Applying Artificial Intelligence (AI) to New Distributed Learning Challenges in the Post-Pandemic Era

Robert Sottilare, Ph.D

Soar Technology, Inc.

Xiangen Hu, Ph.D.

University of Memphis

Evan Oster

Aptima, Inc.

Robby Robson, Ph.D.

Eduworks

iFEST
#ADLiFEST

Applying Artificial Intelligence (AI) to New Distributed Learning Challenges in the Post-Pandemic Era

Bob Sottilare, Ph.D.
Director of Learning Sciences

SOARTECH
www.soartech.com

Thank you to other workshop contributors...

Dr. Amanda Bond, SoarTech

Dr. J.T. Folsom-Kovarik, SoarTech

Dr. Hank Phillips, SoarTech

- **Besides moving folks from F2F to online during the pandemic, how did the pandemic influence distributed learning (DL)?**
  - **influenced permanent changes to DL**
  - **some influence, but no permanent changes**
  - **no change in DL… status quo**

- **How important is AI in the development, delivery, and management of distributed learning?**
  - **very important**
  - **somewhat important**
  - **not important**

Challenge Workshop Agenda

- Introduction of our expert workshop panel members (Moderator; 5 minutes)

- Introduction of the topic and workshop format (Moderator; 5 minutes)

- Expert perspectives on distributed learning challenges and the role of AI in the post pandemic era
  - Dr. Robby Robson (5 minutes)
  - Dr. Xiangen Hu (5 minutes)
  - Mr. Evan Oster (5 minutes)

- Audience participation activity (brainstorming challenges and solutions; 10 minutes)

- Panel Q&A (9 minutes)

- Thank the panel (1 minute)

Introduction of our panel members

- Dr. Robby Robson, CEO, Eduworks, Inc.
- Dr. Xiangen Hu, Professor of Cognitive Psychology at the University of Memphis
- Mr. Evan Oster, Learning Solutions Architect at Aptima, Inc.

Dr. Robson   Dr. Hu   Mr. Oster

9/2/2022

Panel Member Guidance

- Guiding Questions
  - Assuming the pandemic is over, do we go back to DL as usual?
  - Has the pandemic fundamentally changed how DL will be provided?
  - What are the primary challenges that will have to be addressed in the post-pandemic era?
  - What role might AI play in addressing those challenges?

Dr. Robby Robson, Eduworks, Inc.

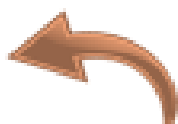## Principal Investigator on two relevant projects

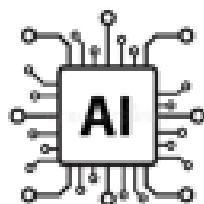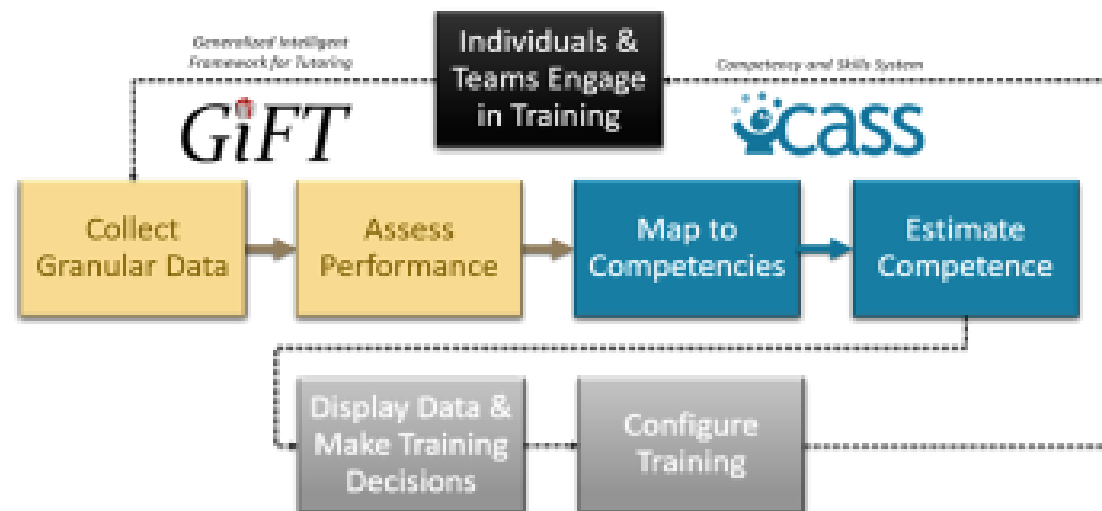In 2020, 11.8 million US undergraduates were enrolled in distance education. 7 million were enrolled exclusively.*

*https://nces.ed.gov/fastfacts/display.asp?id=80

1. Convenience and cost have been demonstrated
2. There is no going back
3. Many questions have been raised

Question: Has the pandemic fundamentally changed how DL will be provided?

