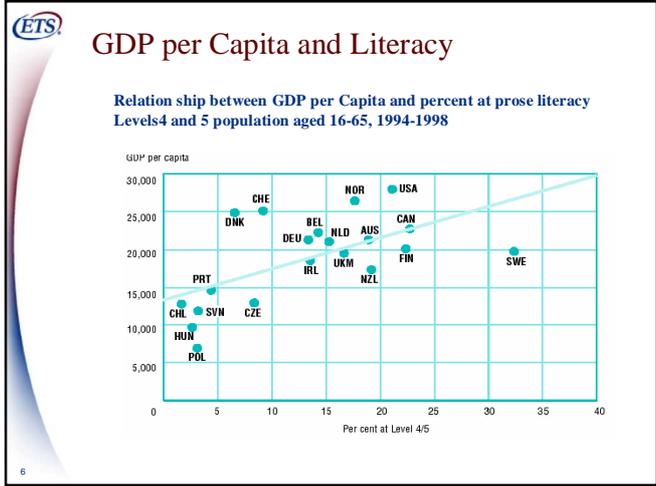(ETS)

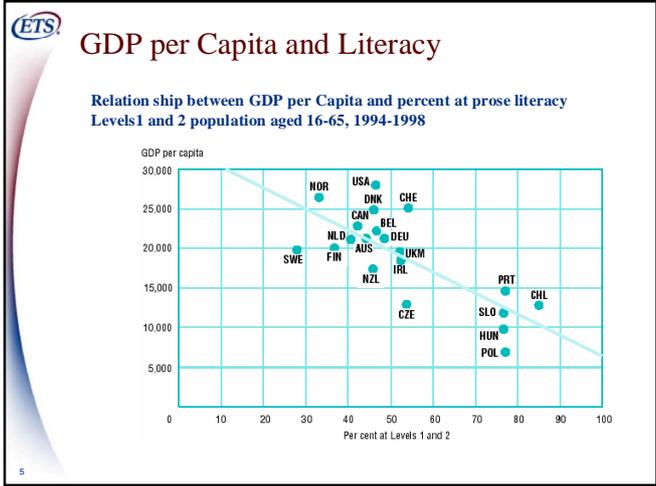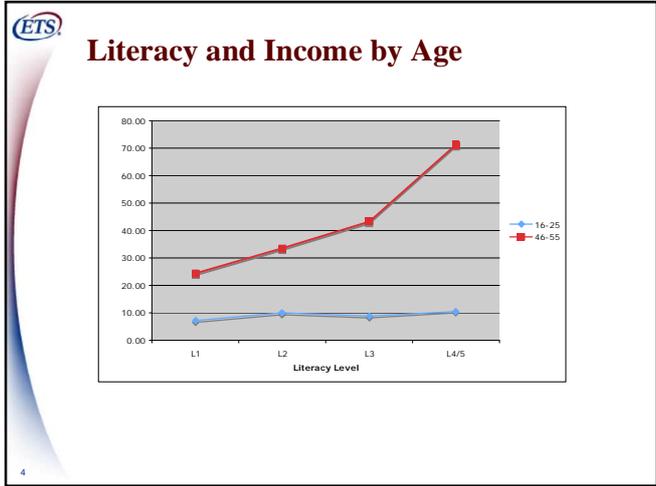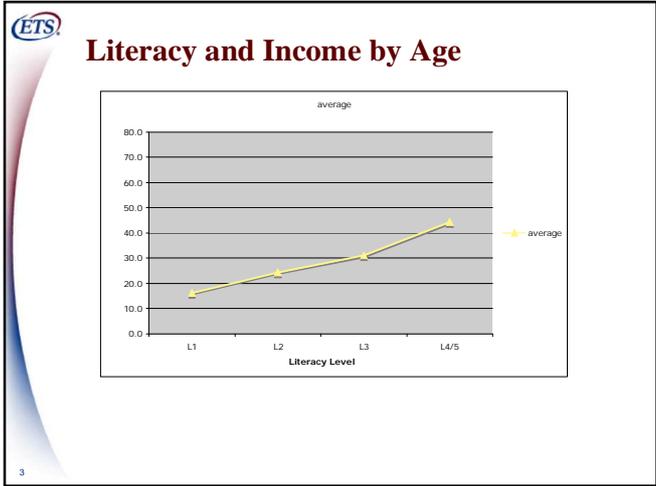# Role of ICT Literacy in Cognitive Skills Assessment

Kentaro Yamamoto
ETS

Measurable Competencies Needed for People at Present and in the Future
March 21, 2007 Tokyo

(ETS)

What we learned from Adult Literacy

• 'Learn to Read' to 'Read to Learn' became relevant for lives of adult in the society based on our everyday literacy activities.

