



Online Workshops for Lesson Study 2.0:
Artificial Intelligence (AI) and Data Science for Education in APEC Economies

The Online Workshops for Lesson Study 2.0: Artificial Intelligence (AI) and Data Science for Education in APEC Economies

What it is with what we have done in the past.

Project Overseers:

ISODA Masami, Prof/PhD.
University of Tsukuba, Japan

Maitree Inprasitha, Vice President,
Khon Kaen University, Thailand

Themes of APEC Lesson Study Project.

- 2006 What is Lesson Study?
- 2007 **Mathematical Thinking**
- 2008 **Representation and Communication**
- 2009-10 **Assessment and Material**
- 2011 **Textbook, e-Textbook and Software**
- 2012 **Earthquake and Tsunami**
- 2013 **Flood and Typhoon**
- 2014 **Fire and Volcanic Eruption**
- 2015 **Future Prediction**
- 2016 **Energy Efficiency on STEM**
- 2017 **Energy Efficiency for Cross-Boarder Edu.**
- 2018 Lesson Study: Next Step

2019-2021 Computational Thinking & Statistical Thinking



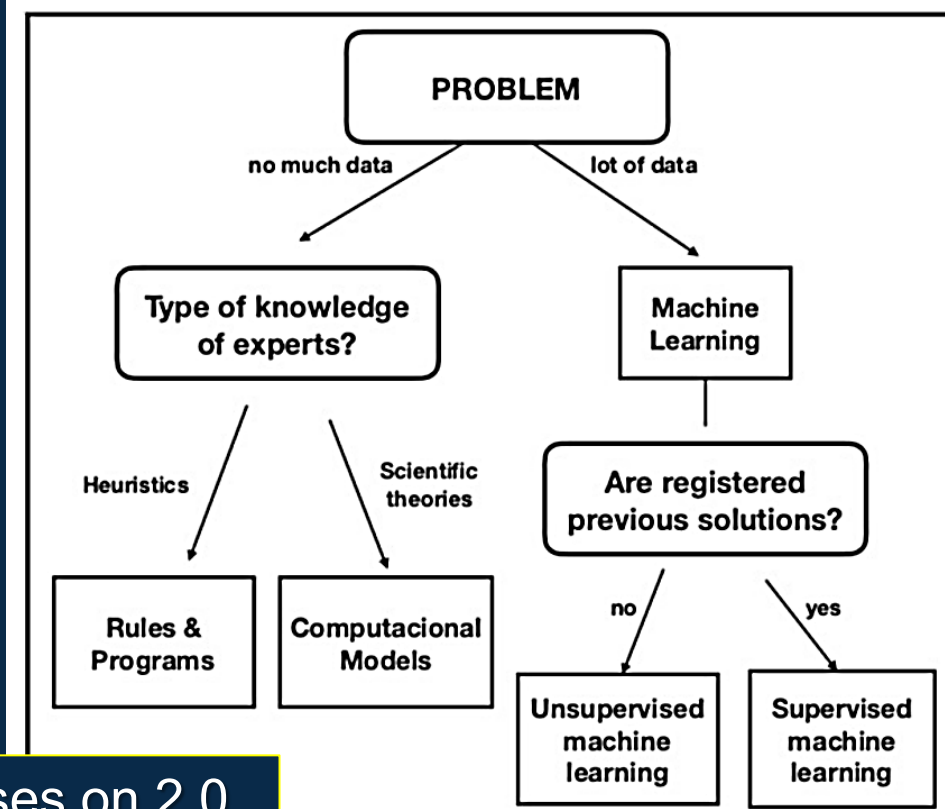
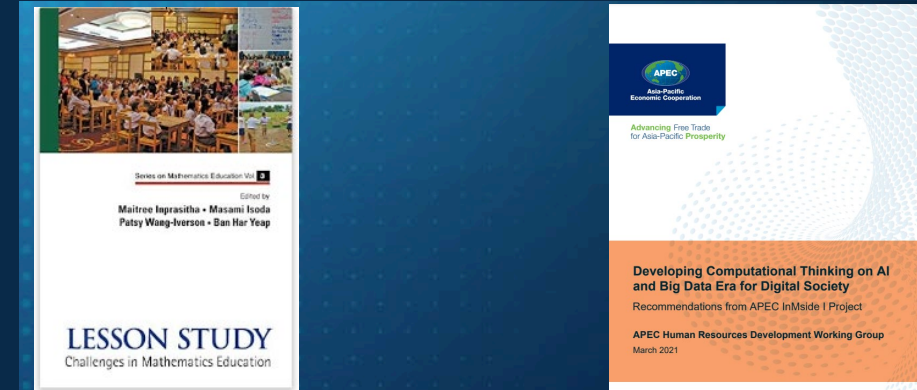
What is Lesson Study 2.0?

Lesson Study: Design sciences to re-present/re-produce **better** practice which may promise to cultivate students such as Student Agency in OECD 2030

- Teachers learning together through plan, do and see cycle
- Most necessary things: **Theme** of Lesson Study and teaching-learning materials which embedded clear **objective** under the theme.

Lesson Study 2.0: Currently, not clear but based on, extend and beyond lesson study.

