Panel 2: ICTs and Learning

ICT as a tool for 21st century skills

Shinobu Yume Yamaguchi
Junko Onodera
Tokyo Institute of Technology

What Education for the Future?
Beyond 2012 -- Rethinking Learning in a Changing World
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Outline

1. Utilization of ICT for Education Development
2. Case 1: Impact of ICT on learning
   - Cognitive vs. Non-Cognitive with “OLPC” (Mongolia)
3. Case 2: ICT use in Japan
   - Supportive tools for Zest for Living
4. Shared Issues
90’s: Possibility and role of ICT for poverty alleviation became development agenda (World Bank, UNDP, etc.)

2000: G8 Kyushu Okinawa Summit (IT Charter / ICT Task force)

2003-2005: World Summit of the Information Society (First UN summit for ICT)

2006: Global Alliance for ICT and Development (GAID) was launched

2009: White Paper: Information & Communication Technologies (ICT) in Education for Development (Gutterman et al.): ICT’s role and challenges for achieving UPE and Gender empowerment were highlighted
Case 1: One Laptop Per Child (OLPC)

2 Million XOs
36 Countries since 2007

“empower the world's poorest children through education”
- OLPC mission

From http://wiki.laptop.org/go/Deployments
OLPC Concept

- A rugged, low-cost, low-power, connected laptop
- Manufactured and sold in large volumes to governments
- Laptop is a means for improving the quality of education in underserved areas

World summit 2005 where the idea of the OLPC was debut
Impact of XO1 laptops on cognitive skills

• Mindstorms (Seymour Papert, 1980)
  – in theory, computers can impact childrens’ cognitive skills
  – “when a child learns to program, the process of learning is transformed. It becomes more active and self-directed.......The new knowledge is a source of power and is experienced as such from the moment it begins to form in the child's mind.” (Page 32)

• IADB Report (Cristia et al., 2012)
  – first large-scale randomized evaluation
  – data collected after 15 months of implementation in 319 primary schools
  – no evidence in Math and Language test scores
  – some effects in general cognitive skills as measured by Raven’s Progressive Matrices
  – more research needed
Education Policy Reform and ICT in Mongolia

- **New Education Standards**
  - Decentralization of educational responsibilities
  - Student-Center Learning for quality of education
- **Education Law Amendment (2012)**
  - “Connect all educational institutions to Internet, introduce ICT into training, information exchange, monitoring, evaluation”
OLPC in Mongolia

- Deployment started in 2008
- 47 Schools
- 12,100 XO1 laptops
- PMU established in 2008
- 10,000 laptops donated through the give 1 get 1 program, 2,100 laptops purchased by Mongolian government

teachers believe XOs develop children
XO1 use in classroom

Lecturing

Active Listening

Creating

Presenting
OLPC Initiative in Mongolia
Multiple Impacts on non-cognitive skills (Teachers’ perception)

- Increased participation in class, with more attention and concentration
- Improved self-learning skills: willingness to try new things
- Improved collaborating between students (teaching each other)
- Improved creative skills (i.e. how to layout information and present)
- Became independent and more confident computer user
- Impacting on community leaning technology
Case 2: ICT use in Education in Japan

Importance of ICT use in education was pointed out in as national strategies since 1980’s

“However, the use of CIT utilization of education in Japan has not been successfully advancing compared with other industrialized countries, having failed to achieve the government targets contained in those various National Strategies established so far…”

MEXT (2011) The Vision for ICT in education

The vision for ICT in Education (2011)
- ICT utilization in education aims to enhance quality of education from the following 3 aspects:
  (i) Information education (cultivating children’s information literacy)
  (ii) Utilization of ICT in course instruction
  (iii) Introduction of ICT for school administrative works
ICT to support Zest for Living

Skills
- Experiment-based reporting
- Discussing
- Logical explanation
- Persuasive speaking

Basic Knowledge
- Learn & think themselves
- Make decisions
- Reach the solution

Balanced knowledge, moral and body

Role of ICT in Learning
- Interactive Learning
- Active Learning
  1. Mass Learning
  2. Individual Learning
  3. Cooperative learning

Need for creative ability based on diverse knowledge and flexible way of thinking in Knowledge-based society

Further need for co-existence with diverse cultures and international cooperation
Trend of ICT use in education (Japan)

