International Computer and Information Literacy Study

A Preliminary Proposal to the
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Julian Fraillon

John Ainley

Australian Council for Educational Research

Contents

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- What
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Why survey
Computer & Information Literacy?
Social Context

- Growth in ICT is a feature of modern societies
- Proficiency in using ICT
    - Central to effective participation in the "information" and "knowledge" societies (employment)
    - Increasingly acknowledged as tool for citizenship participation
    - Need for ICT-related literacy is regarded as increasing

Why survey Computer & Information Literacy?
School Context

- Computers are a major form of ICT in schools
  - As teaching and learning resources (including subject-specific learning tools and broader information resources)
- ICT is a feature of education programs
  - Tension between conceptualisation of ICT literacy as subject tool and as discrete learning area
  - Variation in approaches within and between countries (curriculum design and embedding)
- Existing assessments of ICT literacy
  - Pen-and-paper or computer-based
  - Measure *Computer and Information Literacy*

What is Computer and Information Literacy?

- Computer and information literacy

  ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the workplace and in the community.

- Computer and information literacy (CIL)
  - brings together
    - technical competence (computer literacy),
    - intellectual capacity (conventional literacies & information literacy)
  - has an overall communicative purpose that
    - is context-dependent, and
    - extends beyond constituent elements

The CIL Construct

Computer and information literacy refers to an individual's ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the workplace and in the community.

Strand 1
Collecting and managing information

Aspect 1.1
Knowing about and understanding computers (computer use)

Aspect 1.2
Accessing and evaluating information

Aspect 1.3
Managing information

Strand 2
Producing and exchanging information

Aspect 2.1
Transforming information

Aspect 2.2
Creating information

Aspect 2.3
Sharing information

Aspect 1.1
Knowing about and understanding computers (computer use)

- Declarative and procedural knowledge of:
  - the <u>generic</u> characteristics of computers, and
  - functions of computers
- Basic technical knowledge and skills that underpin our use of computers to work with information
- Know that (for example)
  - Computers "run" programs created by people
  - Operating systems are programs
  - Information is stored in files
  - Computers communicate in networks (e.g. Internet).
- Know how to (for example)
  - execute "generic" basic commands (such as cut and paste) that are common across platforms and software systems.

Aspect 1.2
Accessing and evaluating information

- Investigative processes
  - find and retrieve information
  - judge relevance, integrity and usefulness
- *Why include these processes?*
  - diminution of (pre) filtering of information
  - dynamic context of computer information
  - broader range of (different) processes (c.f. conventional literacies)

Aspect 1.3
Managing information

- "Working with" units of information
  - adopt, adapt and use classification & organisation schemes
  - organise information for efficient use
- Different from Aspect 1.1
  - make decisions about information use

    (rather than simply knowing or demonstrating)
- Different from Aspect 1.2
  - students have some control of the organisational structure of the information
  - "content" only relevant in relation to organisational structure

Aspect 2.1
Transforming information

- Change presentation of information to enhance its communicative effect
  - formatting, graphics, graphing and multimedia
  - specific to context, purpose and audience

Aspect 2.2
Creating information

- Design and generate information products
  - specific for purposes and audiences
  - new or modified products
  - generate new understandings

Aspect 2.3
Sharing information

- Using computers to exchange information and communicate
  - knowledge and understanding of computer-based communication media e.g.
    - email, instant messaging
    - wikis, blogs, and social networking web interfaces
    - media sharing
  - conventions of information sharing using computer-based media
  - social impact of information sharing

Summary Extract: NAP-ICT Literacy Described Scale (single dimension)

4	• well targeted searches • select relevant information from within sources • information products with simple linear structure • some consideration of audience and communicative purpose • recognise situations when ICT misuse may occur • explain how specific protocols can prevent ICT misuse ~61% G10
3	• simple general search questions • select the best information source • retrieve information from given sources to answer specific, concrete questions • assemble information in a provided simple linear order • use conventionally recognised software commands to edit and reformat • recognise common examples in which ICT misuse may occur • suggest ways of avoiding ICT misuse ~49% G6
2	• locate simple, explicit information within a source. • add content and make simple changes to information products as instructed • edit with limited consistency of design and information management • identify basic ICT security and health and safety use issues and practices

Options for elements in computer-based assessment tools

- Conventional
  - Paper formats created on screen
  - Multiple choice or dichotomous (true-false)
  - Constructed or open response
- Simulated
  - Simulated computer tasks
  - Responses automatically captured & scored
- Authentic
  - "real" software (commercial, modified and/or purpose-built)
  - students modify or create files saved and later scored

