



Global Science of Learning
Education Network



THE GLOBAL SCIENCE OF LEARNING EDUCATION NETWORK
SPARKING A GLOBAL RENAISSANCE IN LEARNING



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

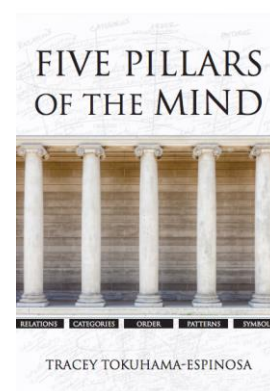
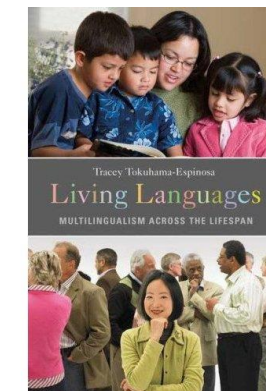
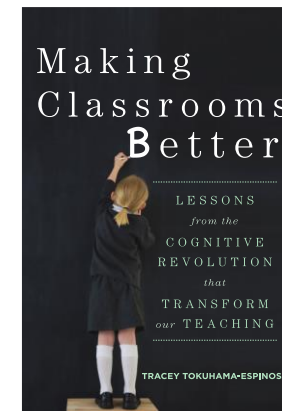
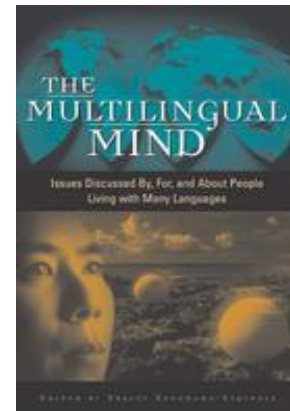
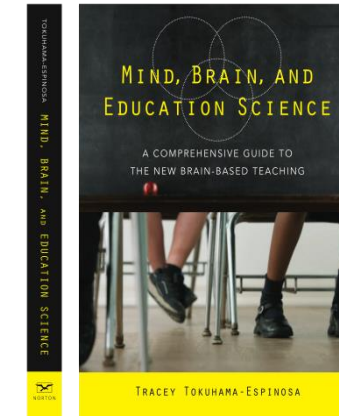
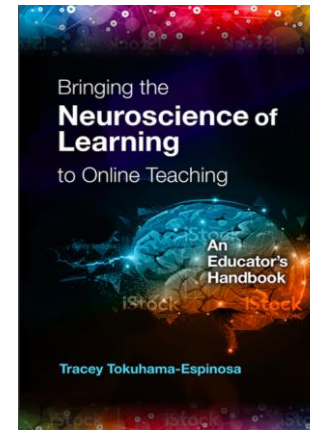
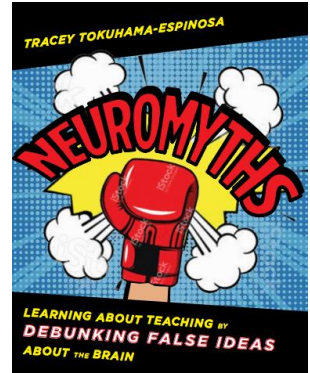
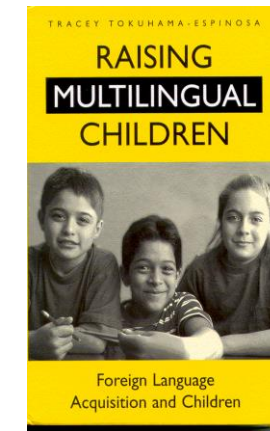
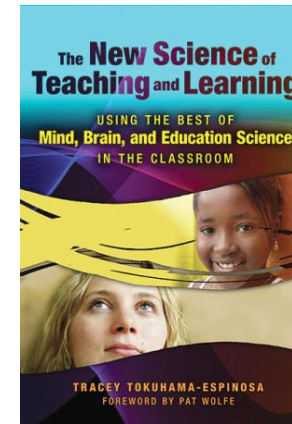
Part 1:

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

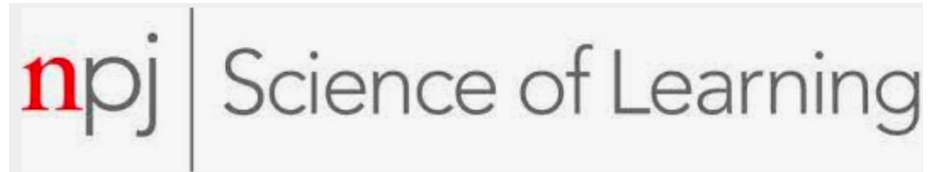
Tracey Tokuhamas-Espinosa, Ph.D.
Harvard University Extension School
www.thelearningsciences.com
tracey.tokuhamas@gmail.com

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.



Thank You!



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THE GLOBAL SCIENCE OF LEARNING EDUCATION NETWORK
SPARKING A GLOBAL RENAISSANCE IN LEARNING



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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.

