Learning Global Competencies
Through Immersion

Chris Dede
Harvard University

Chris_Dede@harvard.edu

https://www.gse.harvard.edu/faculty/christopher-dede
The Core Challenge We Face

- Shifts in the knowledge and skills society values
- Development of new methods of teaching and learning
- Changes in the characteristics of learners

Doing Better Things rather than Doing Things Better
What is “Success”?

In the past five years, which students of yours were the most impressive to you?

- Not grades
- Not high stakes test scores or academic awards
- Not admission to elite universities

Potential positive impact on civilization

Which of their attributes led to that judgment?
Social Media Gave Everyone a Voice

The Conversation Prism debuted in 2008 as social media was exploding online. Social media would change everything about how we communicate, learn and share. It forever democratized information and reset the balance for influence.

The Conversation Prism was designed as a visual map of the conversational networks that continue to reshape everything. Its purpose is to help you understand and appreciate the landscape so that you can play a productive and defining role in the conversations shaping our future.

For more information check out conversationprism.com
Jenkins’ Framework for New Literacies

- **Play** — experimenting with one’s surroundings in problem-solving
- **Performance** — adopting alternative identities for improvisation and discovery
- **Simulation** — interpreting and constructing dynamic models of real-world processes
- ** Appropriation** — the ability to meaningfully sample and remix media content
- **Multitasking** — scanning one’s environment and shifting focus to salient details
- **Distributed Cognition** — fluently using tools that expand mental capacities
- **Collective Intelligence** — pooling knowledge with others toward a common goal
- **Judgment** — evaluating the reliability and credibility of different information sources
- **Transmedia Navigation** — the ability to follow the flow of stories and information across multiple modalities
- **Networking** — the ability to search for, synthesize, and disseminate information
- **Negotiation** — the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms
Digital Teaching Platforms
(Dede & Richards, 2012)

Player Piano | Jazz Combo

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<th>Work</th>
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The Future of Skills: 2030

- Judgment and Decision Making
- Fluency of Ideas
- Active Learning
- Learning Strategies
- Originality Abilities
- Systems Evaluation
- Deductive Reasoning
- Complex Problem Solving

OECD 2030

- Creating New Value
  - adaptability, creativity, curiosity, and open-mindedness
- Reconciling tensions and dilemmas
  - thinking in a integrated way that recognizes interconnections; thinking systemically
  - understanding the needs and desires of others
- Taking responsibility
  - Acting ethically
  - Self-control, self-efficacy, problem-solving
Today's children can meet future challenges if their schooling and informal learning activities prepare them for adult roles as citizens, employees, managers, parents, volunteers, and entrepreneurs.
# Dimensions of Advanced Knowledge and Skills

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“Deeper Learning”

- Case-based learning
- Collaborative learning
- Apprenticeships
- Self-directed, life-wide learning
- Learning for transfer
- Interdisciplinary studies
- Diagnostic assessments
Cone of Learning (Edgar Dale)

After 2 weeks we tend to remember...

- 10% of what we READ
- 20% of what we HEAR
- 30% of what we SEE
- 50% of what we HEAR and SEE
- 70% of what we SAY
- 90% of what we both SAY and DO

Nature of Involvement

- Verbal Receiving
- Visual Receiving
- Receiving / Participating
- Doing
- Participating in a Discussion
- Giving a Talk
- Doing a Dramatic Presentation
- Simulating the Real Experience
- Doing the Real Thing

Immersion
Continuum of **Immersive Media**
Delivery Methods for Immersion

PC virtual simulations

Smartphone-based interactive 360 videos and augmented reality

PC virtual reality headsets
360 videos

traditional content (text, videos)

assessments

interactive navigation

PC Browser

Smartphones
+ VR Lenses

GearVR

Oculus Go
Real Teacher

Virtual Students controlled by hidden human puppeteer
Welcome. EcoLearn is an educational research group at the Harvard Graduate School of Education that explores the use of advanced immersive technologies to support learning about the complex causal dynamics of ecosystems.