Number of students per computer

<table>
<thead>
<tr>
<th></th>
<th>March, 2010</th>
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<tbody>
<tr>
<td>Primary school</td>
<td>8.1</td>
<td>6.7</td>
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<tr>
<td>Junior high school</td>
<td>7.6</td>
<td>6.4</td>
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Digital blackboard installation rate

- Primary schools: 75.8% in March 2010, 69.1% in March 2011
- Junior high schools: (n=21,105)

- Primary schools: (n=9,778)
- Junior high schools: (n=9,778)

Digital textbook availability

- Primary school (n=21,105): 85% available, 15% not available
- Junior high school (n=9,778): 86% available, 14% not available

Average number of digital blackboard owned

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Digital textbook availability

- Primary schools: 46% very much, 51% somewhat yes, 3% somewhat no, 0% not at all
- Junior high schools: 34% very much, 58% somewhat yes, 7% somewhat no, 3% not at all

Source: MEXT (2011)
http://www.mext.go.jp/a_menu/shotou/zyouhou/1308647.htm
Training opportunity for ICT use

Did you participate in teachers’ training for improving instruction ability in ICT use last year?

Primary school
(n=396,681)

- Yes: 27%
- No: 73%

Junior High School
(n=225,945)

- Yes: 19%
- No: 81%

n= total number of primary and junior high school teachers in Japan

Source: MEXT, 2011
http://www.mext.go.jp/a_menu/shotou/zyouhou/1308647.htm
ICT use case study

1. National workshops organized by JAVEA (Japan audio-visual education association) with MEXT in 2010 and 2011
   - 144 specific cases of ICT in classroom (137 schools) with 2,500 participants (2010)
   - 250 cases shared with 1,940 participants

2. 10 cases can be viewed at http://www.eduict.jp/movies/
Trend of ICT use in classroom  
(Findings from -2012 case study analysis)

1. **Equipment used:** Digital blackboard is mostly used.  
   - used in the half of the cases  
   - supported by supplementary budget (FY09)  
   - average installation rate is 1 unit per school  
   - need more equipment

2. **Contents used:** Still images, DVD/commercially-supplied learning software, and motion pictures are mostly used.  
   - digital textbook for teachers is mostly used

3. **Modality:** ICT is mostly used in  
   - Two-way interaction between teachers and students (61.5%)  
   - student’s presentation/practice (42%)  
   - ICT is utilized for interactive communication

4. **Most teachers perceive positive responses from students when ICT is used in class.**  
   - Increased attention and concentration

**Findings from -2012 case study analysis-**

(Keys for lesson improvement by using ICT)

1. **ICT use and academic development**
   - Main purpose of ICT use should be improvement of lesson for students’ academic development.
   - Instructors of the cases recognized effectiveness of ICT use for achievement of lesson goals

2. **Expression activity and ICT use**
   - Cases show examples of ICT use for enhancement of expression activity
   - Students can share information for deep understanding of lesson by using ICT

3. **ICT as a learning tool for students**
   - Cases using tablet PC for each student show examples of individualized and collaborative learning

4. **ICT use for experiment and observation activities**
   - ICT use for experiment and observation help students gain understanding in reality

5. **ICT use for lesson study**
   - It is necessary to set lesson goals and examine teaching materials for lesson improvement by using ICT

6. **Lesson goal and student’s ICT use**
   - Students use ICT as a learning tool. ICT use should not be the lesson goal.

Case 1
Japanese language for 2nd grade students

Let’s discuss your opinion using digital textbook

- Purpose: Discussion by using digital textbook
- Equipment: digital blackboard, digital textbook
- ICT use for discussion and presentation
- Teachers’ perception:
  - Most students’ expressed their opinions by writing on digital blackboard
  - Students seemed to express their opinions by using blackboard
- Movie: http://www.eduict.jp/movies/
Japanese for 2\textsuperscript{nd} grade students

Digital textbook is used to explains pinion by showing evidences – logics are needed.

Students present and discuss by showing their reasons for argument.

Students’ cards are displayed to identify and exchange their opinion.