A Flipped Conference

flip!idij



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/>

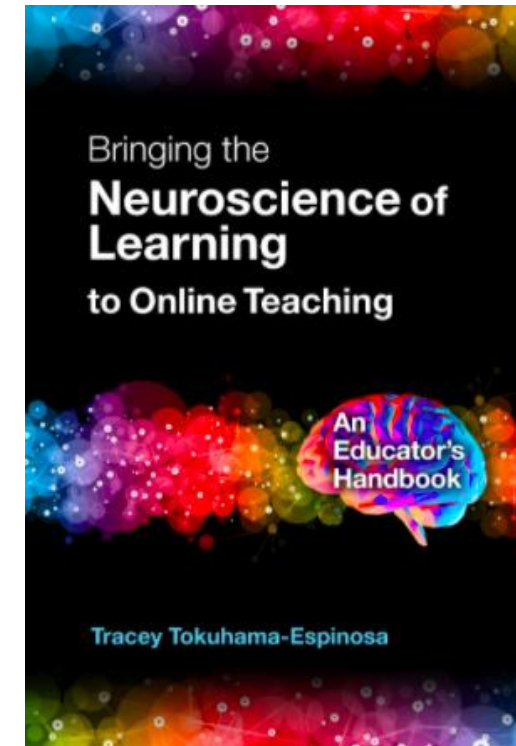
Today

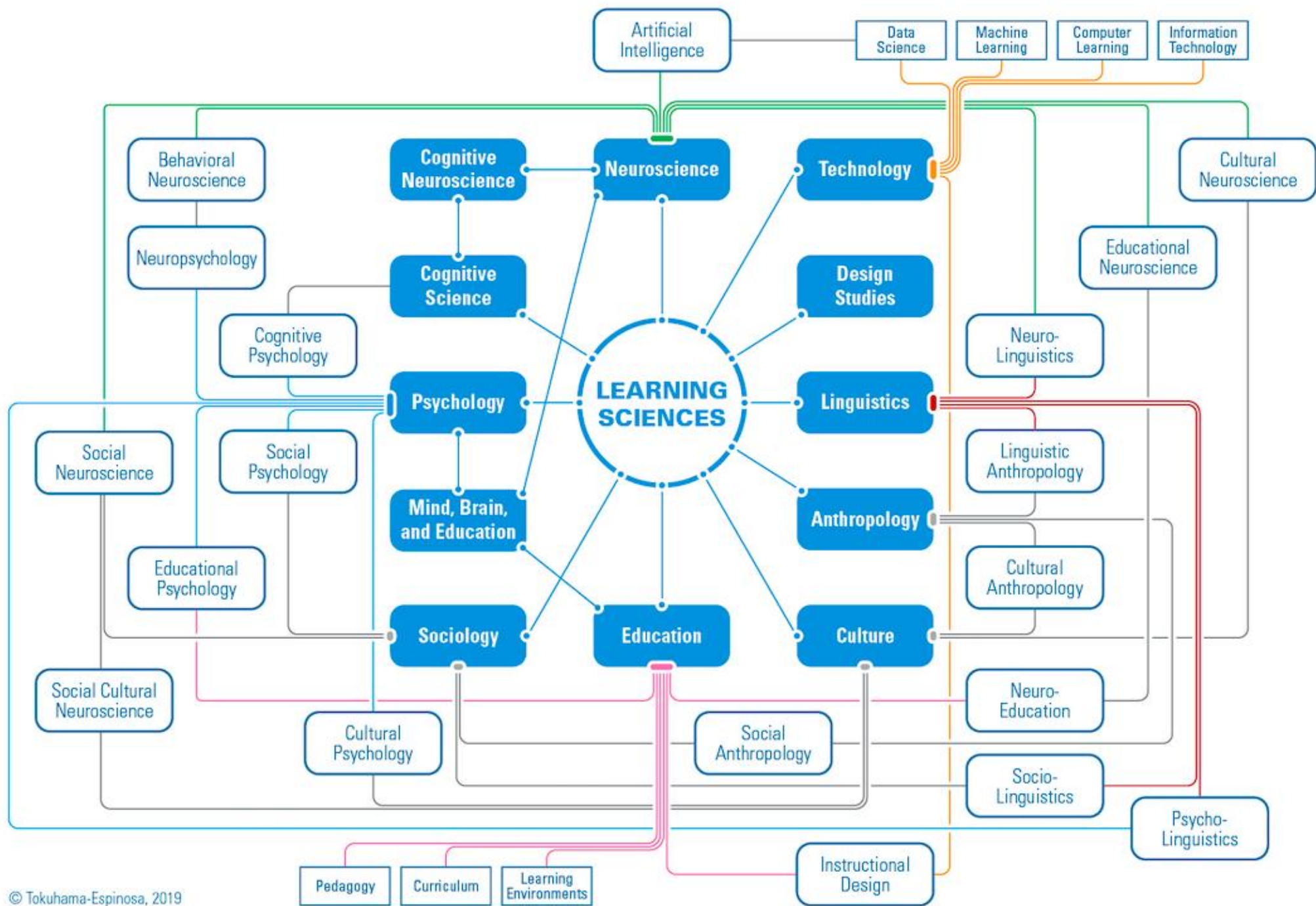
1. Brief review of pre-encounter video:
 - Assessment-evaluation-feedback
 - Curriculum: What is worth teaching?
 - The use of time and space
 - The changing student profile
2. Facilitate discussion around the ideas from participants
 - Direct response
 - Group response
3. Please use the chat!



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?

