Digital Learning: Promises and Possibilities for the Science of Learning in a Post-Pandemic Educational Landscape

Part 1:
How has COVID changed assessment-evaluation-feedback, curriculum, time, and the student profile in Education

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Background

- **Professor, Harvard University Extension School**: “The Neuroscience of Learning: Introduction to Mind, Brain, Health and Education science”

- **OECD**: Member of the expert panel on Teachers’ New Pedagogical Knowledge based on contributions from Technology and Neuroscience

- **Associate Editor** of the Nature Partner Journal Science of Learning

- Interdisciplinary researcher in **neuroscience, cognitive psychology and education** (cultural anthropology and linguistics).

- **Boston University**: BA, BS, magna cum laude; **Harvard University**: Master’s in International Educational Development; **Capella University**: Ph.D. in Professional Studies in Education (Mind, Brain and Education Science)

- Teacher at all levels of education (K-University, continuing education) with more than 30 years of experience in 40 countries.
Three part series:

Digital Learning: Promises and Possibilities for the Science of Learning in a Post-Pandemic Educational Landscape

• Part 1: **Session 1** (macro): (a) assessment-evaluation-feedback; (b) curriculum; (c) the use of time and space; and (d) the changing student profile.

• Part 2: **Session 2** (meso): instructional design of educational experiences has changed forever thanks for new digital tools for learning.

• Part 3: **Session 3** (micro): pedagogical practices that are supported by evidence in the learning sciences which can be used with equal success online as in face-to-face contexts.

https://tdlc.ucsd.edu/GSLN/overview.html
A Flipped Conference

1. Before the synchronous meeting:
   - Please watch this video
   - Get curious!
   - Send in any questions or topics you want to focus on

2. During synchronous meeting:
   - Your ideas are the focus of a deeper discussion
   - Broader sharing of ideas (breakout room discussions in small groups)
   - Deeper exploration of concepts

3. After synchronous meeting
   - Reflection (3-2-1)
   - Extension (bundles)
   - Transfer to new contexts

https://www.wellplannedweb.com/2016/04/why-were-flipping-the-funnel/
Today

1. Brief review of pre-encounter video:
   • Assessment-evaluation-feedback
   • Curriculum: What is worth teaching?
   • The use of time and space
   • The changing student profile
2. Facilitate discussion around the ideas from participants
   • Direct response
   • Group response
3. Please use the chat!
Bringing the Neuroscience of Learning to Online Teaching

• Beyond “Emergency Remote Online Teaching”
• Long-lasting changes in Education framed by the “COVID-19 Opportunity”
• What will remain after the pandemic is gone?

Quick Review of Video Content
Assessment-Evaluation-Feedback: Different but related

Assessment

Feedback

Evaluation

"Academic Achievement"

Diagnosis (baseline)

What to improve

Formative or Summative

Worth as a student
Why evaluate?

- Standardized testing brought into question
- U.S. students are some of the most tested in the world (112 tests K-12) (Layton, 2015, p. E-1)
- Multiple choice tests do not evaluate all competencies equally well

We foster our students’ love for learning, encourage them to try new and exciting things. …We intend that all children should enjoy their learning, achieve their potential and become independent life-long learners.

Source: Author, based on Wiggins & McTighe, 2005
Different evaluation tools measure different competencies:

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Attitudes</th>
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<td><strong>Examples</strong></td>
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<td>Quizzes and Tests (multiple choice; fill in the blank)</td>
<td>Tests (open-ended problems)</td>
<td>Observation over time</td>
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<td>Demonstration</td>
<td>Thinking Routines (“I used to think . . . Now I think . . .”)</td>
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<td>Simulation</td>
<td>Collaborative activities (debate, group projects, discussion)</td>
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<td>Project-based learning</td>
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<td>Inquiry-based learning</td>
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<td>E-portfolios over time</td>
<td>Journaling</td>
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* E-portfolios over time
• K-12 “defense” of testing process due to university requirements

• The decline of the SAT? Openness of universities to consider alternate routes of evaluating “successful” students
Assessment-evaluation-feedback

- New technologies and better tools
- E-portfolios
  - More actors
  - Measures or Progress, Process and Products
  - Assessment over time

13 May 2021

https://cat.xula.edu/food/tag/eportfolio/
Why evaluate?