1. **No** – The pandemic largely moved classroom instruction online and (in general) not advanced new methodologies
2. **Yes** – It raised new questions and spurred new research.

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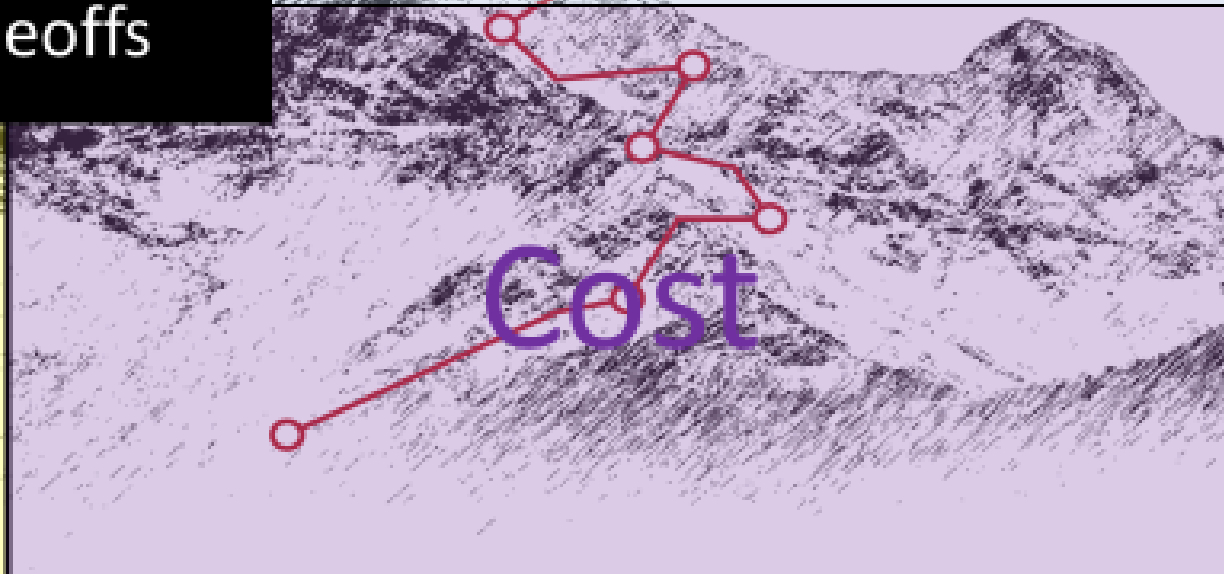**Question:** What are the primary challenges that will have to be addressed in the post-pandemic era?

Effectiveness

Equity

Requirements
&
Tradeoffs

Access

Cost

Question: What role might AI play in addressing those challenges?

The classic uses of AI …

- Recommender systems (Differentiation)
  - Solve Tradeoff Problems
  - Aid with Individualization
  - **Increase Equity and Improve Access**
- Adaptation
  - Implement Personalized Learning
  - **Improve Effectiveness**

Issues with the AI …

- **Bias**
- **Explainability ("Scrutability")**
- **Trustworthiness**

Differentiation

"Instruction is tailored to meet the learning needs, preferences and goals of individual students."

Individualization

"Instruction calibrated to meet the unique pace of various students is known as individualized learning. If differentiation is the "how" then individualization is the "when.""

Personalization

"Personalized learning … refers to the whole enchilada: learning that is tailored to the preferences and interests of various learners, as well as instruction that is paced to a student's unique needs."

https://www.iste.org/explore/Education-leadership/Personalized-vs.-differentiated-vs.-individualized-learning

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One final note ...

AI loves Data ...

And Data we have ....

A Threat and an Opportunity!

Data produced in Higher Education by Online Courses

- **One enrollment** = 50 Minutes of Zoom x 3 Sessions per week x 40 weeks = **100 hours of Zoom Video Data**
- **Zoom recording: Over one Gigabyte per hour**
- Ten Million Learners = **One Billion hours**
- One Billion hours x 1 GB/hour = **1 Exabyte of data** (over 250 years to download on a 1,000 Mbps network)

Data produced in synthetic and semi-synthetic training

VR produces up to one terabyte per hour

- One Million Learners engaged in VR for 10 hours produces **10 Exabytes of data**