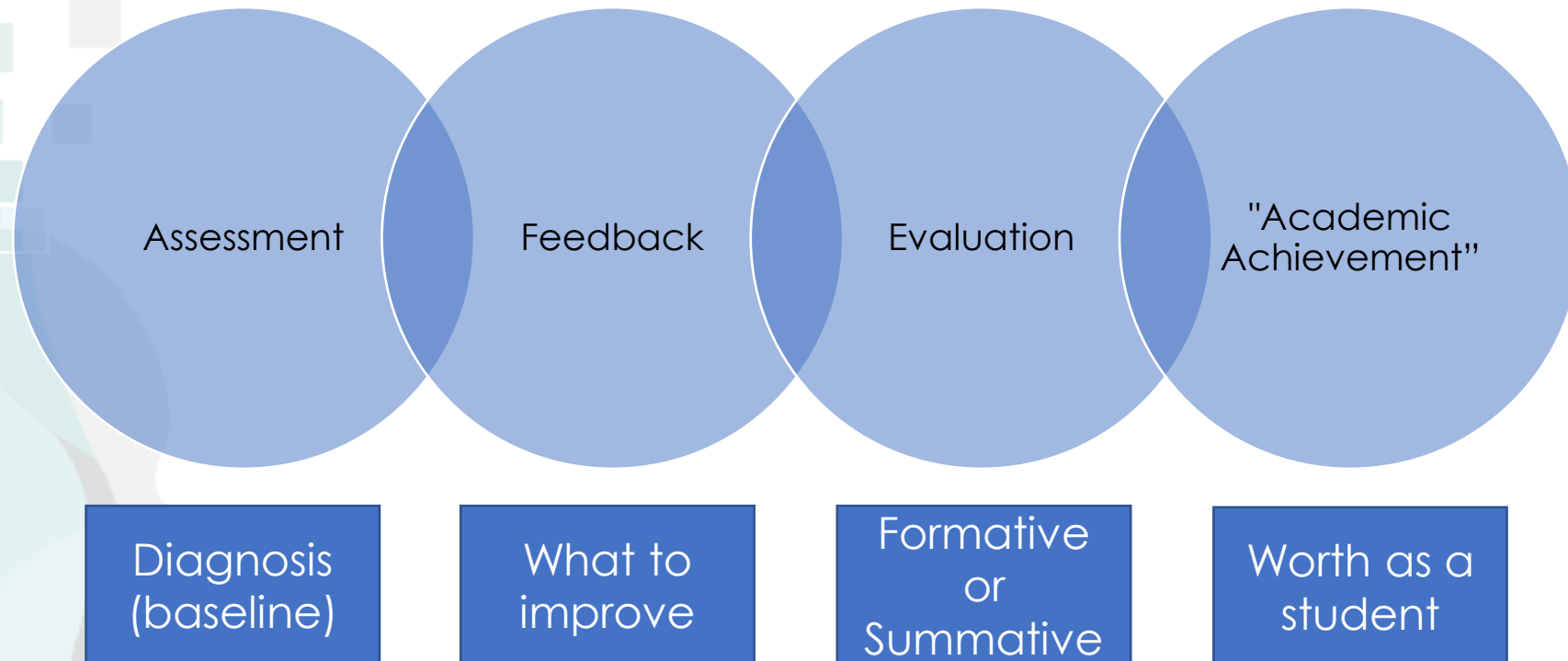






Quick Review of Video Content

Assessment-Evaluation-Feedback: Different but related

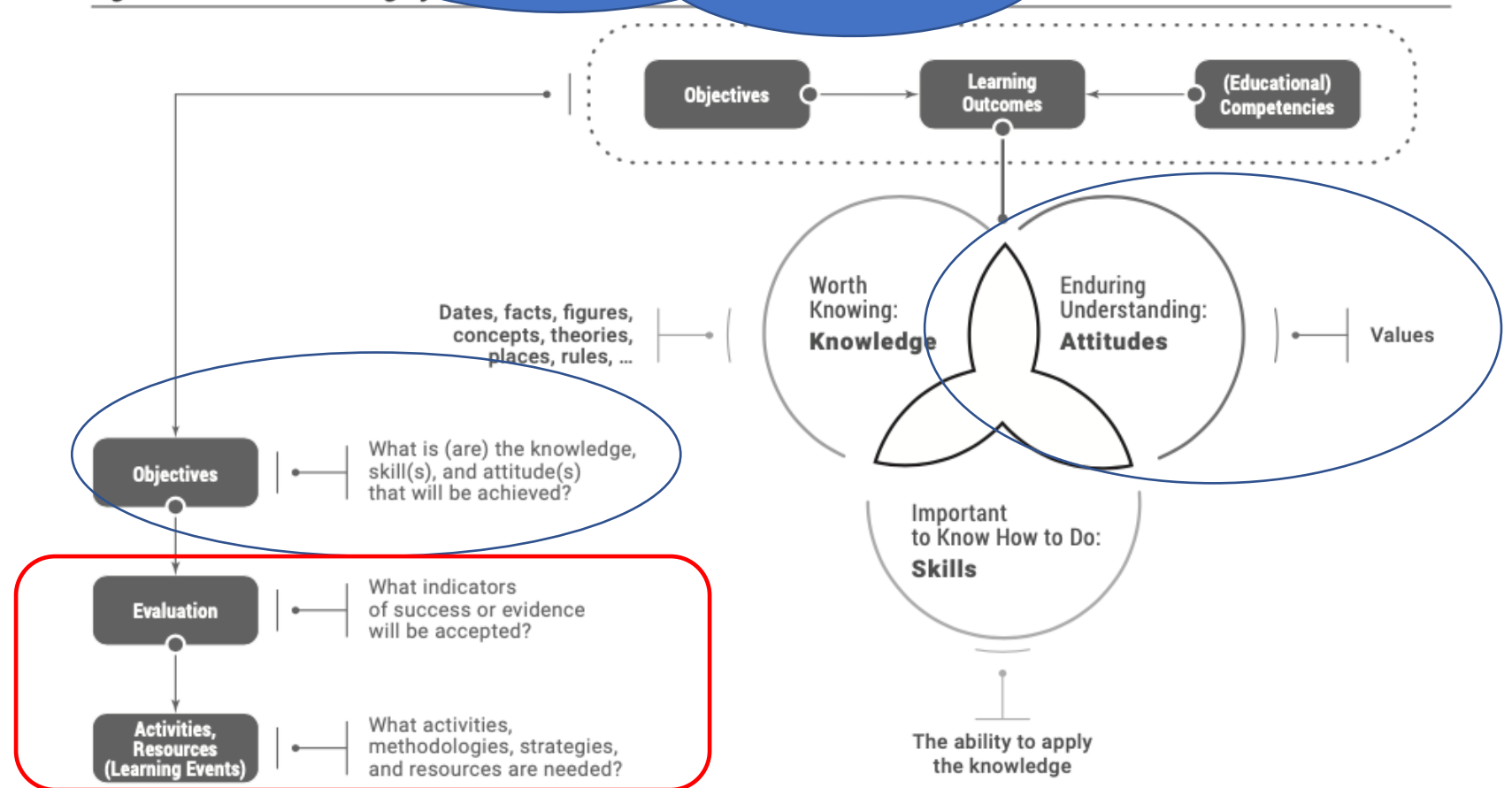


Why evaluate?

- 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**.

Figure 3.2. Understanding by



Source: Author, based on Wiggins & McTighe, 2005

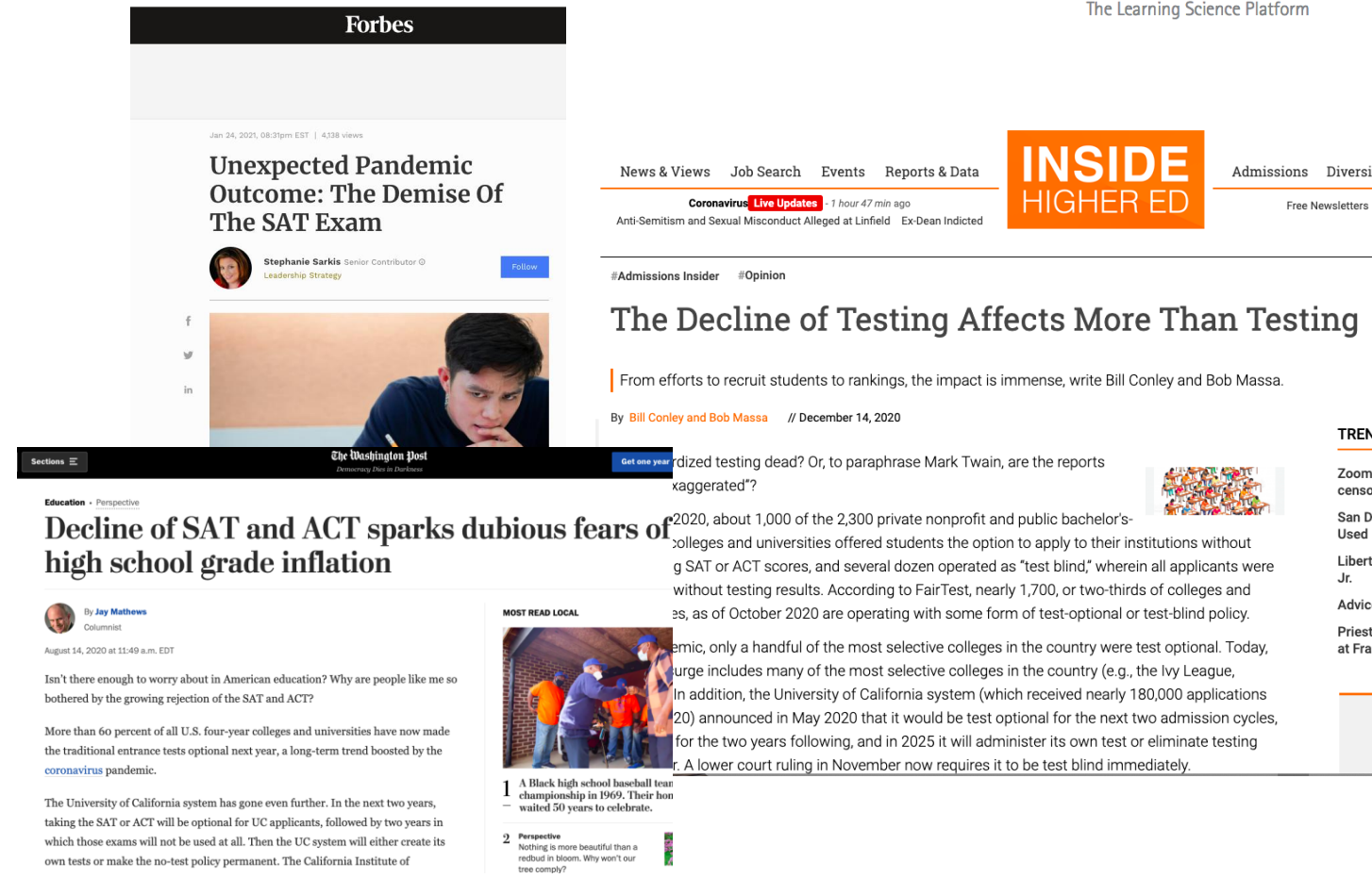
Different evaluation tools measure different competencies:

Table 3.1 Evaluation Tools Differ for Knowledge, Skills, and Attitudes

	Knowledge	Skills	Attitudes
Examples	<ul style="list-style-type: none">• Quizzes and Tests (multiple choice; fill in the blank)	<ul style="list-style-type: none">• Tests (open-ended problems)• Demonstration• Simulation• Project-based learning• Case study• Problem-based learning• Inquiry-based learning• E-portfolios over time	<ul style="list-style-type: none">• Observation over time• Thinking Routines ("I used to think . . . Now I think . . .")• Collaborative activities (debate, group projects, discussion)• Journaling* E-portfolios over time

Assessment-evaluation-feedback

- 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



The screenshot displays two news articles. The top article is from Forbes, titled "Unexpected Pandemic Outcome: The Demise Of The SAT Exam" by Stephanie Sarkis, dated Jan 24, 2021. The bottom article is from The Washington Post, titled "Decline of SAT and ACT sparks dubious fears of high school grade inflation" by Jay Matthews, dated August 14, 2020. The Washington Post article includes a sub-header "Education • Perspective" and a byline "By Jay Matthews, Columnist". The article text discusses the growing rejection of the SAT and ACT, the impact of the coronavirus pandemic on testing, and the University of California's decision to make SAT and ACT optional for its applicants. A sidebar on the right of the Washington Post article lists "MOST READ LOCAL" stories, including a Black high school baseball team's championship and a perspective on a redbud in bloom.

Assessment-evaluation-feedback

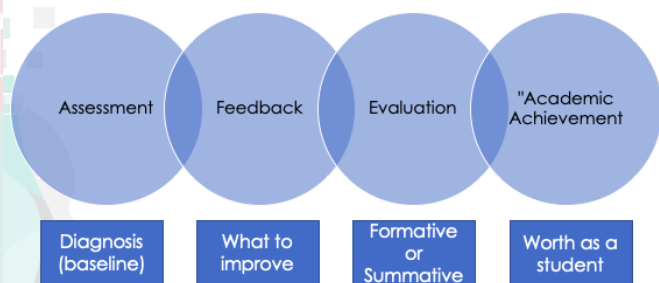
- New technologies and better tools
- E-portfolios
 - More actors
 - Measures or Progress, Process and Products
 - Assessment over time

What is an e-portfolio?



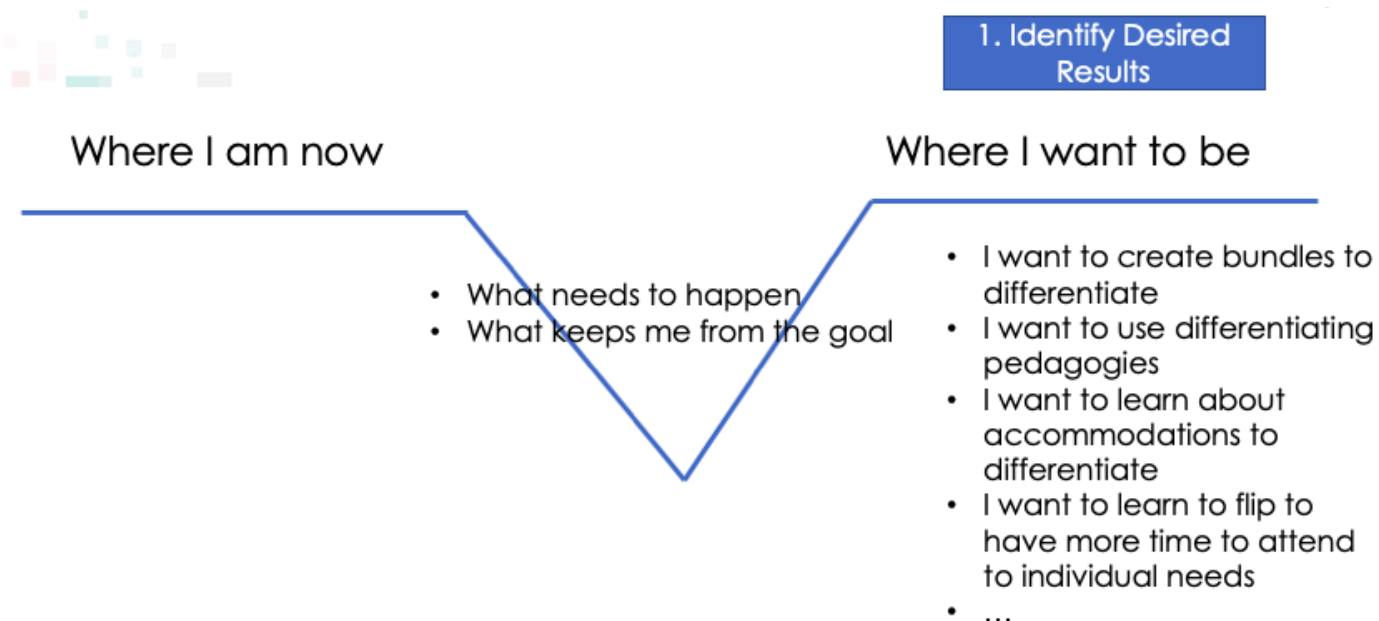
Why evaluate?

- To rank? Judge?



As a teaching tool?

Gap Analysis ("V" Analysis)



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?*

IT'S TIME
TO **RETHINK**
EVERYTHING

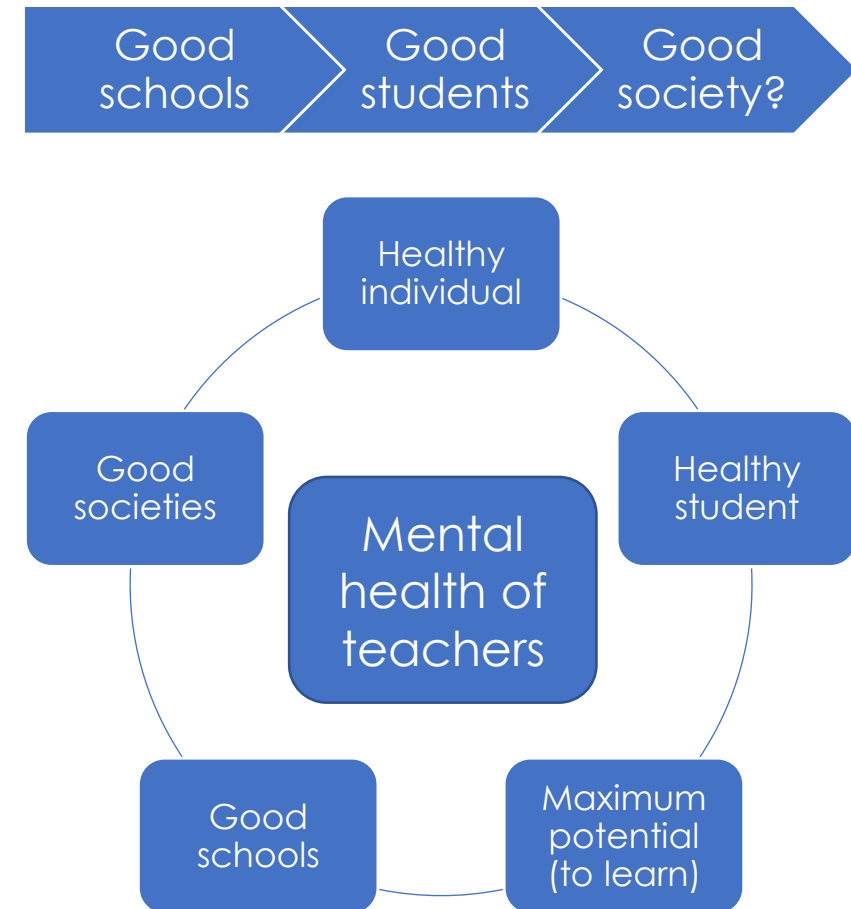
Curriculum: What is worth teaching?