- Theme 1. **Developing innovative methods of analysis** as for sciences of lesson study by using AI and Data Science approaches: *what approaches and why?*
- Theme 2. **Developing innovative teaching approaches** by using newest educational environment/system/software which embedded AI: *what environments?*
- Theme 3. **Developing innovative environments** for extending and adapting the current product, theme or objective of lesson study: *How can we embed?*



APEC KKK 2022 Asian Pacific -Tsukuba International Conference

Feb.2022 <https://youtu.be/5QniYKaLpK4>



Online Workshops for Lesson Study 2.0:
Artificial Intelligence (AI) and Data Science for Education in APEC Economies

Keynote by Dr. Roberto Araya



APEC KKKU 2022 Asian Pacific -Tsukuba International Conference

Feb.2022 Keynote 1 by Dr. Roberto Araya



Online Workshops for Lesson Study 2.0:
Artificial Intelligence (AI) and Data Science for Education in APEC Economies

Roberto discussed necessity of
Randomized controlled trial in Education

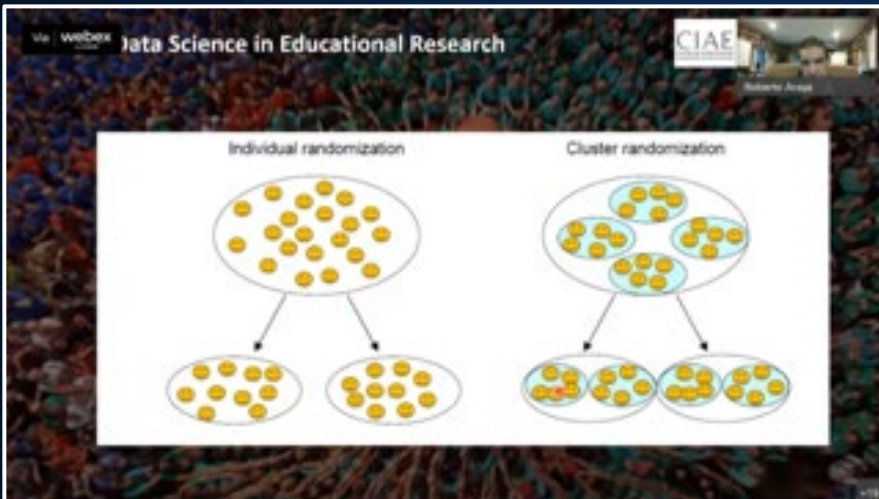
Data Science in Educational Research

World Bank

Box 5. How Do Impact Evaluations Inform Education System Reforms?

The World Bank Group has worked energetically over the past five years to expand the portfolio of education impact evaluations and systematically harvest their lessons. The approach has been to integrate rigorous impact evaluations into new or ongoing operations, with technical support from experts across the Bank. Ideally, integration takes place at the project design stage, as early integration permits not only better tracking of impacts, but can also improve project design by tracing expected impact channels. In some cases, the evaluation design has included a randomized controlled trial, which allows the most straightforward linkage between interventions and impacts. At other rigorous approaches are also used.

World Bank Group Education Strategy 2020: Learning for All (Fostering in People's Knowledge and Skills to Promote Development)



Lesson Study

Finding the time to meet face-to-face to observe lessons from the other members of the group

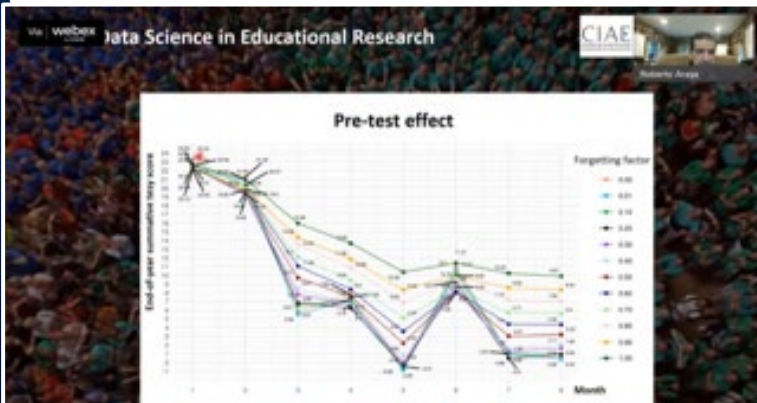
It works with small groups of teachers.

Although open public lessons are developed with thousands of teachers actively watching the lessons, they only take place a couple of times a year.