• To rank? Judge?

As a teaching tool?

Gap Analysis ("V" Analysis)

Where I am now

- What needs to happen
- What keeps me from the goal

Where I want to be

- I want to create bundles to differentiate
- I want to use differentiating pedagogies
- I want to learn about accommodations to differentiate
- I want to learn to flip to have more time to attend to individual needs
- ...

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Tokuhama-Espinosa
Curriculum: What is worth teaching?

Reassessment of priorities in education

• Why do we educate?

• How should we teach to meet all students’ needs?

• How can we best respond to individual gaps in knowledge that prevent students from mastering understanding?

• Are we evaluating the right things?

• Are there new tools to assess?

• What should we be teaching?
Curriculum: What is worth teaching?

Time shortages due to COVID-19

1. Priorities:
   • Mental health
   • Critical thinking
   • Leverage problem-based teaching and learning to both save time and “cover” multiple subjects in a single activity

2. What is the role of school (universities) in society?
The use of time and space

• Before the pandemic, it was thought of in terms of space; since the pandemic, we think of time. Before we used to think of class time and homework; now we talk about synchronous and asynchronous learning activities.
The use of time and space

• Changed forever are:
  1. the school calendar
  2. the differences between synchronous and asynchronous learning,
  3. time for communication, and
  4. the time we give to activities like evaluation.
Figure 4.2. Decision Tree: Asynchronous vs. Synchronous, Explicit vs. Implicit, Digital vs. Analog

Q. When should you use Digital Resources?
A. When they best meet your Objective.

Do you have a clear Objective?

- Asynchronously
  - Is the Objective best met Asynchronously or Synchronously?
    - Asynchronously
    - Synchronously

Modality

- Online
  - Implicit instruction
    - Digital Technology
  - Explicit instruction
    - Digital Technology

- Offline
  - Implicit instruction
    - Digital Technology
  - Explicit instruction
    - Digital Technology

Pedagogy

- Implicit instruction
  - Digital Technology
- Explicit instruction
  - Digital Technology

Activity or Resource

- Other
- Other
- Other
- Other
- Other
- Other
- Other
- Other

Revisit Understanding by Design:
What are the knowledge, skills, and attitudes you want each student to have by the end of this lesson / class / unit / semester?
The changing student profile

- Traditionally excluded learners
  - Prison populations
  - Pregnant teens
  - Students absent due to long-term illness
- Work
- Non-traditional learners
  - Older demographics
  - Re-training; Upskilling
- Potential response to the existential crisis in university education?
  - The global schoolhouse: A new reality?
  - The best qualified teachers available to all?
Challenges

Inequities

• The move online has revealed (exacerbated) many inequities in society, most especially in public schools.
  • Poor infrastructure and lack of Internet
  • Quality of the teacher
    • Teacher education
    • Education and Technology
    • Roles of IT Departments, instructional designers, versus “common knowledge” for all educators?
  • Policy
  • Research

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Great questions!
Flipped conference: Options

1. Directly respond to questions sent in before based on the pre-encounter video
2. Facilitate discussion around the comments sent in based on the video
3. Seek out and respond to new questions posed in the chat
4. (Work from my own agenda or that of the sponsors)
Your agenda

1. Learning analytics (dangers of)
2. Role of teachers as caregivers in this changing landscape
3. Mental Health
4. Wider community of actors (parents) involved in education
5. Feedforward
6. Priorities in education (COVID-catalyzed)
   • What is worth teaching?
Learning Analytics
Learning analytics

- **Kristin**: I'm really interested to learn more about the dangers of learning analytics!
- How can we leverage that data effectively while also being respectful of individual student learning journeys and the inherent variation therein?
- What should we keep in mind when engaging with this data?

• Students take an average of 4-5 minutes
• Between 1-20 attempts
• Average score was 94/100

**Average time spent in Canvas**

• The average number of hours spent in the Canvas course was 288:39 hours
Data is only as good as the person who interprets it.

• Companies overpromise the reach of their tools.

