Enhancing Curriculum, Pedagogy and Assessment to support the development of 21st century skills in our youngest learners

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Outline

1. What are 21st century skills?
2. Why are 21st century skills particularly important today?
3. What do educators need to know?
4. How can educators support the development of 21st century skills?
5. Issues related to technology use
6. Conclusions
WHAT ARE 21ST CENTURY SKILLS?
What are 21st century skills?

• Multiple definitions of 21st century skills exist
• The Partnership for 21st Century Skills (2011) has identified certain core skills that are necessary to be competent and productive in the 21st century
What are 21st century skills?

Learning and Innovation Skills (4Cs)

• Creativity
  – Being confident and proactive in trying new approaches while thinking creatively in day-to-day situations and in their own learning

• Critical thinking
  – Being able to solve problems by looking at them in a new way, by analyzing, using evidence and reflecting when linking learning across subjects, and/or applying the information to new situations

• Collaboration
  – Working together in groups to reach a goal by putting their talents, expertise and skills to work. It is the ability to share responsibility, exhibit flexibility and be respectful of others

• Communication
  – Competence in listening, speaking, reading, writing and sharing one’s thoughts

(Partnership for 21st Century Skills, 2001)
What are 21\textsuperscript{st} century skills? Beyond the Framework

• Research suggests additional 21\textsuperscript{st} skills are important
  – Using imagination
  – Being inquisitive and self-directed
  – Working in teams
  – Taking risks
  (Jerald, 2009; Garriock, 2011)

• 4Cs + 3Rs in early childhood

  Creativity, critical thinking, collaboration and communication + \textbf{Reading}, \textbf{wRiting} and \textbf{aRithmetic}
WHY ARE 21ST CENTURY SKILLS PARTICULARLY IMPORTANT TODAY?

Changes in the work force and nature of work
Speed of technology change and implications for early educators
Why are 21st century skills particularly important today?

The Future of 21st Century Work

IN MORE DEVELOPED COUNTRIES

- Research
- Development
- Design
- Marketing & Sales
- Global Supply Chain Management

IN LESS DEVELOPED COUNTRIES

DONE BY PEOPLE

DONE BY MACHINES

Creative Work

Routine Work

Routine Work

Source: Trilling & Fadel, 21st Century Skills, 2009
Why are 21\textsuperscript{st} century skills particularly important today?

- Knowledge workers, when skilled and connected, can work anywhere
- Technological change has changed the way we work and play
- Need for life-long learning
Why are 21\textsuperscript{st} century skills particularly important today?

Speed of Technological Changes: From this...
Speed of Technological Changes: ...to this

- WhatsApp
- Viber
- Twitter
- WeChat
- Gmail
- Facebook

Modern devices and applications.
Why are 21st century skills particularly important today? Speed of technological changes
Why are 21st century skills particularly important today?
Speed of technological changes
Why are 21st century skills particularly important today?
What implications does the speed of technological change have for early educators?

- With information so readily available, the need to learn and memorize facts diminishes
- Today’s kindergarteners will enter the workforce in 2035. We do not know what the world will be like then, but we do know that they need to be able to “Learn to learn” and possess critical thinking skills
- Importance of domain-specific knowledge. Knowledge and 21st century skills are not separate
- We still have to teach the 3Rs and encourage practice
What do educators need to know?

Early years are critical
Importance of quality
Early learners and technology
Characteristics of today’s learners

What do educators need to know?
What do educators need to know?
Early years are critical

• Brain plasticity—the brain is very sensitive to environmental influences

• Emotional and physical health, social skills and cognitive-linguistic capacities that emerge in the early years are all important foundations for the development of 21st century skills
What do educators need to know? Importance of quality

• The quality of early learning environments is related to child outcomes
  – Structural and system quality (regulatory variables)
    • Physical setting – health and safety standards
    • Teacher qualifications
    • Teacher/child ratio: Group size
  – Process quality
    • Staff-child interactions
    • Curriculum – age appropriate with educational content
  – Management-related quality
    • Leadership and supervision
    • Mentoring/Coaching
    • Opportunities for professional development
What do educators need to know?
Early learners and technology