EcoMUVE is a curriculum that uses immersive virtual environments to teach middle school students about ecosystems and causal patterns.

EcoMOBILE is an extension of the EcoMUVE curriculum that blends immersive virtual environments and real ecosystems infused with digital resources.

EcoXPT is a new project being designed to work alongside EcoMUVE to support experiment-based inquiry in immersive virtual environments.

The EcoMOD project will explore the power of immersive virtual environments to support computational thinking and ecosystem science learning in elementary grades.
EcoMUVE to EcoXPT

Inquiry based on Observation
Can infer correlations

Inquiry based on Experimentation
Can infer causation

Supporting Causal Reasoning in Complex Systems
Situated Experimentation in EcoXPT

- Provides epistemologically authentic experimentation and investigation, extending student comprehension of causal relationships.
- Experimental tools allow students to gather confirming evidence and to test misconceptions.
  - Tolerance Tanks
  - Tracers
  - Comparison Tanks
  - The Weather Simulator
  - Mesocosms
  - The Buoy
- Supports students as they build and test their own hypotheses about why the large fish died.
### Database of Logdata - Track students’ behaviors: where they went, what data they collected, path to solve problem

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- **Logfiles:** Events, Chats, Notebooks...
Tools for Transformational Insights
The Next Wave of Disruption/Transformation

EXPERIENCE ON DEMAND
WHAT VIRTUAL REALITY IS, HOW IT WORKS, AND WHAT IT CAN DO

JEREMY BAILENSON
Research-based Overview
Affordances

Authentic experiences for teacher / parent learning

Authentic assessments of individuals and groups

Reduced cost and risk

Technology-assisted data collection

Standardized authentic training and testing scenarios

Large distribution via web and smartphones
A Different Model of Teaching

- Experiences central, rather than information as pre-digested experience
- Knowledge is situated in a context and distributed across a community
- Reputation, experiences, and accomplishments as measures of quality
Core Principles of Professional Development

- Teachers teach as they were taught.
- The important issue is not technology usage, but changes in content, pedagogy, assessment, and learning outside of classroom.
- Continuous peer learning is the best strategy for long-term improvement.
Professional Development: Communities of “Unlearning”

- Developing fluency in using emerging interactive media
- Complementing presentational instruction with collaborative inquiry-based learning
- Unlearning almost unconscious assumptions and beliefs and values about the nature of teaching, learning, and schooling
Challenges in Unlearning: Individual

- A leader unlearning the practices that underlie one role to instead use a new set of practices for a new role (shifting from command-and-control to distributed leadership)

- A teacher/professor transforming instructional practices from presentation/assimilation to active, collaborative learning by students (using the case method of teaching, or using project-based learning)

Is what I am trying to shift a threat/challenge to my identity, to how I see myself, or how I see the world?
Quarterback Decision Making
Rizzo: VR for PTSD

Bravemind
PTS Virtual Reality Exposure Therapy

14 Diverse Customizable Scenarios
Slater: VR for Empathy

**PERFORMER**
Mimics the movement of the user.

**USER**
Can see, move, and touch the space through performer's perspective while listening to their narrative.

**IMAGE SEEN BY THE USER**
Shows the first-person perspective of the performer.
Challenges in Unlearning: Organizational

- An educational organization transforming from credentials certified by seat-time and standardized tests to credentials certified by proficiency on competency-based measures, irrespective of student time taken to accomplish this.

- An educational organization that (perhaps unconsciously) discriminates against certain types of people transforming its individual and institutional behaviors to actively promote diversity and equity.

Is what we are trying to shift a threat/challenge to my identity, to how I see myself, or how I see the world?
Three key areas in which machine bests humans:

- consume huge amounts of data
- receive thousands of inputs at once
- create a unified model of knowledge across that scale of information and make judgments from it

Timothy Estes, founder and CEO of Digital Reasoning
But Humans...

- Have access to a LOT more [diverse] data than a machine:
  - building intuitions and holistic pictures in our mind
  - seeing connections that the machine might not even have the possibility of seeing because it doesn’t have the right data.

