Digital literacy – myths and realities

Julian Fraillon
Overview

• An incomplete history of computing instruction in schools
• Intersections in digital competencies
• Examples of work measuring and reporting on ICT/digital literacies
• Myths and realities
• Concerns
• Futures
• Questions
An incomplete history of computing instruction in schools

Computer science/computing
(1980s – 1990s)
– Emphasis on PC use, programming in ‘basic’ languages (e.g. Logo, Pascal, Basic) and use of applications (later)

ICT literacy/digital literacies
(mid 1990s to present – peak in early 2000s)
– De-emphasis on computing and emphasis on information literacy and communication (two-way) in a digital environment
An incomplete history of computing instruction in schools (cont.)

Computing/digital technologies
(2010s – present with genesis in mid 2000s)

– Increasing emphases on:
  i. Understanding computer use (mid 2000s)
  ii. Uses of digital technologies to solve “real world” problems (mid 2000s)
  iii. Computational thinking/coding/algorithimic thinking (2010s)
Intersections in digital competencies

Computer science

Computing/digital technologies

ICT/digital literacies
Intersections in digital competencies

- Computational thinking
- Algorithmic thinking
- Coding/programming
Intersections in digital competencies

- Ethical use
  - Safe
  - Responsible
  - Respectful

- Production of digital artefacts
Intersections in digital competencies

• Evaluating technical specifications
• Evaluating UI and UX designs
Intersections in digital competencies

- Understanding computer use
- Problem solving

Computer science

Computing/digital technologies

ICT/digital literacies
Measuring and reporting ICT/digital literacies

- **Australian NAP ICT Literacy**
  - Grades 6 and 10 (≈11 and 15 year olds)
  - Triennial since 2005
  - Representative sample (national and at the level of states and territories)
  - Four 20 minute test modules assessing ICT literacy
  - Students also complete a questionnaire about their ICT use in and out of school

- **IEA International Computer and Information Literacy Study**
  - Grade 8 (or equivalent)
  - 2013 and 2018 (in development)
  - Cross-national (22 “countries” in 2013, 14 in 2018)
  - Two 30 minute test modules assessing CIL
  - Questionnaires for students, teachers, ICT coordinators, principals and national centres
  - In 2018 eight countries are also completing an computational thinking international option (two 25 minute modules)
Search for and locate information, plan use of information when creating information products

Precision, efficiency and control when gathering information or creating information products

Critical perspective and autonomy when gathering information or creating information products

Work independently using computers as information-gathering and management tools, recognize the nature and quality of information reflects the characteristics of people who created it

Complete basic and explicit information gathering and management tasks, simple information products that show consistency of design, and show awareness of mechanisms for protecting personal information

Evaluate the reliability of information based on its content and probable origin, create information products targeted for audience and purpose
Myth 1

The “digital natives”
Student CIL by level (ICILS 2013)

Country
Korea, Rep. of
Australia
Poland
Czech Republic
Norway (Grade 9)¹
Slovak Republic
Russian Federation²
Croatia
Germany†
Lithuania
Chile
Slovenia
Thailand²
Turkey
ICILS 2013 average

<table>
<thead>
<tr>
<th>Country</th>
<th>BL1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea, Rep.</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
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<tr>
<td>Australia</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Poland</td>
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<td>50%</td>
<td>75%</td>
<td>25%</td>
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<tr>
<td>Czech Republic</td>
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<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Norway (Grade 9)¹</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Slovak Republic</td>
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<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Russian Federation²</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Croatia</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Germany†</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Lithuania</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<td>Chile</td>
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<td>75%</td>
<td>25%</td>
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<tr>
<td>Slovenia</td>
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<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Thailand²</td>
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<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
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<tr>
<td>Turkey</td>
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<td>50%</td>
<td>75%</td>
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<td>50%</td>
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<tr>
<td>ICILS 2013 average</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>25%</td>
<td>50%</td>
</tr>
</tbody>
</table>
ICILS L1: Demonstrate familiarity with the basic range of software commands, recognize potential for misuse of computers
Student ICTL by level (Aust., 2017)

Year 6
- L1 (or below), 13%
- L2, 33%
- L3, 41%
- L4, 13%

Year 10
- L1 (or below), 3%
- L2, 10%
- L3, 33%
- L4, 46%
- L5, 8%

Year 6
- L2, 33%
- L1 (or below), 13%

Year 10
- L2, 10%
- L1 (or below), 3%

46% at or below L2

13% at or below L2
Myth 2

Boys will outperform girls
## Gender differences in CIL (ICILS 2013)