• We are supporting Digital Natives

• Prensky (2001) defines digital natives as those born into an innate "new culture", while the digital immigrants are old-world settlers, who have lived in the analog age and have immigrated to the digital world. Immigrants struggle more than natives to adapt to hi-tech progress

• Digital natives are the first generation of children fluent in the language of digital technologies (e.g., computers, video games)

• Children in the developed world are growing up mobile
What do educators need to know?
Early learners and technology

Growing Up Mobile
In the two years since Common Sense Media first reported on the media use of 0- to 8-year-olds, our latest survey in the series, Zero to Eight: Children’s Media Use in America 2013, shows the media environments and behaviors of young kids have changed. More than ever, they’re growing up mobile.

3/4 of all kids have access to mobile devices at home.

Smartphones are still the most common device (63%, up from 41%), but tablet ownership is 5 times higher (8% to 40%) than it was in 2011.
What do educators need to know?
Early learners and technology

The number of kids who've used mobile devices has nearly doubled since 2011 (38% to 72%).

Average daily use of mobile devices has tripled, from 5 to 15 minutes a day.

TECH SAVVY TODDLERS:
In 2011, 10% of kids under 2 had used a mobile device.
Now, that's grown to 38% of all kids under 2.

Traditional screen time is down but mobile screen time is up.

↓ :31  ↑ :10
What do educators need to know? Early learners and Technology

Shift in daily screen time, 2011-2013

Despite the move to mobile, TV still dominates kids’ screen time.

Of the nearly two hours of screen time (1:55), 50% is spent in front of TV sets ... but the when and how is changing.
What do educators need to know?
Early learners and Technology

Access to mobile media devices has risen among lower-income families, up from 22% to 65% ... but the “digital divide” between rich and poor persists.

In lower-income families*:
- 20% have tablets (up from 2%)
- 46% have high-speed internet access

In higher-income families*:
- 63% have tablets
- 86% have high-speed internet access

* lower-income is defined as families earning less than $30,000 a year
* higher-income is defined as families earning more than $75,000 a year

The digital divide impacts access to educational content, too.
TV still rules as the most widely-used platform for educational content (61%), compared to mobile devices (38%), and computers (34%).

Across ALL families, 54% of higher-income kids use educational content on mobile devices, but only 28% of lower-income kids do.

It’s mainly an issue of access. This gap disappears for computer owners and diminishes for those who own mobile devices.

Among kids who own mobile devices, those who sometimes/often use educational content on:
What do educators need to know?
Early learners and technology

• We investigated the usage pattern of electronic devices among Chinese preschoolers and the impact on school readiness.

• Parents of 567 K3 Chinese children (mean age = 5.5) from 20 kindergartens in Hong Kong responded to a questionnaire on family environment and children’s usage of electronic devices. Teachers assessed the children’s school readiness using the Chinese Early Development Instrument.
What do educators need to know?
Early learners and technology

- Preschoolers had an average daily screen time of 147 minutes. Increased usage of electronic devices was generally associated with poorer school readiness.

- Placing a television in the child’s bedroom was negatively associated with being “Very Ready” in the physical well-being and cognitive development domains.

- Parental control of electronic devices was associated with higher school readiness. Wealthier families owned more electronic devices but children spent less time on them. The negative effects from the use of electronic devices were more pronounced in children from lower socio-economic backgrounds.
What do educators need to know? Early learners and technology

Source: Ip, Rao et al., 2015
What do educators need to know?
Characteristics of today’s learners

Digital children:
How they think and learn

"I tapped the page, but nothing happened!"

"They're OK, I guess. I just wish I could change the font."

“GLASBERGEN”
Choosing Curriculum Models
Curriculum Guidelines
Instructional Approaches
Assessment
Leadership

HOW CAN EDUCATORS SUPPORT THE DEVELOPMENT OF 21ST CENTURY SKILLS?
Choosing curriculum models

• 4Cs + 3R

• A variety of curriculum models exist for the early years

• “Global” versus “developmentally-focused” curricula (Yoshikawa et al., 2013)

• General versus content specific curricula (Auger, Jenkins & Burchinal, 2014)
  – Few global curricula have been rigorously evaluated
  – Developmentally-focused curricula have been recently evaluated and have had positive results → intensive professional development and monitoring of child progress is needed
Average cognitive impact at end of treatment

