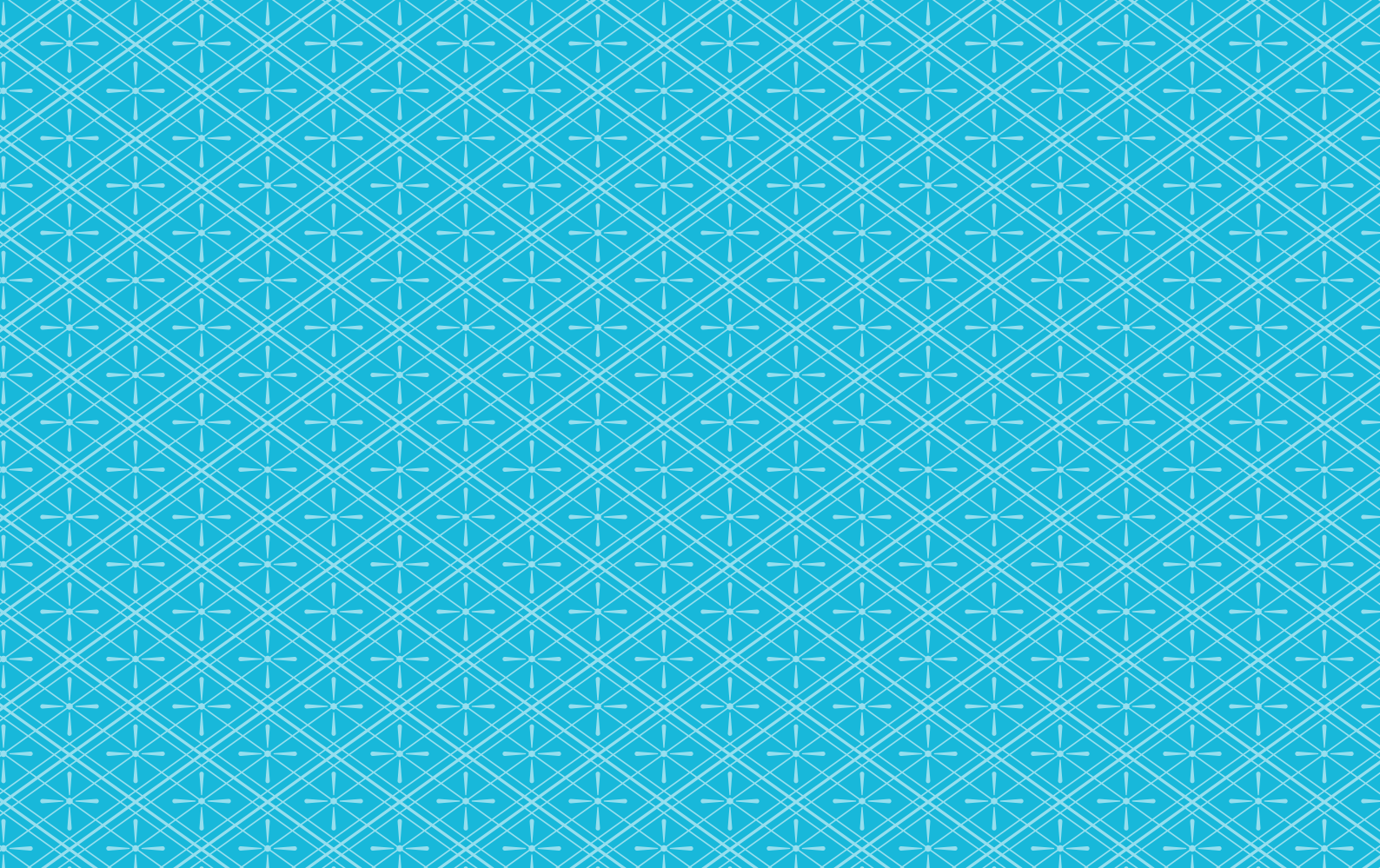
## References

- M. Barak, D. Ben-Chaim, and U. Zoller, 'Purposely Teaching for the Promotion of Higher-Order Thinking Skills: A Case of Critical Thinking', *Research in Science Education*, 37 (2007), 353–369.  
doi: 10.1007/s11165-006-9029-2
- B. S. Bell and S. W. J. Kozlowski, 'Active Learning: Effects of Core Professional Development Design Elements on Self-Regulatory Processes, Learning, and Adaptability', *Journal of Applied Psychology*, 93(2) (2008), 296–316.  
doi: 10.1007/s11165-006-9029-2
- J. D. Bransford, A. L. Brown, and R. R. Cocking (eds.), 'How People Learn: Brain, Mind, Experience, and School', Washington, DC: National Research Council (2000).
- S. M. Brookhart, C. M. Moss, and B. A. Long, 'Professional Development in Formative Assessment: Effects on Teacher and Student Learning'. Paper presented at the annual meeting of the National Council on Measurement in Education, New York, N.Y. (March 2008).
- Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 1983).
- L. S. Vygotsky, *Mind and Society: The Development of Higher Mental Processes* (Cambridge, MA: Harvard University Press, 1978).
- D. William and M. Thompson, (2007). 'Integrating Assessment with Instruction: What Will It Take to Make It Work?' In C. A. Dwyer (ed.) *The Future of Assessment: Shaping Teaching and Learning* (Mahwah, NJ: Lawrence Erlbaum Associates, 2007).









Higher Education Commission