- Have a powerful role in figuring out the sources of data to give the machine and projecting their intuition.
Learning WITH the Machines

Deep Learning (A.I.) + “Deeper Learning” (H.I.)
= Augmented Intelligence

© Center for Curriculum Redesign
Thinking about “Pipelines”

- Grade Progressions based initially on age, then on prior schooling
  - K-12 and and 13-14 and 13-16 and 17-18, 20, 24…
  - K-16
  - preK-20

- Age Progression based on life-stage and personal evolution
  - Assumption that this next generation will typically live until 90+
  - Assumption that must work until approximately 75 to cover retirement
  - Assumption that people about age 15 start to plan about their first career

The Sixty Year Curriculum (60YC)
The 60 Year Curriculum (60YC)

Services and experiences that encompass learning

- to prepare for a lifelong series of careers
- to excel in the roles that a succession of social, civic, and professional opportunities present
- to engage in post-career activities

resilience and creativity given social, civil, and professional uncertainty, challenge, and opportunity
# DCE/HGSE 60YC Workshop

## Literacies
- Tech/Machine
- Data
- Human

## Competencies
- Critical Thinking
- Systems Thinking
- Entrepreneurship
- Cultural Agility

<table>
<thead>
<tr>
<th>Pre-Career</th>
<th>Career 1</th>
<th>Career 2</th>
<th>Career 3</th>
<th>Retirement</th>
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</thead>
<tbody>
<tr>
<td>K-12</td>
<td>2-4 yr College</td>
<td>Prof Cert.</td>
<td>Masters</td>
<td>Prof Dev.</td>
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<tr>
<td>M.A., Ph.D.</td>
<td>Job Training</td>
<td>60 yr Coaching</td>
<td>60 yr Coaching</td>
<td>60 yr Coaching</td>
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</table>

Purposefully offer the Flow
## DCE/HGSE 60YC Workshop

<table>
<thead>
<tr>
<th></th>
<th>Career Prep</th>
<th>Career Advancement</th>
<th>Job Change</th>
<th>Career Change</th>
<th>Leadership</th>
<th>Retirement</th>
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<tbody>
<tr>
<td>Knowledge &amp; Experience</td>
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<tr>
<td>Teaching &amp; Learning</td>
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<tr>
<td>Leadership &amp; Planning</td>
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<tr>
<td>Evaluation &amp; Outcomes</td>
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</tbody>
</table>
Overview of Stanford and GaTech

- A series of “loops” over the course of a lifetime, with mid-career refreshment for older students and work in the world for younger.
- A focus on skill acquisition/competencies rather than disciplinary topics and academic field.
- Personal-paced learning programs over six years distributed across time and space.
- Declaring a purpose rather than a major: mastery with meaning.
- Globalization at home with an emphasis on inter/intrapersonal.
- Microcredentials, minimester classes, and credit for accomplishment measured by demonstrated competencies.
- Personalized advising and learning based on AI.
- A distributed worldwide presence with Living Libraries.

Potential Aspects of a 60YC Model
Question for Discussion

Would you advise a young person you are mentoring to give preference to a higher education institution that offered a 60YC approach?

- Why or why not?
Supporting Inquiry through Modeling

Computational modeling and programming activities are integrated with an immersive ecosystem such that the epistemic goals of science are visible to young learners.

**Immersive Ecosystem:**
- Authentic Ecosystem
- Observation and Data Collection
- Develop theories and build causal relationships

**2D Programming Environment:**
- Test theories by programming the behavior of agents in the system
- Assess how well the computer model “fits” with the immersive ecosystem

**Modeling Cycle:**
Movement between mediums to iteratively refine & test theories.
Woodpeckers as A Keystone Species
Constructing explanations

“Were there measurements that surprised you? If so, tell us why?”

“Was the pond healthy? Explain why.”

Students exposed to EcoMUVE provided richer explanations

Explanations included:
- plausible scientific mechanisms
- connections to prior knowledge
- comparison among variables
Concept Map Tool
GoPro Cameras Capture EcoMOBILE Experience