What we need to build is a much larger and more connected community. If the community is very small, it may experience the "Tasmanian effect"

Data Science in Educational Research

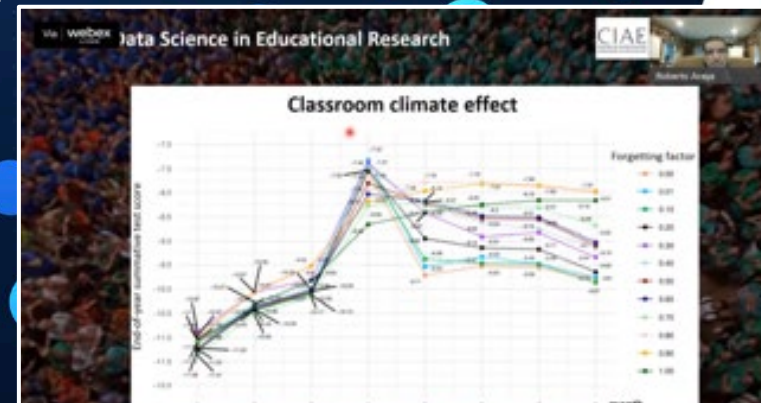
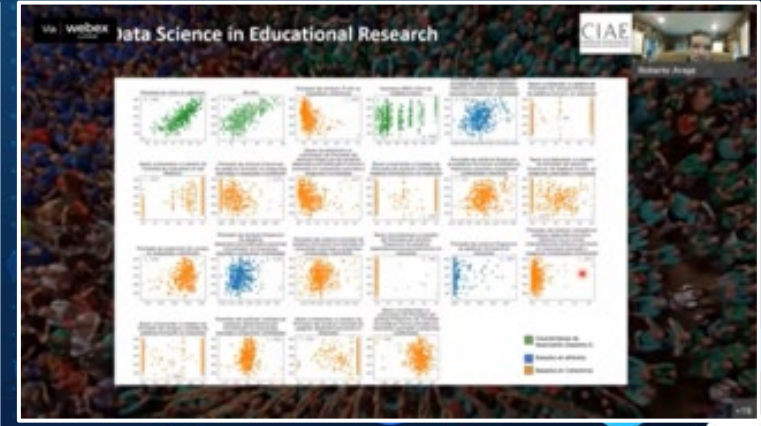
Help – seeking behavior



Data Science in Educational Research

Frequency of the answers

Fecha	Usuario	RTT	Respuesta
09-02-20	Roberto Araya	0.0000000	en un momento de la vida con el agua fría se pone más caliente por la poca energía que tenemos el agua caliente tiene más energía que hace que la vida se desarrolle más rápido
09-02-20	Roberto Araya	0.0000000	conocer con un poco de lo que él me ha dicho que también cambia un poco de color y estudio bien que sea diferente más rápido en el agua caliente
09-02-20	Roberto Araya	0.0000000	es por que la vida en el momento con agua caliente se desarrolla más rápido que el que tiene agua fría
09-02-20	Roberto Araya	0.0000000	en el transcurso de los días cuando el momento de agua caliente se desarrolla más en desarrollo y de agua caliente se