Teacher’s perception
• Students are active in communicating own opinion
• Students are building their logic by presenting

Source: JAVEA (2012)
http://www.javea.or.jp/eduict/jirei/70.pdf
Movie: http://www.eduict.jp/movies/
### Case 2
Integrated study for 3rd grade students

#### “Our town-Sakai City”

- **Purpose**: students of different schools in Sakai city investigate their own city’s public facilities and discuss their findings for better use.
- **Equipment**: Digital TV, PC, Digital blackboard, TV conference system.
- **ICT use for**: interviews and investigation in communities and exchanging opinions.
Case 2
Integrated study for 3\textsuperscript{rd} grade

Students go out to the community and investigate the problem that the public library face in their town.

Students videotape interviews and discuss how to relate library activities to citizens.

Students from 2 schools present their findings and opinions and ask questions.

Teacher’s perception
- Students are confident by communicating their findings
- Students from different schools collaborate for their community

Source: JAVEA, 2011
http://www.chidigi.jp/pdf/jireishu00-10.PDF
Model Case 3
Science for 4th grade students

“Temperature and Volume”

- Purpose: To get student present their experiment to understand the increment in volume of heated air
- Equipment: Digital camera, Digital blackboard, Digital textbook
- ICT use for recording experiment, sharing information and presenting results.
Case 3
Science for 4th grade students

Teacher’s perception
- Students reviews process of experiment to improve the procedure
- Students learn how to manage information and present properly to communicate message.

Student records their own experiment by using a digital camera

Student presents and shares their experiment process and result with a digital blackboard

Teacher summarized the students’ experiment with assessment and review lessons

Source: JAVEA (2012)
http://www.javea.or.jp/eduict/jirei/74.pdf
Shared Issues

1. Teachers see potential of multiple ICT tools to motivate students’

2. Focus on non-cognitive skills development
   - Presentation/communication skill
   - Creative way to organize information
   - Higher interest on learning

3. Need of integration ICT-supported activities into curriculum and teacher training opportunity

4. ICT is a learning teaching tool. Use of ICT should not be the goal.
Thank you very much
• Backup slides
ICT use in Education in Japan

- Importance of ICT use in education was pointed out in several government reports and national strategies since 1980’s

“However, the use of CIT utilization of education in Japan has not been successfully advancing compared with other industrialized countries, having failed to achieve the government targets contained in those various National Strategies established so far…” MEXT (2011) The Vision for ICT in education

- The vision for ICT in education (2011)
  - Comprehensive policy on the utilization of ICT in education towards FY2020
  - ICT utilization in education aims to enhance quality of education from the following 3 aspects:
    (i) Information education (cultivating children’s information literacy)
    (ii) Utilization of ICT in course instruction
    (iii) Introduction of ICT for school administrative works
Case Study Analysis: Findings from 2011 Case studies

1. Good installation of digital tools benefits teachers to spend more time for material preparation.
2. Teachers elaborate and utilize their own teaching materials.
3. Digital blackboard is often used with digital contents based on textbooks.
4. Combined use of ICT and traditional blackboard is important.
5. In classroom, ICT is used for both teachers’ explanation and students’ presentation.
6. ICT can be effectively utilized for hands-on activities.

Source: JAVEA, 2011
Number of students per computer

Source: MEXT (2011)
http://www.mext.go.jp/a_menu/shotou/zyouhou/1308647.htm
Digital Blackboard

Digital Blackboard possession rate

Average number of digital blackboard owned

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Source: MEXT (2011)
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n= total number of primary and junior high schools in Japan
Digital Textbook

Primary school
(n=21,105)
- Available: 85%
- Not available: 15%

Junior high school
(n=9,778)
- Available: 86%
- Not available: 14%

n= total number of primary and junior high schools in Japan

Source: MEXT, 2011
Digital Contents

Is it necessary to fulfill digital contents based on textbooks?

Primary schools (n=1,303)
- Yes very much: 46
- Somewhat yes: 51
- Somewhat no: 3
- Not at all: 0

Junior high schools (n=596)
- Yes very much: 34
- Somewhat yes: 58
- Somewhat no: 7
- Not at all: 0

Source: MEXT, 2011
Digital Contents

Is it important to increase free or less expensive educational software?

Primary schools (n=1,303)
- Yes very much: 54
- Somewhat yes: 42
- Somewhat no: 4
- Not at all: 0

Junior high schools (n=596)
- Yes very much: 49
- Somewhat yes: 45
- Somewhat no: 6
- Not at all: 0

n= number of survey participating schools

Source: MEXT, 2011