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.



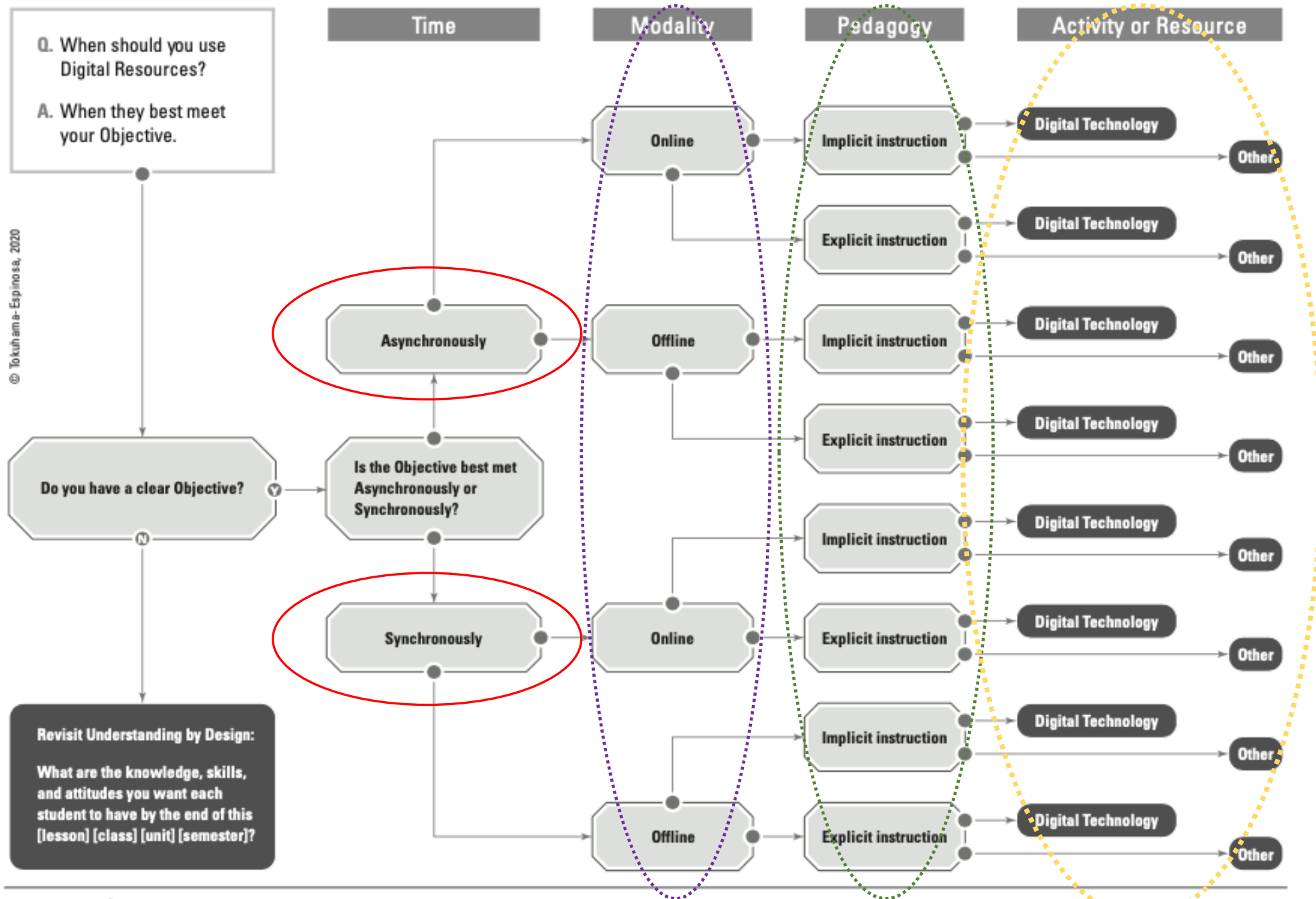
asynchronous
vs.
synchronous

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



The changing student profile

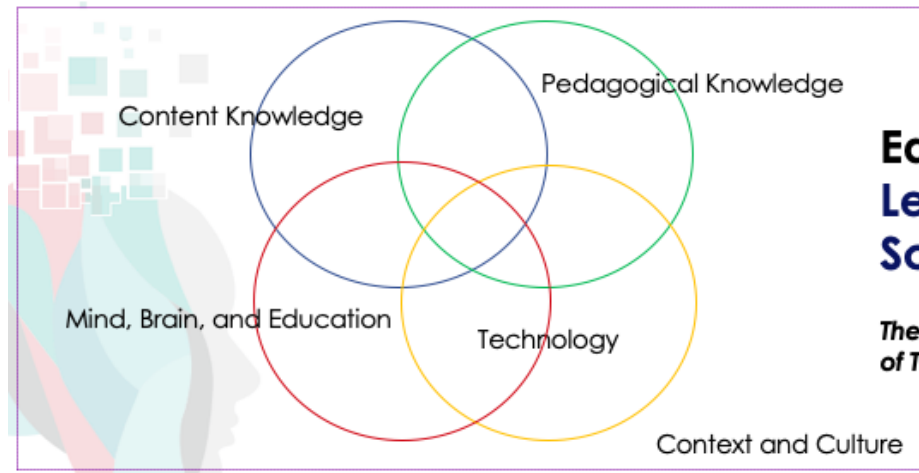
- Traditionally excluded learners
 - Prison populations
 - Pregnant teens
 - Students absent due to long-term illness
 - Work
- Non-traditional learners
 - Older demographics
 - Re-training; Upskilling
- Potential response to the existential crisis in university education?
 - The global schoolhouse: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



**Educator as a
Learning
Scientist**

*The Science in the Art
of Teaching*

Questions? Comments?

Practices, Policies and Research



Great questions!