<table>
<thead>
<tr>
<th>Country</th>
<th>Difference (CIL scale points)</th>
<th>Females - Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>24(4.0)</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>25(4.8)</td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>15(3.5)</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>12(2.7)</td>
<td></td>
</tr>
<tr>
<td>Germany†</td>
<td>16(3.8)</td>
<td></td>
</tr>
<tr>
<td>Korea, Rep. of</td>
<td>38(4.1)</td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>17(3.4)</td>
<td></td>
</tr>
<tr>
<td>Norway (Grade 9)¹</td>
<td>23(3.5)</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>13(3.7)</td>
<td></td>
</tr>
<tr>
<td>Russian Federation²</td>
<td>13(2.4)</td>
<td></td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>13(4.1)</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>29(3.6)</td>
<td></td>
</tr>
<tr>
<td>Thailand²</td>
<td>9(5.6)</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>2(3.8)</td>
<td></td>
</tr>
<tr>
<td><strong>ICILS 2013 average</strong></td>
<td>18(1.0)</td>
<td></td>
</tr>
</tbody>
</table>
Gender differences in ICTL (Years 6 & 10)

NAP - ICT Literacy Scale Scores 2005 to 2017 (Year 6)

NAP - ICT Literacy Scale Scores 2005 to 2017 (Year 10)
Myth 3

ICT have transformed classrooms and pedagogy
Students’ use of computers for school-related purposes

Reported using computers for this purpose at least once a month (%)

Most frequent

- Preparing reports or essays
- Preparing presentations
- Working with other students from your own school
- Completing [worksheets] or exercises

ICILS 2013 average
Students’ use of computers for school-related purposes

Reported using computers for this purpose at least once a month (%)

- Completing tests
- Organizing your time and work
- Writing about your learning
- Working with other students from other schools

Countries:
- Australia
- Chile
- Croatia
- Czech Republic
- Germany†
- Korea, Republic of
- Lithuania
- Norway (Grade 9)¹
- Poland
- Russian Federation²
- Slovak Republic
- Slovenia
- Thailand²
- Turkey
- ICILS 2013 average

Least frequent
Teachers’ self-reported use of ICT in class

Reported using activity **often** using ICT in reference class (%)

- **Australia**
- **Chile**
- **Croatia**
- **Czech Republic**
- **Korea, Rep. of**
- **Lithuania**
- **Poland**
- **Russian Federation¹**
- **Slovak Republic**
- **Slovenia**
- **Thailand**
- **Turkey**
- **ICILS 2013 average**

**Most frequent**

- Presenting information through direct class instruction
- Reinforcing learning of skills through repetition of examples
- Providing feedback to students
- Assessing students' learning through tests
Teachers’ self-reported use of ICT in class

*Reported using activity *often* using ICT in reference class (%)*

**Least frequent**
- Supporting inquiry learning
- Collaborating with parents or guardians in supporting students’ learning
- Enabling students to collaborate with other students (within or outside school)
- Mediating communication between students and experts or external mentors
## Teachers’ self-reported use of ICT in class

*Tools used by teachers in *most lessons* with reference class*

<table>
<thead>
<tr>
<th>Software tool</th>
<th>Mean (%)</th>
<th>Min (%)</th>
<th>Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wordprocessors or Presentation Software</td>
<td>30</td>
<td>13</td>
<td>47</td>
</tr>
<tr>
<td>Computer-Based Information Resources</td>
<td>23</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Tutorial Software or [Practice Programs]</td>
<td>15</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Interactive Digital Learning Resources</td>
<td>15</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Communication Software</td>
<td>10</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Multimedia Production Tools</td>
<td>8</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Graphing or Drawing Software</td>
<td>7</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Spreadsheets</td>
<td>7</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Data Logging and Monitoring Tools</td>
<td>6</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Digital Learning Games</td>
<td>5</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>E-portfolios</td>
<td>4</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Social Media</td>
<td>4</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Concept Mapping Software</td>
<td>4</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Simulations and Modeling Software</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>
Myth 4

*Student digital literacy will continue to increase*
Australian NAP ICT-L average scores (2005 to 2017)

NAP - ICT Literacy Scale Scores 2005 to 2017

Year 6
Year 10
Concerns

- **Style over substance**
- **Lost in the cross-curricular fog** (failings in explicit teaching)
- **Tablets**
- **Teacher preparation and teacher preparedness**
Futures

Computing/digital technologies

A device debate

Core digital competencies
Thank you
Questions

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ICILS 2013 International Report

NAP ICT Literacy Reports

DIGICOMP 2.0