• Literacy skills are multi-faceted.

• Society is by and large based on meritocracy.

• Framework is important

(ETS)

Literacy and Income by Age

(ETS)

Literacy and Income by Age

(ETS)

GDP per Capita and Literacy

Relation ship between GDP per Capita and percent at prose literacy Levels1 and 2 population aged 16-65, 1994-1998

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(ETS)

GDP per Capita and Literacy

Relation ship between GDP per Capita and percent at prose literacy Levels4 and 5 population aged 16-65, 1994-1998

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What Is a Framework?

A framework provides:

- a rationale for defining skills and knowledge required

- a common language for discussing the definition and the assumptions underlying it

- a vehicle for deciding on the kinds of evidence that need to be collected to support inferences we want to make about individuals' skills and knowledge

- a mechanism for building consensus among various constituencies

- an important connection between public policy, assessment, curricula and professional development

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Why Measure ICT?

- ICT is changing the very nature and value of knowledge and information

- ICT literacy in its highest form has the potential to change the way we live, learn and work

- ICT literacy cannot be defined primarily as the mastery of technical skills

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Today's Information Landscape

"… the workplace … demands a new kind of worker, who [has] to access, manage and use the vast amount of information delivered to them through multiple channels (e.g. phone, Internet, e-mail, printed documents, Web-casts) and in a wide variety of formats (e.g. video, printed, electronic text)."

(Source: Bonnie Cheuk, "Information Literacy in the Workplace Context: Issues, Best Practices and Challenges," July 2002, White Paper prepared for UNESCO.)

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Today's Information Landscape

"On average, people in the functions we studied spend 8 hours per week obtaining, reviewing, and analyzing external information. Ten percent of all users spend over 20 hours per week looking for information."

(Source: "Managing Online Information to Maximize Corporate Intranet ROI", pg. 5. White paper prepared for corporate end users by Outsell, Inc. of Burlingame, CA, July 6, 2001)

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Secretary's Commission on Achieving Necessary Skills
(SCANS Report, 1991)

An effective worker

- Identifies, finds, and selects necessary information
- Assimilates and integrates information from multiple sources
- Represents, conveys, and communicates information to others effectively
- Converts information from one form to another
- Prepares, interprets, and maintains quantitative and nonquantitative records and information, including visual displays

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Defining ICT Literacy

ICT literacy is the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others in order to participate effectively in society.
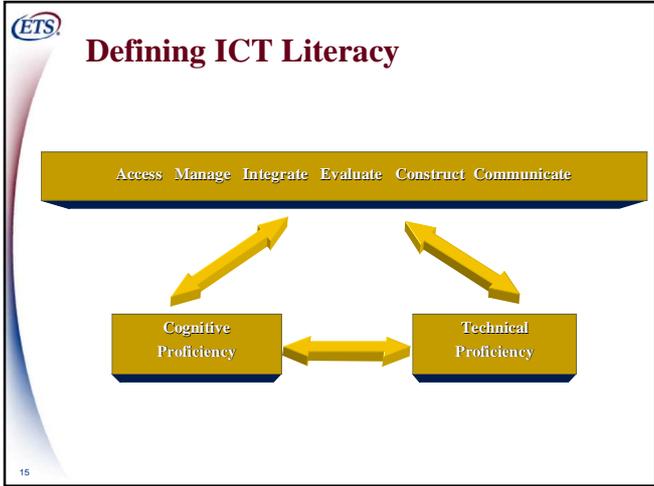
12