Thailand

Mauritius

Hawai'i
(USA)

Guatemala

Iran

Missouri
(USA)

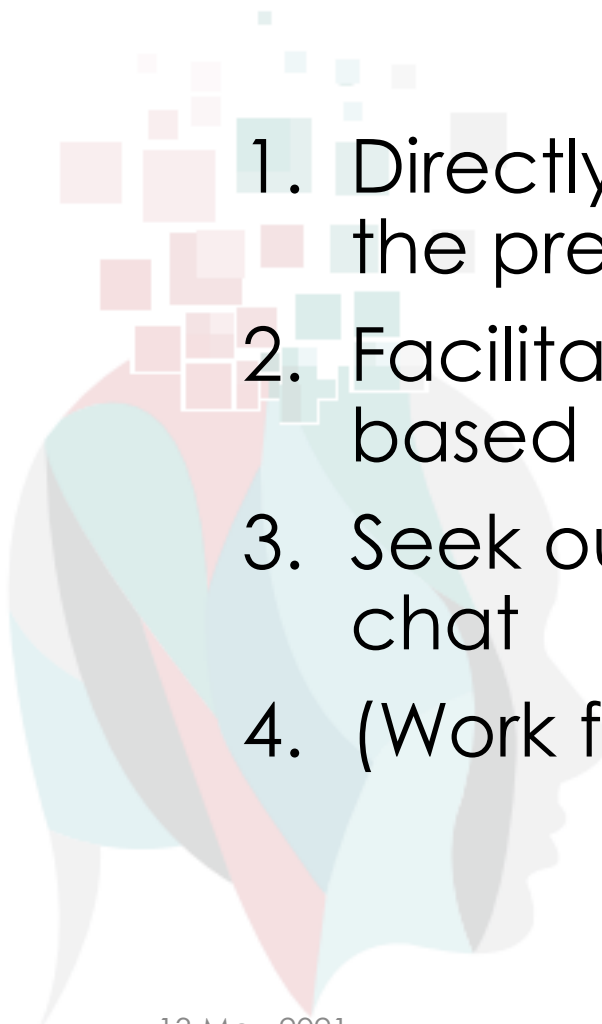
Ecuador

New York
(USA)

UK

Canada

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?



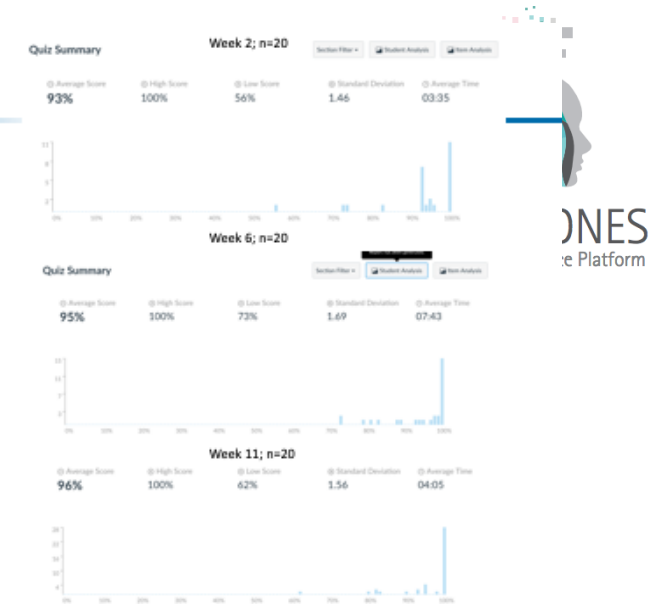
Learning Analytics

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?

Quizzes

- 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

Total Activity			
725:02:57	338:45:14	133:08:59	229:21:07
21:26:34	665:53:48	325:31:23	523:02:21
76:10:30	09:18	1234:10:19	132:28:04
506:01:45	37:57:45	21:16:37	01:39:59
585:57:29	252:45:00	260:54:10	146:27:50
521:07:48	184:59:49	262:35:35	419:46:16
132:19:38	315:42:02	660:06:06	46:48:54
200:17:38	373:07:10	40:24:31	105:03:17
584:15:59	193:34:12	855:01:27	257:51:24
1238:20:20	995:07:58	380:50:41	273:29:58
19:11	463:45:13	331:49:52	214:31:58
327:47:05			
119:47:34			

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 disadvantaging"



The Internet and Higher Education
Volume 46, July 2020, 100745



Re-imagining 'Learning Analytics' ... a case for starting again?

Neil Selwyn

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<https://doi.org/10.1016/j.iheduc.2020.100745>

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Highlights

- Learning Analytics can be discriminatory, oppressive and ultimately disadvantaging.
- Concerns over 'data ethics' and 'social good' do not address these issues.
- We need to expand understandings of Learning Analytics 'stakeholders'.
- Can data science be reimagined for un-categorizable forms of 'learners'?

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:
- Shibani, A., Knight, S., & Shum, S. B. (2020). Educator perspectives on learning analytics in classroom practice. *The Internet and Higher Education*, 46, 100730.



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The Internet and Higher Education
Volume 46, July 2020, 100730