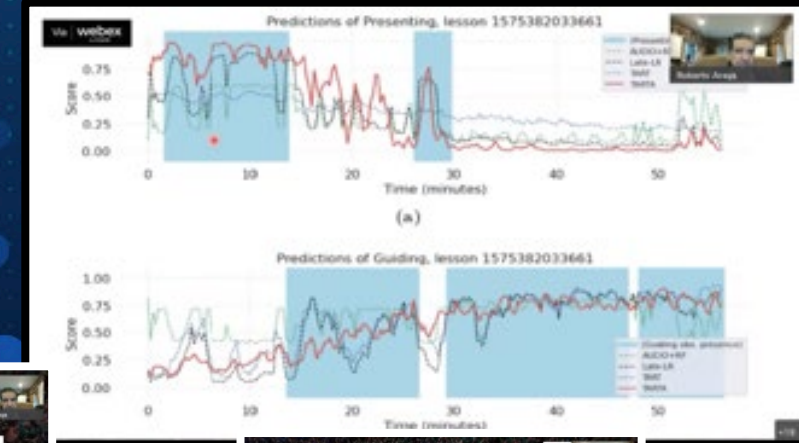
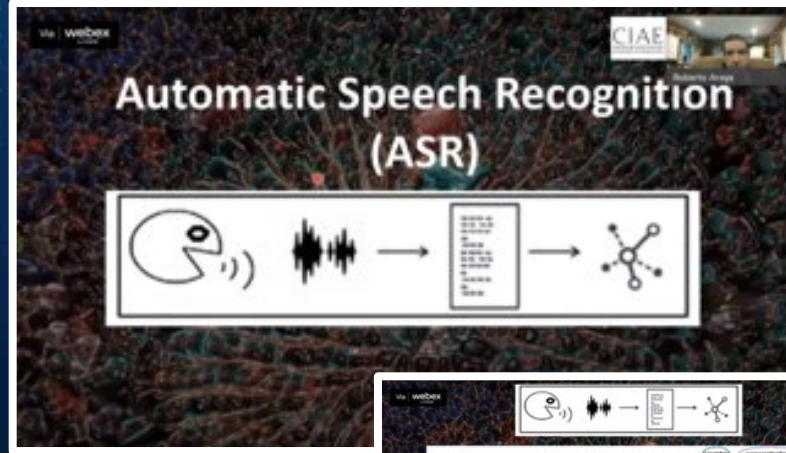
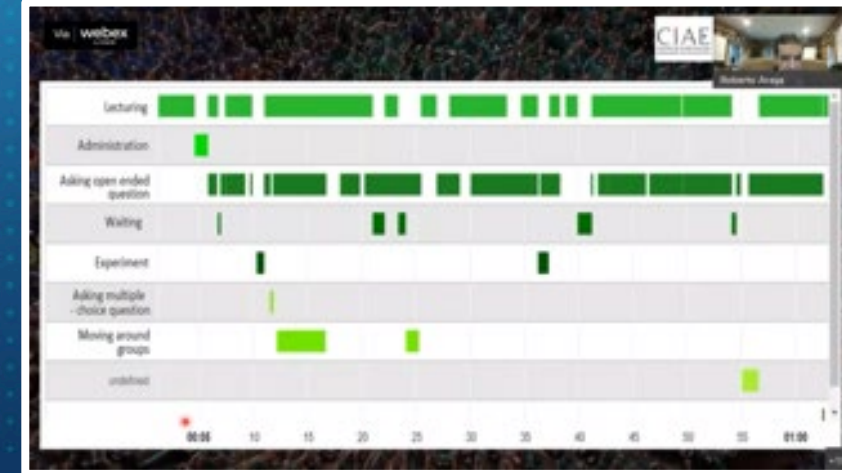
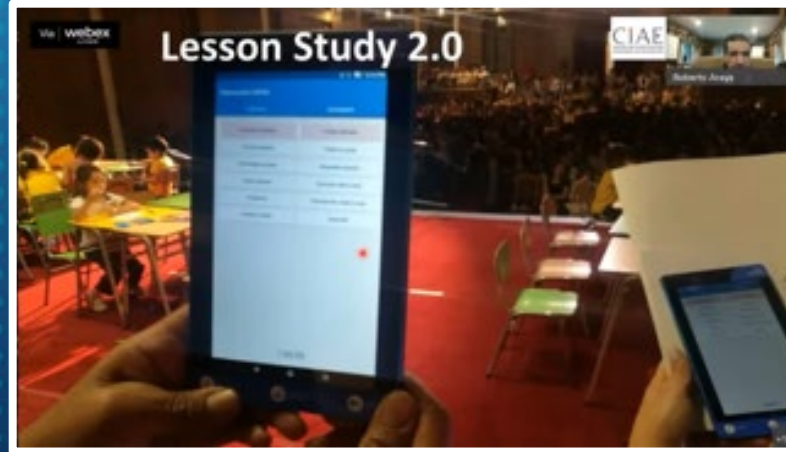
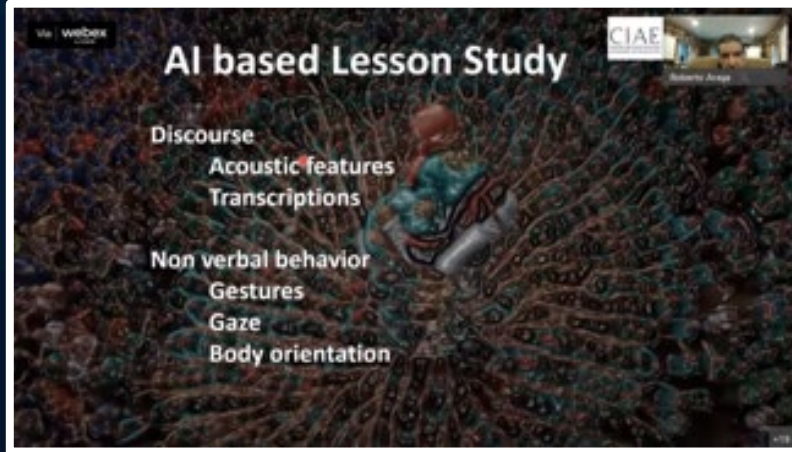


APEC KKK 2022 Asian Pacific -Tsukuba International Conference

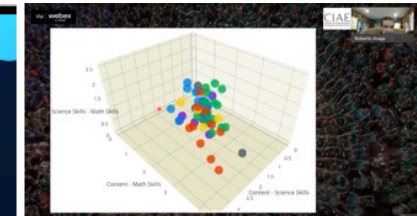
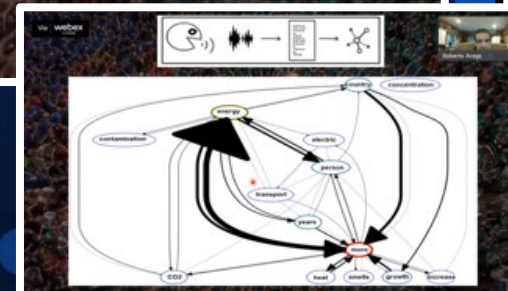
Feb.2022 Keynote 1 by Dr. Roberto Araya



Online Workshops for Lesson Study 2.0:
Artificial Intelligence (AI) and Data Science for Education in APEC Economies



Roberto demonstrated what AI and Data Science can do and Role of Computational Model. In any case, only human can interpret.