(Source: Duncan, 2015)
Choosing curriculum models
Evidence-based and culturally appropriate

• Characteristics of Boston pre-K Curriculum
  – Evidence informed mathematics, literacy and behavioral curricula
  – Intense professional development component

• Some examples from Hong Kong
  – Chan & Rao, 2013 (Curriculum Models)
  – Li, Rao, & Tse, 2012 (Chinese Literacy)
  – Ng & Rao, 2008 (Numeracy)
## Domains covered by curriculum guidelines

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Curriculum guidelines

Singapore Nurturing Early Learners (2012)
• Aesthetics and Creative Expression
• Discovery of the world
• Language and Literacy
• Motor Skills Development
• Numeracy
• Social and Emotional Development

Hong Kong Guide to the Pre-primary Curriculum (2006)
• Physical Fitness and Health
• Language
• Early Mathematics
• Science and Technology
• Self and Society
• Arts
Curriculum guidelines

Curriculum Guidelines in Hong Kong

A pre-primary curriculum geared towards providing a high quality, integrated early education and childcare service should have the following key features:

- Relevant and appropriate content to match children's needs and interests
- Provision of learning experiences that build on children's prior knowledge and previously acquired skills
- Learning through play
- No text books at the nursery class level. Lower and upper kindergartens may use resource packages as learning materials
- Opportunities for children to engage in self-initiated activities
- Theme-based learning
- Use of mother tongue as the medium of instruction
- Observation records on children's performance and progress made in various developmental aspects as the core assessment data
- Strong collaboration among practitioners, parents and community service workers
Instructional approaches

• Children who used a large number and range of learning materials at age 4 had higher cognitive development at age 7

• Children who had more highly educated teachers at age 4 performed better in language at age 7

• Children who made choices about what they did, and who worked in small groups for at least 50% of the time, showed enhanced language and cognitive development at age 7

• Where teachers and caregivers supported children’s learning in small groups, they were more able to support and respond to children’s individual needs, abilities and diverse languages

IEA Pre-primary Study, High/Scope Foundation, 2007. (15 country study)
Instructional Approaches

• Intentional teaching, individuation and educational focus important (Camilli et al., 2010)

• Child-centered versus didactic instruction

• Developmentally appropriate versus didactic versus mixed approach (Marcon, 2002)
Instructional approaches
Research evidence and implications

• Developmentally Appropriate Practice (DAP) approach

• Tools of the Mind (Bodrova & Leung, 2006)

• DAP is possibly best for younger children, but older preschoolers should be prepared for literacy, numeracy, and the transition to primary school (Melhuish et al., 2015)
Instructional approaches
Changing culture to teach the 4Cs

• Teacher is no longer a transmitter of knowledge, but someone who orchestrates the process of learning. Emphasis on knowledge construction

• The need to create a culture of enquiry

• Student-centered methods (Project-based learning)

• Teachers use methods that they believe are most effective in facilitating learning

• Need for great collaboration among teachers
Instructional approaches
Challenges in teaching 21st century skills

• How should we teach self-direction, collaboration, creativity, and innovation? Commonly agreed upon approaches to teaching these skills have not been articulated.

• There is a lack of research of how we can teach skills such as collaboration and self-direction effectively.

• The plan of proponents of 21st century skills seems to be to give students more experiences that will presumably develop these skills: for example, working in groups BUT experience is not the same thing as practice. Need practice and feedback.
Instructional approaches
Challenges in teaching 21st century skills

- Skills need to taught in the context of particular content knowledge, with both treated as equally important
- We cannot assume that mandating their teaching will result in students learning them
- Teachers can be said to have taught, only when learners are observed to have learnt
Instructional approaches
Pedagogical strategies for the 4Cs

• Nurture a sense of wonder
  Let children investigate, experiment, ask questions
  ✔ (Jonathan and the Homeless Snail p. 47 Learning Stories)

• Emphasize effort over ability
  ✔ Scoop with confidence and Pour with Satisfaction p. 59
    Learning Stories)