Educator perspectives on learning analytics in classroom practice

Antonette Shibani ^{a, b}  , Simon Knight ^a, Simon Buckingham Shum ^b

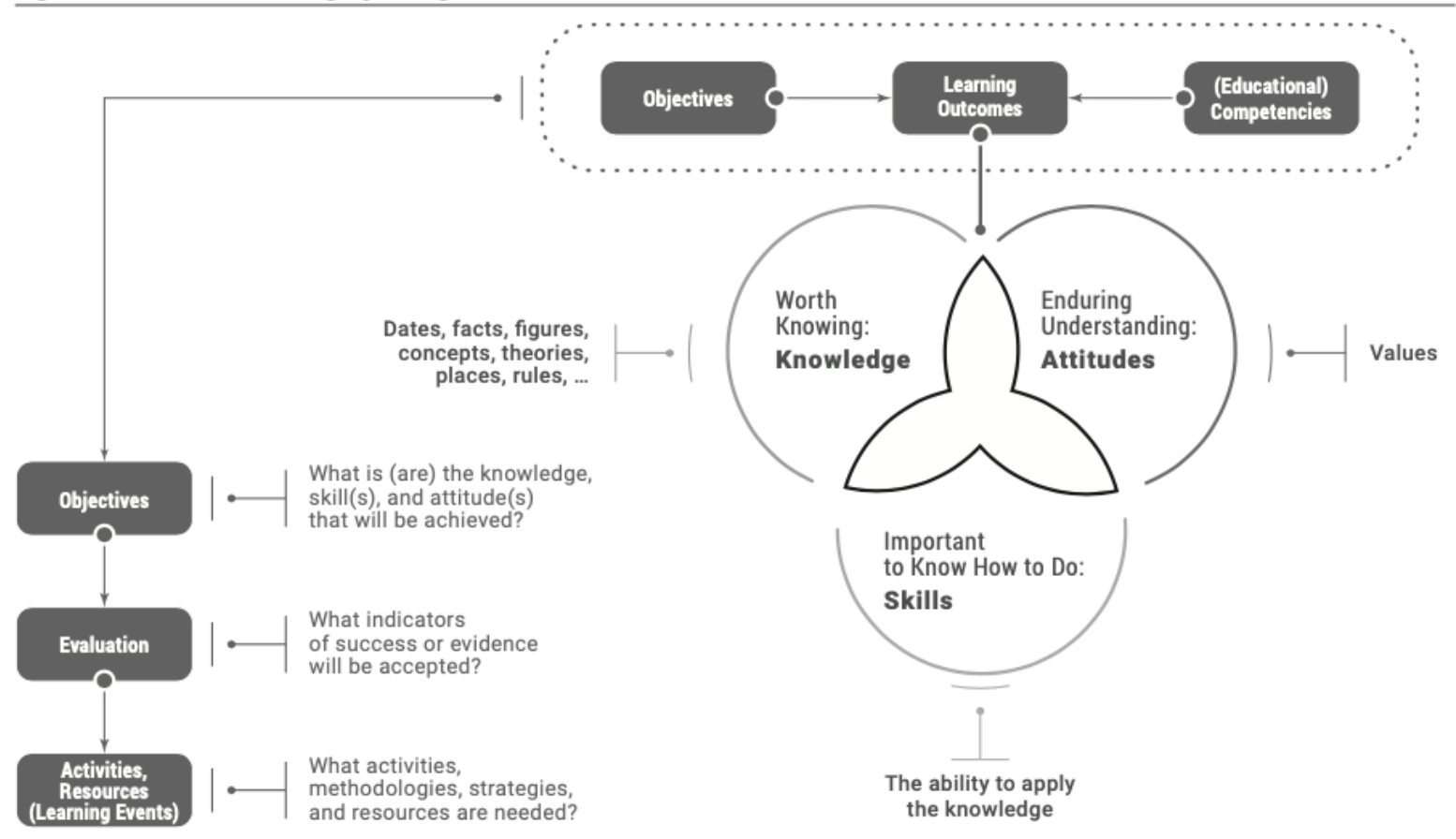


Do we need teachers if we have Google?

Teachers as (non)essential workers

- **Yadhira:** Some people think that the pandemic shows that teachers are not essential in education?
- How can you answer this?

Figure 3.2. Understanding by Design



Source: Author, based on Wiggins & McTighe, 2005

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)

View Sugata Mitra's TED Talk



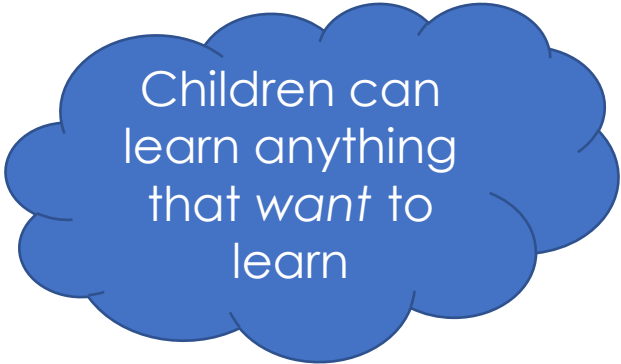
Sugata Mitra: *A Hole in the Wall*



Method
of the
Grand-
mother

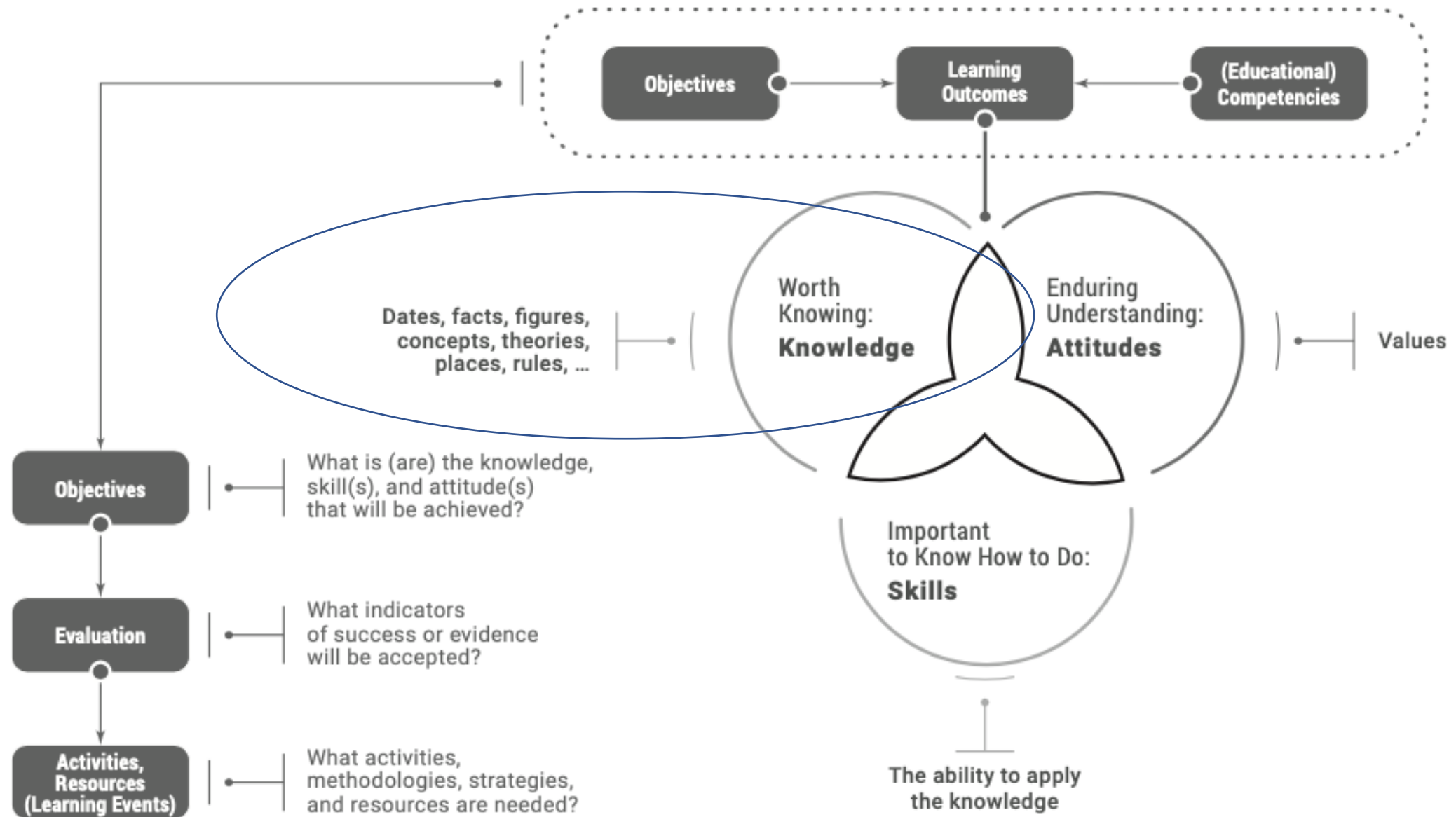


- **Results:** Given free and public access to computers and the Internet, a group of children can:
 - **Become computer literate on their own**, that is, they can learn to use computers and the Internet for most of the tasks done by lay users.
 - **Teach themselves** enough English to use email, chat 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**.