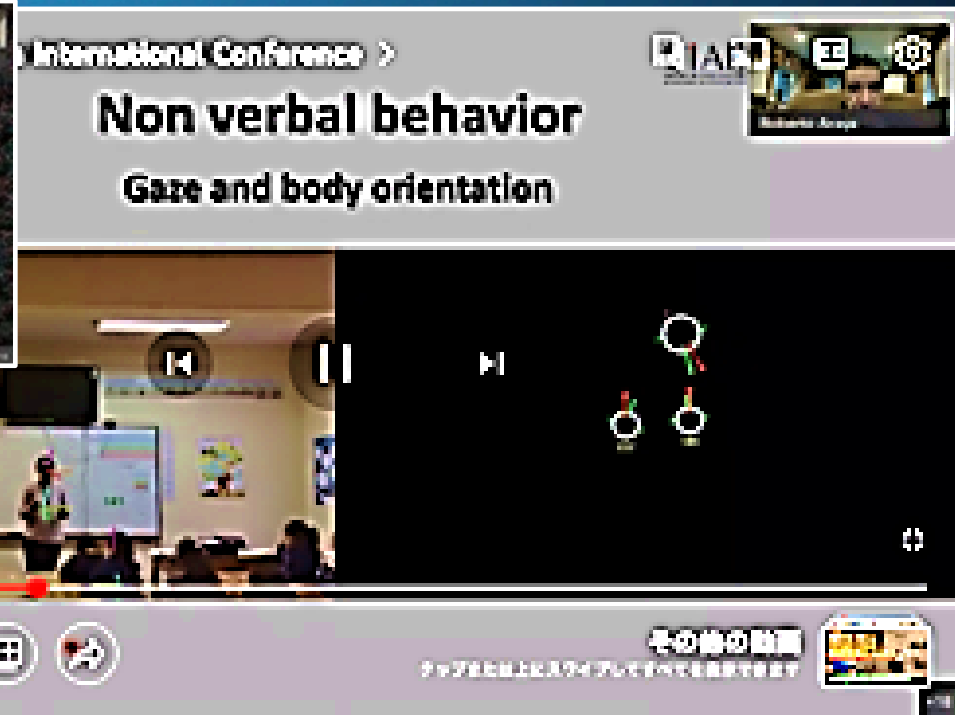
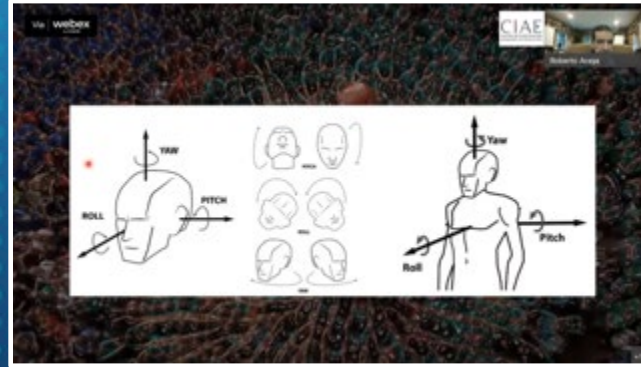
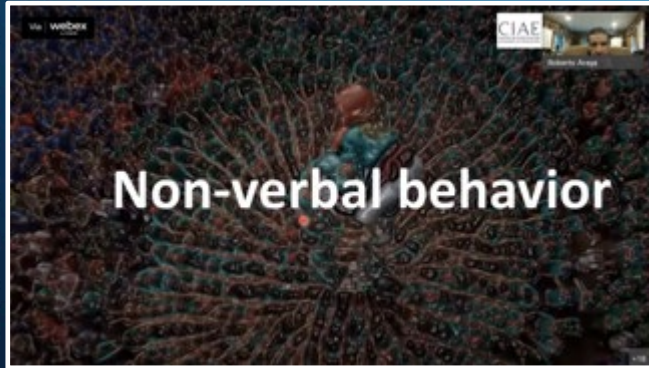