Defining ICT Literacy

Access Manage Integrate Evaluate Construct Communicate

Increasing Complexity of Knowledge and Expertise

13
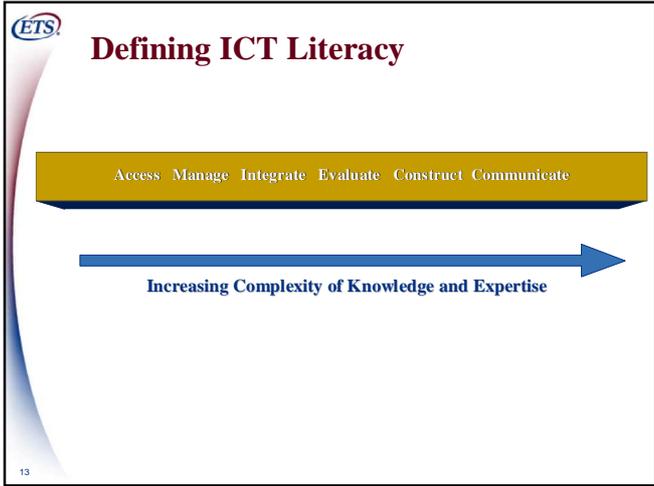
ICT Processes

Access	Knowing about and knowing how to collect and/or retrieve information.
Manage	Organizing information into existing classification schemes.
Integrate	Interpreting, summarizing, comparing and contrasting information using similar or different forms of representation.
Evaluate	Reflecting to make judgments about the quality, relevance, usefulness, or efficiency of information.
Construct	Generating new information and knowledge by adapting, applying, designing, inventing, representing or authoring information.
Communicate	Conveying information and knowledge to various individuals and/or groups

These processes are based on the key components of information problem solving models which typically include steps related to the acquisition, evaluation, synthesis and communication of information.

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Defining ICT Literacy

Access Manage Integrate Evaluate Construct Communicate

Cognitive Proficiency

Technical Proficiency

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Organizing the Domain

- **What kind of information should be reported?**

- **Who will use the information that is reported?**

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Task Characteristics

PROCESSES

Access   Manage
Integrate   Evaluate Construct
Communicate

CONTEXTS

Personal   Public
Educational   Occupational

TECHNOLOGY ENVIRONMENTS

World Wide Web   Desktop
E-learning

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Building ICT Tasks

SCENARIOS
Technology Environments
Web
Desktop
E-learning simulations
Context

Personal   Public
Educational   Occupational

TASKS
Processes
Access
Manage
Integrate
Evaluate
Construct
Communicate

Functionality   Representations
Word Processing   E-mail   Text   Images
Presentation   Database   Numbers   Graphics

E-commerce   Spreadsheet
Concept Mapping
Browser (includes search engines)

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Assessment Tasks

The assessment tasks were organized into 3 sections and designed to cover a range of the process components, environments and contexts defined in the framework document.

• Technical skills involving scrolling, typing, highlighting and the cutting and pasting of information
• Short scenarios consisting of discrete tasks including using an email application, a database and the results of a web search
• Long scenarios involving an open ended web search and an open ended simulation tool

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Examples of Access

• Open a file, e-mail message or application
• Access information using a browser through the World Wide Web
• Navigate within a Web site to locate information
• Use a search engine within an application or Web page

Examples of Manage

• Manage files (save to specific locations, change locations)
• Organize and paste information into a table or chart
• Enter information into simulation software
• Enter information into a database
• Use a word processor to create an ordered list of items.

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Examples of Integrate

• Compare information presented in a video clip and graph
• Look through several Web sites to identify, compare and summarize information on a particular topic

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Examples of Evaluate

• Select Web sites that best meet specified criteria
• Evaluate reliability of information sources
• Use a simulation to pick a correct hypothesis

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Examples of Construct

• Write a brief e-mail message
• Write a paper using a word processor
• Develop a report using presentation software
• Create a Web page
• Transform one representation to another, for instance a table to a graph

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Examples of Communicate

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- Send a message (e-mail, instant message)
- Contribute to an on-line discussion on a mailing list
- Purchase an item using e-commerce
- Make a multi-media presentation

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Video clip for sample items

Was it the future?

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- This is what we have so far and not the future.
- This does not address many features
  - Interaction between ICT and literacy.
  - ICT would be a powerful tool for those with interface difficulties.
  - ICT is a powerful tool for problem solving.
  - We are still improving scoring methods to capture construct relevant proficiency of ICT with ever changing technical features.
- Something are clear

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Knowledge Duplication: Past

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Traditional tests at schools have been testing presence or absence of knowledge transmitted from the teachers to the students. These processes were carried out through standardized teaching objectives, textbooks, and controlled practices, exercises and drills. Location and transmission of knowledge has been limited and restricted.

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Knowledge democratization: future

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- Type of knowledge
- Location of knowledge
- Half life of knowledge
- Acquisition path
- Acquisition sequences
- Expression of knowledge

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