Creating electronic items
Based on "authentic" (real-world) tasks

- Items grouped in thematic "modules"
- Modules reflect a sequence of processes
- Processes are drafted as items in storyboards
- Storyboards created, reviewed and refined
- Consultation with stakeholders and experts
- Items enacted as working software
- Working software reviewed and refined
- Feedback from "pilots" and expert consultation
- Finalise electronic items

Student questionnaire

- Collected electronically with assessment instrument
- Student background characteristics
- Students and computers (e.g.)
  - Access
  - Familiarity
  - Experience and use of computer applications
  - Use of other forms of ICT
  - Attitudes to and interest in computers
  - Student self-reported competency

Teacher questionnaire

- Survey features
  - on-line administration (DPC)
  - sample of all teachers in target grade (s)

- Content
  - Teacher characteristics
  - Computer familiarity
  - Applications and functions
  - Experience and use of particular computer applications
  - Attitudes to using computers in general
  - Attitudes to the use of computers in teaching
  - Competency in using computers
    - General aspects of computing
    - Educational aspects of computing

- Linkages
  - Explicit item links to SITES 2006: e.g. self-reported competency

School questionnaire (s)

- Survey features
    - on-line administration (DPC)
    - completed by school principal & information technology coordinator
- Content
    - School characteristics
    - Computer resources
    - Policies and practices regarding the use of ICT
        - Policies and practices for access
        - Levels of technical support
        - Levels of pedagogical support
        - Provision of and support for professional development
- Linkages
    - Explicit item links to SITES 2006 (School and IT coordinator)

Delivery methods

- Maximise use of existing school computer facilities
- Minimise requirement to "fiddle with" existing school computer facilities

Delivery methods

Remote network connection (via Internet)	Local network connection (wireless or cable)

Existing web resource
Modified applications
  (e.g. google apps)
  – Software for access
  – Data capture	

Project specific server farm(s)
  – School computers are terminals
  – Project software on server
  – Servers can be
    central / region / country
  – Project data capture on server
	Notebook server school LAN
	  – notebook server
	  – school computers
	Project LAN (server & client)
	  – notebook server
	  – project client computers
	Download of data to server

Web applications

- Features of Web-based applications e.g. Google Apps.
  - word processor
  - spreadsheet
  - presentation software
  - software to utilise these applications would need to be developed
- Advantages
  - Provides the applications in many languages
  - Utilises existing resources with generic features
- Disadvantages
  - May be difficult to develop other applications
  - Issues of control of operations
  - Difficult to have application on a local server if required
  - Temporary connections to internet via the wireless
    - expensive
    - not sufficient capacity in remote areas

Project Servers

- Features
  - Schools connect to a server farm with all software
  - Fall back provision of local servers / servers & clients
- Advantages
  - Control over data capture (on server or downloaded)
  - Uses project-adapted or project-developed software
    - Non-commercial applications such as OpenOffice
    - Can develop generic but unfamiliar software applications
- Disadvantages
  - Bandwidth requirements ($\approx$ 4 Mb/sec for 10 users)
  - Investment in server farm

Populations and samples

- Core: grade 8 from ISCED level 1
- Option: grade 4 from ISCED level 1
- Two stage cluster sample design
  - Schools with probability proportional to size
  - Random sample of students in target grade (18-20 students per grade)
  - Features
    - Fewer demands on resources
    - Greater sampling efficiency (lower design effect)

Development

- Framework
  - Revision in with stakeholders (NRCs) and experts
- Items
  - Developed through pilots and consultation
  - Assessment storyboards
  - Assessment items
  - Questionnaire items
- Assessment Software
  - Development
  - Pilot testing

Possible timeline

- Data collection
  - End 2011 (Southern Hemisphere)
  - Beginning 2012 (Northern Hemisphere)
- March 2009 – December 2009
  - Framework development
- July 2009 – June 2010
  - Establishment and testing of delivery platform
- January 2010 – December 2010
  - Assessment and survey materials
- March 2011 – May 2011
  - Field trial
- October 2011 – December 2011
  - Main survey (Southern Hemisphere)
- March 2012 – May 2012
  - Main Survey (Northern Hemisphere)

Example Items

- Below and on the following slide are links to school release materials from the Australian national sample assessment of ICT literacy in 2005. These release materials can be downloaded or viewed online as video demonstrations or as static PowerPoint slides in a presentation.

Flag Design (Grade 6)

- Click here to **play online** the 'Flag Design' presentation
- Click here to **download and play** the 'Flag Design' presentation (Winzip required)
- Click here to **play online** the 'Flag Design' video
- Click here to **download and play** the 'Flag Design' video (Winzip required)
- Click here to **download** the 'Flag Design' scoring guide (Winzip required)

Example Items (cont.)

Conservation Project (Grade 6 & 10)

- Click here to **play online** the 'Conservation Project' presentation
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- Click here to **play online** the 'Conservation Project' video
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Video Games and Violence (Grade 10)

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