APEC KKKU 2022 Asian Pacific -Tsukuba International Conference Feb.2022

Keynote 1 by Dr. Roberto Araya

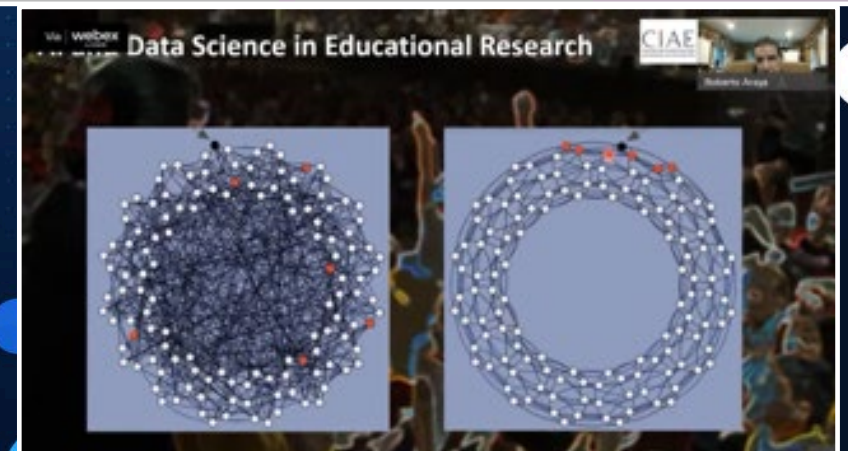
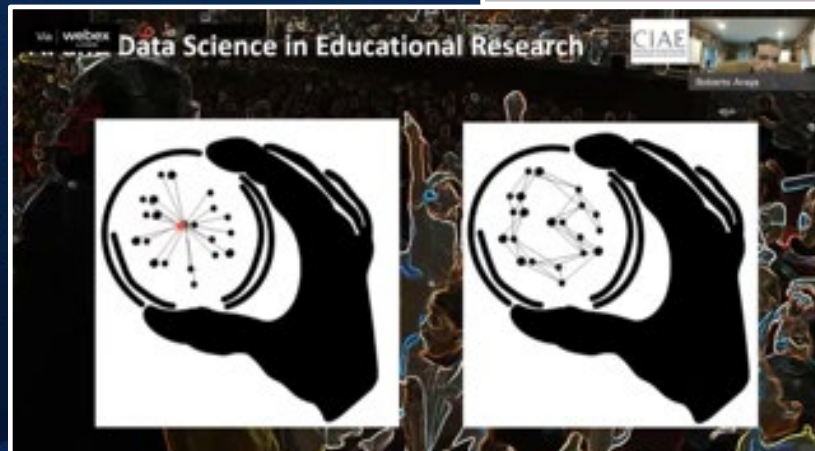
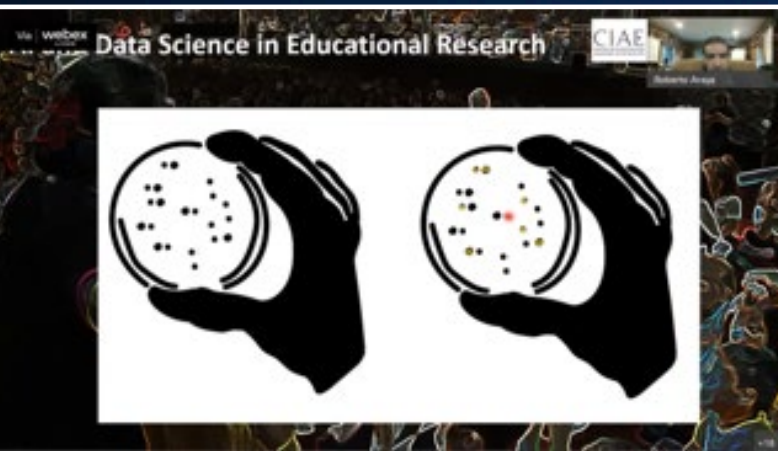


Online Workshops for Lesson Study 2.0:
Artificial Intelligence (AI) and Data Science for Education in APEC Economies



Cultivate?
In biology and Medicine,
culture plates are used for screening and
avoid contaminations.

For education, data scientist try to use
plates for finding the relationship of data.



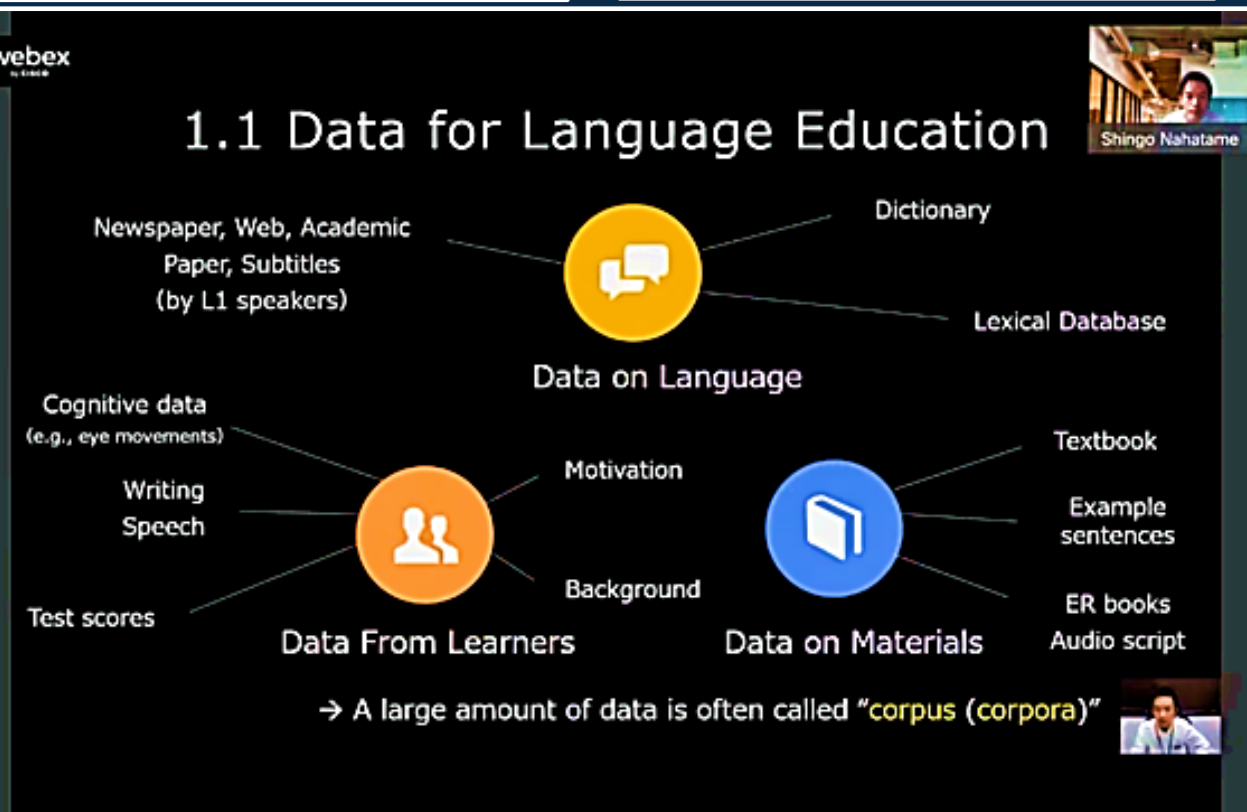
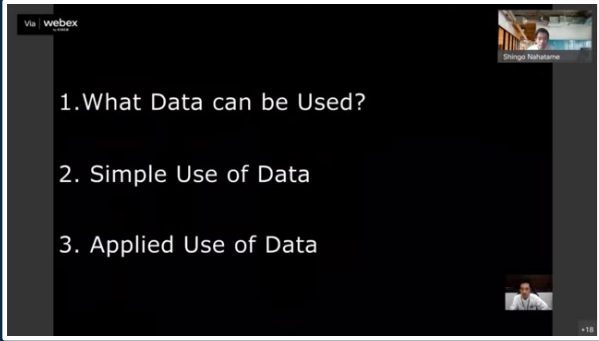
APEC KKKU 2022 Asian Pacific -Tsukuba International Conference