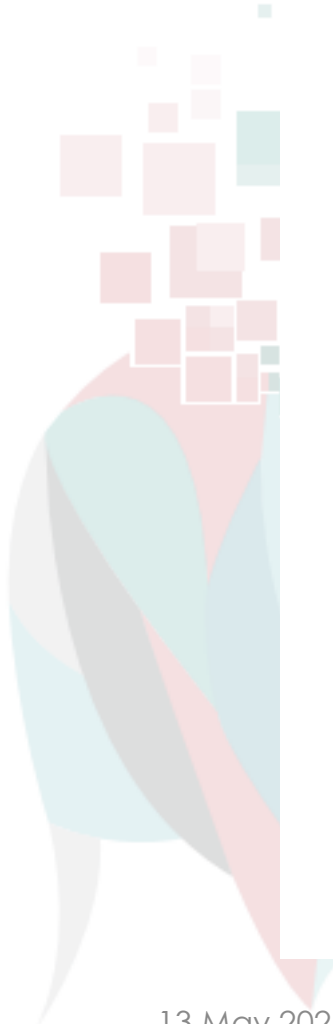
Children can
learn anything
that want to
learn

Figure 3.2. Understanding by Design



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.

- Tokuhamma-Espinosa, 2021, p.104)



Prioritize Relationships and Mental Health

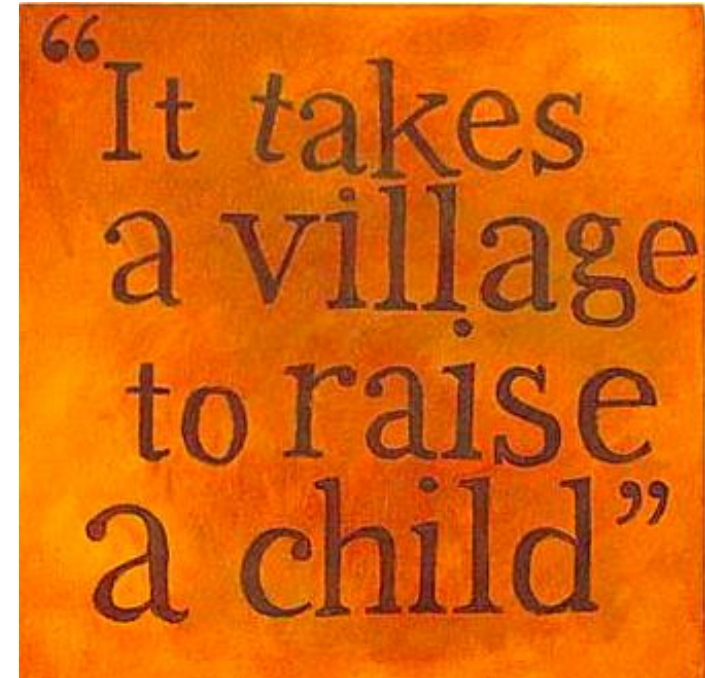
Mental health of students and teachers

- **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...



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 new 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 profile be like if they are missing out on one of the most important aspects of education: learning how to be part of a society?

Blum-Ross, A., Kumpulainen, K., & Marsh, J. (Eds.). (2019). *Enhancing digital literacy and creativity: Making spaces in the early years*. Routledge.
Kucirkova, N., Rowsell, J., & Falloon, G. (Eds.). (2019). *The Routledge International Handbook of Learning with Technology in Early Childhood*. Routledge.
Kumpulainen, R., Kullu, P., Mäkinen, M., Wiseman, A., Järvelinen, A., & Koskinen-Sinisalo, K. L. (2019). *Future pedagogical approaches to digital and multimodal practice in early childhood education*. In *The Routledge Handbook of Digital Literacies in Early Childhood* (pp. 419-429). Routledge.



Digital divide

- Gounshali:** ...inequalities arise because of digital divide. It is not always feasible to have the online



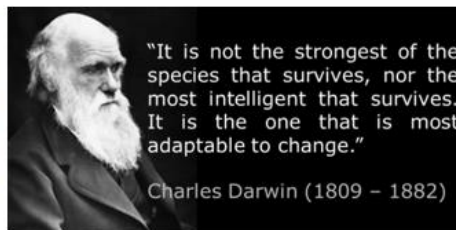
The globalised classroom

- 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?** What should be needed for this proposed?



How has this COVID experienced changed the learner?

- What doesn't kill you makes you strong?
- "Zoom fatigue"; "Multi-tasking"?



From Standards to Mastery (again)

- Tina:** There's been a need for **diversity in delivery, assessment validity, reassessing achievement, etc** to establishing **more effective teaching and learning tools, goals and outcomes**.
- A positive has been that we are once again **evaluation as tools to support learning**



less curriculum
ce for both stu
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Flipping

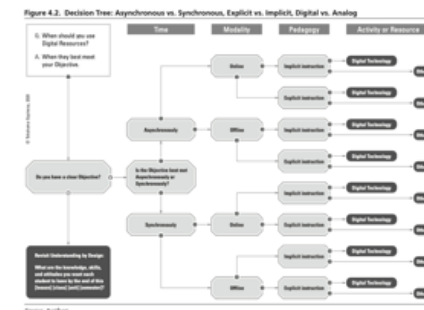
- Ali:** I would like to know about the process of flipped instructional design. More clearly, I want to know how it is possible to design instruction step by step when the approach is flipped learning?

Figure 5.2. A 12-Step Instructional Design Process



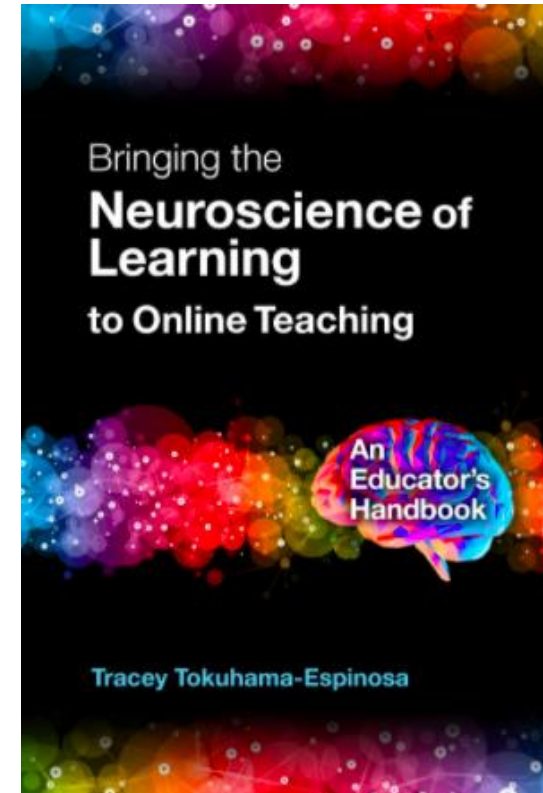
Asynchronous=Agency?

- 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 are 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....




<https://www.tcpress.com/bringing-the-neuroscience-of-learning-to-online-teaching-9780807765524> Promo code: APR2021

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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