• Technology has exponentially increased the amount and types of data that can be gathered but "Not everything that counts can be counted, and not everything that can be counted counts." (Attributed to William Bruce Cameron, 1963)

• “Learning Analytics can be discriminatory, oppressive and ultimately disadvantageous"
Promising solution?

- Co-development of learning analytics specific to particular classroom and clear teacher objectives.
- Why? Because “predictive models” need to be tailored to context.
- See:
Do we need teachers if we have Google?
Teachers as (non)essential workers

• **Yadhira**: Some people think that the pandemia shows that teacher are not essential in education?

• How can you answer this?
Sugata Mitra: A Hole in the Wall

- Professor of Educational Technology at the School of Education, Communication and Language Sciences at Newcastle University, England.
- **Hypothesis:** “The acquisition of basic computing skills by any set of children can be achieved through incidental learning provided the learners are given access to a suitable computing facility, with entertaining and motivating content and some minimal (human) guidance” (1999)
Sugata Mitra: A Hole in the Wall

- **Results:** Given free and public access to computers and the Internet, a group of children can:
  - *Become computer literate on their own,* that is, they can learn to use computers and the Internet for most of the tasks done by lay users.
  - *Teach themselves* enough English to use email, chat and search engines.
  - *Learn to search the Internet for answers* to questions in a few months time.
  - Improve their *English* pronunciation on their own.
  - Improve their *mathematics and science* scores in school.
  - Answer examination questions *several years ahead of time.*
  - Change their *social interaction skills and value systems.*

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[https://en.wikipedia.org/wiki/Minimally_invasive_education](https://en.wikipedia.org/wiki/Minimally_invasive_education)
[https://www.youtube.com/watch?v=dk60sYrU2RU&t=78s](https://www.youtube.com/watch?v=dk60sYrU2RU&t=78s)
Figure 3.2. Understanding by Design

- Objectives:
  - Dates, facts, figures, concepts, theories, places, rules, ...
  - What is (are) the knowledge, skill(s), and attitude(s) that will be achieved?

- Learning Outcomes:
  - What indicators of success or evidence will be accepted?

- (Educational) Competencies:
  - What activities, methodologies, strategies, and resources are needed?
  - The ability to apply the knowledge

- Enduring Understanding:
  - Attitudes

- Important to Know How to Do:
  - Skills

- Worth Knowing:
  - Knowledge

Source: Author, based on Wiggins & McTighe, 2005
Promising solution?

Lesson: Let the Computers Do What Computers Do Best, and Let People Do What They Do Best. Technology is here to stay. Most recognize that technology is a tool, and neither inherently “good” nor “bad”; it is the way we use it that counts. Teachers save time using technology, which they can then use to do the more humane parts of our job, like motivating, building up resiliency, and caring for our students. Synchronous time should prioritize social–emotional learning, mental health, and critical thinking. To give us the time needed for attention to these activities, teachers can off-load content to pre-class videos and to digital resources.

• Tokuhama-Espinosa, 2021, p.104)
Prioritize Relationships and Mental Health
Mental health of students and teachers

• **Yadhira**: Who is **responsible for mental health** in schools? The psychologists? Teachers don’t feel prepared to assume this.

• **Gounshali**: Thank you for an insightful pre-encounter video....as you mentioned, teachers are the **caregivers**, and their mental health is a priority. How can **universities** engage in providing an appropriate environment for better self-care of their lecturers?

Parents as key actors

• **Ali:** I think there is also an urgent need to think about the changing parenting responsibilities. They now have more collaboration in education than anytime before. So, this faces them with new expectations, challenges and requires research and policy to reconsider parents' roles in education.

“It takes a village to raise a child”
Feedforward

- **Barbara:** Is feedforward reframing feedback with an emphasis on the future by using for example growth mindset language or is it lessening the feedback with preference for feedforward questions?

- **Yadhira:** Can you give us an example that shows the difference between feedback and feedforward?

Taking into account the feedback you received...

What will you do differently next time?