Feb.2022

Keynote 2 by Dr. Shingo Nahatame



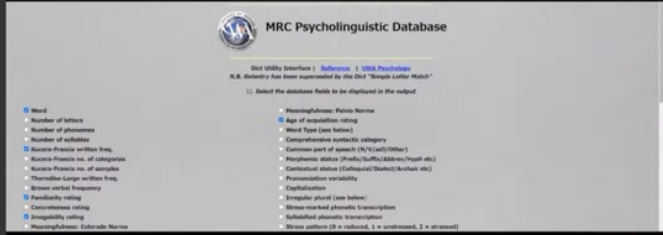
Dr Nahatame explained current common methodologies in English Education.



Keynote 2 by Dr. Shingo Nahatame

Dr Nahatame explained current common methodologies in English Education.

2.1 Lexical Database



MRC Psycholinguistic Database (Coltheart, 1981)
https://websites.psychology.uwa.edu.au/school/mrcdatabase/uwa_mrc.htm

2.3 Learner data

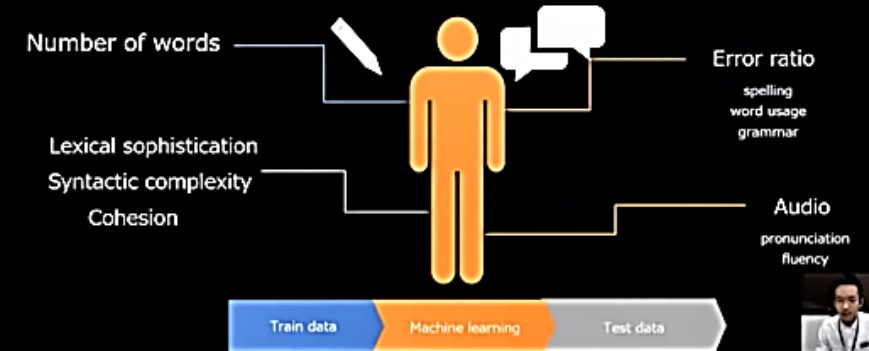
Writing Data of L1-Japanese L2-English Learners




ICNALE Online http://language.sakura.ne.jp/icnale/icnale_online.html
By Dr. Shin Ishikawa, Kobe University

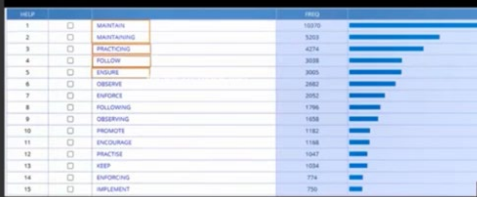
3.1 Text Difficulty

Automated scoring of speaking and writing



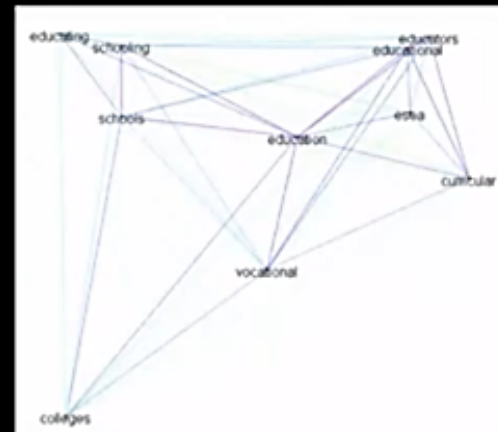
2.2 L1 Speaker Data

What verb do you use for "social distancing"? 