• Encourage use of objects/materials in multiple centers/areas
  and diverse ways
  ✔ (It’s Lightning p. 40, Learning Stories)
Instructional approaches
Pedagogical strategies for the 4Cs

• Ask questions that help extend students’ learning
  What, why, how questions
  ✓ (Drinks for Sale p. 44 Learning Stories)

• Help children identify patterns
  ✓ (Come and build with me - blocks arranged in the same order of colors as traffic lights; p. 22 Learning Stories)
Instructional approaches
Pedagogical strategies for the 4Cs

• Use technology to motivate and enhance learning experiences
  ✓ *(Will the Rainbow be Frozen? P, 53, Learning Stories)*

• Encourage collaboration among children
Assessment

- Methods to observe and document young children’s learning and development:
  - Checklists
  - Rating scales
  - Running and anecdotal records
  - Photographs
  - Video recordings
  - Portfolios
  - Transcriptions of conversations and even discussions with parents. (ECDA, 2015)

- Early Years Development Framework (EYDF)

- Nurturing Early Learners Framework (NEL) articulates the importance of documenting children’s learning
Assessment of 21st century skills

- After delineation of developmentally appropriate 21st century skills and shared understanding of these, a balance of different methods of assessment is needed

- Assessment FOR learning. Feedback on student performance should be part of everyday learning

- Need a balance of formative and summative assessments that measure student mastery of developmentally appropriate 21st century skills

- Greater use of portfolios of student work that demonstrate mastery of developmentally appropriate 21st century skills

- Need a balanced portfolio of measures to assess student progress in attaining developmentally appropriate 21st century skills
Leadership

• Leadership and child outcomes

• Five faces of early childhood leadership
  – Administrative leadership
  – Pedagogical leadership
  – Community leadership
  – Conceptual leadership
  – Advocacy leadership

(Kagan & Bowman, 1997)
Leadership

• Leaders at all levels
  – Vision and shared understanding
  – Curriculum leadership
  – Commitment to quality assurance and enhancement
  – Effective communication
  – Balancing managing and communicating
Digital divide
Recommendations on technology use
Importance of Co-viewing and Joint Media Attention
What should not change

ISSUES RELATED TO TECHNOLOGY USE
Digital divide

App Gap

• Children from more advantaged families are more likely to use mobile devices and apps than children from less advantaged families

Exposure to the Media

• Children whose parents did not have a college degree spent 90 minutes more per day exposed to the media than children from higher SES counterparts
Issues related to technology use

• Different views about technology use in early childhood classrooms

• When used appropriately, technology can support young children’s learning and relationships with peers and adults

• It is not necessarily just about the amount of time spent, but it is about the content and the context! What you choose to show children, matters

• Distinction between non-interactive and interactive media
Recommendations on Technology Use

• No exposure to electronic screens under 2 years

• No more than 1-2 hours per day of screen media
  – for children aged two or above
  
  (American Academy of Pediatricians, 1999)

• Technology and interactive media recognized as valuable tools  Technology and interactive media should not replace other beneficial educational activities e.g., outdoor play, social interactions with peers and adults

  (NAEYC & Fred Rogers Center, 2012)
Importance of Co-viewing and Joint Media Attention

- Joint media engagement (JME) refers to spontaneous and designed experiences of people using media together.

- JME can happen anywhere and at any time when there are multiple people interacting together with media.

- Modes of JME include viewing, playing, searching, reading, contributing, and creating, with either digital or traditional media.

- JME can support learning by providing resources for making sense and making meaning in a particular situation, as well as for future situations (Stevens & Penuel, 2010).
What should not change?

• Teacher and parent support for socio-emotional development, the development of learning-related skills and self-regulation

• Emphasis given to the home environment

• Parents should be encouraged to foster 21st century skills at home → way to do this
CONCLUSIONS
Conclusions

Foster the development of 21\textsuperscript{st} century skills – it is important to give adequate attention to the early years.

Realize that we are facilitating “digital children” who are surrounded by technology, who engage in non-linear thinking, have short attention spans and fast response times.

Use evidence-informed practices for curriculum development, instruction and assessment.

Be sensitive to context, and be aware of the issues related to the development of 21\textsuperscript{st} century skills.

Be a leader in preparing our youngest learners.
THANK YOU