Metacognitive skills are grounded in the habituated feedback dialogue students have with teachers.
What gets prioritized and who decides?
The “new” goals can’t be served by old (evaluation) tools

- **Elizabeth:** We have moved in the direction that process/skills/dispositions are more important than content and that exposure and practice needs to be in more authentic and interdisciplinary contexts/constructs. Those types of learning events often produce different and more personalized learning in students.
- We still want to measure/quantify student growth and the things we are valuing are potentially harder to quantify.
- **Portfolios** certainly provide a mechanism for collecting evidence of growth.
- How would you suggest we move forward **both defining and measuring student growth** against **mission-based competencies?** How does feedback and assessment have to change? How do we help parents understand this change?
- **Ryan:** Regarding ’Why evaluate’: **using evaluation as a teaching tool** makes sense and is more valuable.
- From the perspective of a Ministry of Education or Department of Education, were there changes in how they view evaluation or could we expect changes on the types of evaluations they are open to?
Conundrum: Evaluation as a hostage taker (chicken and the egg)

- Aaron: My conundrum...While recent trends lean towards a departure from traditional testing, isn't there an inherent risk...to embrace alternative methods of assessment until universities unilaterally adopt a standard admissions requirement?
- Until the result of a standardized aptitude test, or GPA is valued with less weight in an admissions decision, aren't we doing harm to students' competitiveness in these situations if we don't prepare them to maximize their credentials in historically critical metrics? By becoming early adaptors to nouveau measurements of learning, will we be inadvertently narrowing the scope of opportunity for post secondary study?

Assessment-evaluation-feedback

- K-12 "defense" of testing process due to...

Dear Tracey,

I am writing to share some exciting updates and news about a leadership transition.

**Big News**

We are delighted to report that MTC continues to expand and thrive despite the seismic impact of COVID-19. Eleven schools sent Mastery Transcripts to college admission offices in 2020-2021 and more than 160 colleges have offered admission to one or more applicants. Our sending schools are beginning to explore ways to use our transcript to help students who are considering work and internship pathways.
What is worth teaching?

• **Winsome:** What is worth teaching is possibly the most important question post-pandemic. But it needs to be answered now.

• **Who** should answer that question? And who should determine the "right" answer?

Note: Teachers certainly aren't given the chance to make these decisions on behalf of the system for which they work, but the system does measure them based on what they teach.
Breakout Room (Chat)

Introduce yourself.

Choose one of these topics and discuss:
1. What is worth teaching?
2. Who decides?
3. Why is the school curriculum structured around “subjects”?
4. Why do universities award degrees in “fields?”
Lingering questions
Young children online

- Carol: What can we do to help kids learn how to socialize? ... Breakout rooms and group projects might help older kids, but what about the younger ones? What will our students profit be like if they are missing out on one of the most important aspects of education: learning how to be part of a society?

Digital divide

- Gounahli: Inequalities arise because of digital divide. It is not always feasible to have the nine jobs in kids.

The globalised classroom

- Clare: How do we best realise the potential of a globalised classroom? From UK HE experience, simply putting students in the same class does not suffice for meaningful engagement.

- Yadhira: Nice to be able to be trained by the best teacher, in a global schoolhouse way. But, how evaluation and feedback work in this scenario?

From Standards to Mastery (again)

- Tina: There’s been a need for diversity in delivery, assessment validity, re-assessing achievement, etc. to establishing more effective teaching and learning tools, goals and outcomes.

Asynchronous = Agency?

- Ryan: Re- synchronous and asynchronous learning - there are some examples, from England for example, where those students who were able to succeed in asynchronous learning were those with greater student agency. This is related to the issues of equity. For this type of learning to be effective, what considerations are there for students who may have lower student agency or require greater support for independent work?

- Yadhira: What is the role of collaborative learning (team working) in synchronous and asynchronous times?
Summary

1. Flipped conference format
2. Video review
   - Assessment-evaluation-feedback
   - Curriculum: What is worth teaching?
   - The use of time and space
   - The changing student profile
3. Your agenda:
   - Learning analytics (dangers of)
   - Role of teachers as caregivers in this changing landscape
   - Mental Health
   - Wider community of actors (parents) involved in education
   - Feedforward
   - Priorities in education (COVID-catalyzed)
     - What is worth teaching?
4. And now....
3-2-1

- 3 things that were new (unknown before)
- 2 two things so interesting you will continue to research them or share with someone else
- 1 thing you will change about your practice based on the information shared today
For more information:

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Who dares to teach must never cease to learn.

(John Cotton Dana)