The Coronavirus Corpus by Dr. Mark Davies (Davies, 2021) <https://www.english-corpora.org/corona/>

3.1 Text Difficulty



Created by using R package LSAfun (Günther., & Kaup, 2015)
based on Touchstone Applied Science Associates, Inc. (TASA) corpus

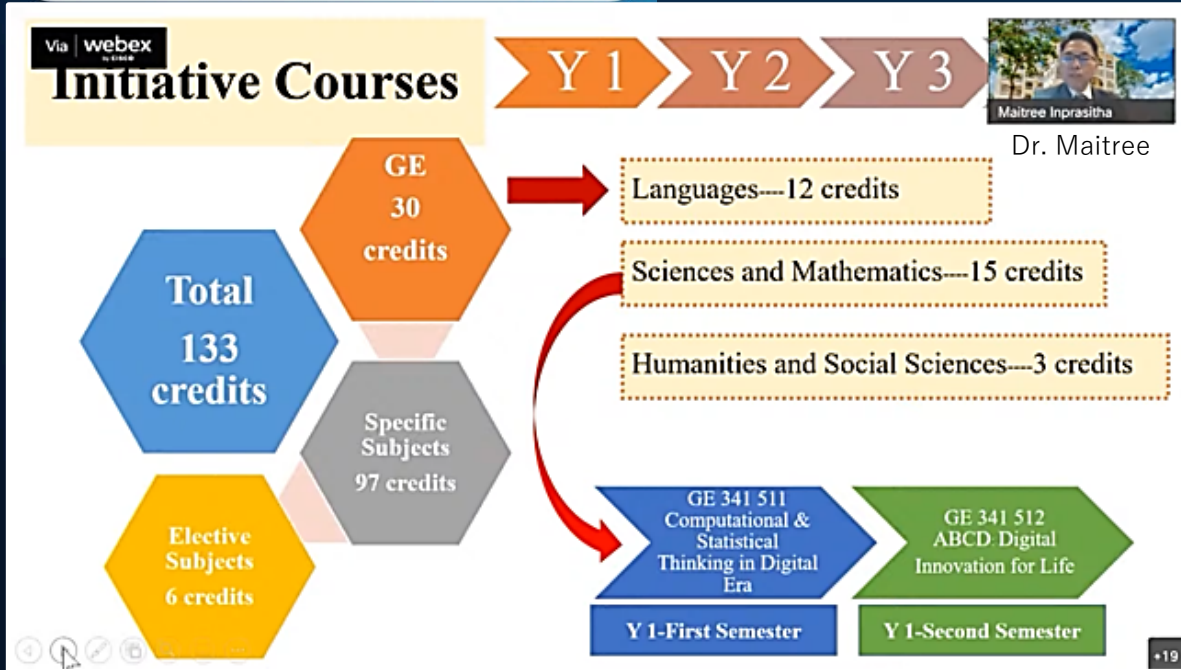
3.3 Cognitive Processes

Infer cognitive processes during reading



APEC KKU 2022 Asian Pacific -Tsukuba International Conference

Feb.2022 Teacher Education Programs for AI and D. S.



Via webex

Syllabus of AI Mathematics

Concepts	Contents	
AI and Mathematics	Mathematics related to AI	<ul style="list-style-type: none"> The use of mathematics in the history of artificial intelligence. Examples of using mathematics in artificial intelligence.
Representation of Data	Representation of Text Data	<ul style="list-style-type: none"> Expressing text data using numbers and symbols. Understanding the principles of processing text data and visualizing the data.
	Representation of Image Data	<ul style="list-style-type: none"> Expressing image data using numbers and symbols. Understanding the principles of processing image data and visualizing data.
Classification and Expectation	Classification of Data	<ul style="list-style-type: none"> Understanding mathematical methods of classifying text and image data using artificial intelligence.
	Tendency and Expectation	<ul style="list-style-type: none"> Finding the probability of a case to be occurred and using the probability for prediction. Expressing the trend of data as a trend line and
Optimization	Optimization and Decision Making	<ul style="list-style-type: none"> Understanding the construction principles and n express errors when classifying and predicting d Making decisions optimized through finding min of functions. Selecting AI mathematics inquiry topics related decision-making and conducting the topics.

Dr. Lew

hee-chan lew

Via webex

Initiative Courses SEAMEO Online Learning

筑波大学 Using online contents and learning together in Thai.

My happiness is to collaborate with next generations and develop their learning content and terminology for New Normal!

筑波大学 University of Tsukuba

Mathematics, Data Science, and AI Education in University of Tsukuba

KATO Mitsuyasu, M.D., Ph.D.
Vice President & Executive Director for Education
University of Tsukuba

Dr. Kato

Via webex

THE ROLE OF SEAQIM IN PROMOTING AI AND DATA SCIENCE IN INDONESIA

Asia Pacific-Tsukuba International Conference

★ Dr. Farida Nurhasanah ★

Deputy Director for Program
SEAMEO Regional Center for QITEP in Mathematics
Researcher and Lecturer in Mathematics Education Department
Sebelas Maret University
2022

Dr. Farida

Via webex

Artificial Intelligence and Data Science for Education in Vietnam Reality and challenges

Dr. Nguyen Chi Thanh

Vietnam national university - University of Education (VNU-Ued)

Dr. Nguyen