Will Work for Data
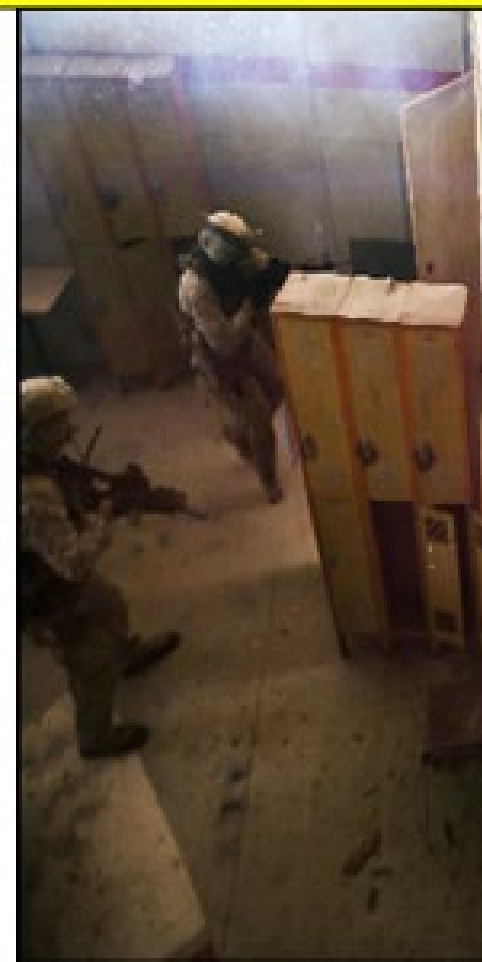
THANKS FOR LISTENING!

robby.robson@eduworks.com

eduworks

Dr. Xiangen Hu, University of Memphis

Xiangen Hu

- Working with ADL since 1999

- Professor of Psychology (& Computer Engineering, & Computer Sciences)

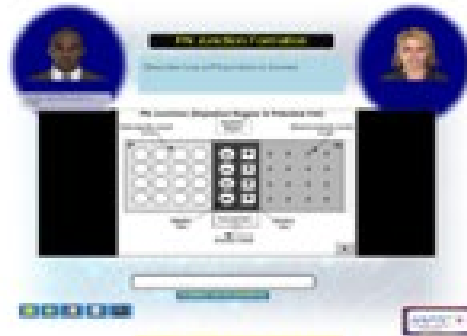- PISA RIG (Research And Innovation Group)

- PI ($10M) Co-PI ($40M)

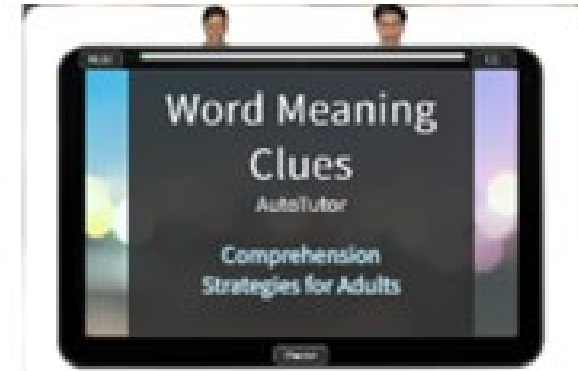- ONR STEM Grand Challenge

- ARL GIFT R&D
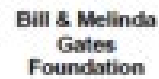
- IES Efficacy for ITS

Projects

Logic/Set Theory

Adult Literacy

Electronics

Statistics

Questions

1. Assuming the pandemic is over, do we go back to DL as usual?

2. Has the pandemic fundamentally changed how DL will be provided?

3. What are the primary challenges that will have to be addressed in the post-pandemic era?

4. What role might AI play in addressing those challenges?

Before Pandemic:

- DL is Optional

  - Migrate **SOME** classroom instruction online

  - Innovative Learning Technologies such as ITSs are "toy" implementations

  - selected learning theories combined with selected domains.

  - Mostly well-defined domains

During Pandemic:

- DL is Mandatory

  - Migrate **ALL** classroom instruction online

  - **New** Learning Technologies and implementation methods **tried**

  - Challenges & **New** Issues

Before Pandemic:

- **Research**
  - Understand why some of DL implementations work well
- **Applications**
  - What works?
    - How to create them fast and easy
- **Technology (AI)**
  - AI will help Learning Technology.
    - The more the better!

After Pandemic:

- **Research**
  - Understand why some of DL applications do not work as well as expected
- **Applications**
  - What does not work?
    - why not? how to make them work?
- **Technology (AI)**
  - AI will help Learning Technology
    - Really? Side effects?

Questions

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3. What are th[...]to be addressed in the post-pan[...]

More learners, more domains, more AI

4. What role might AI play in addressing those challenges?

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Not just what works, need to provide what does not work... like any prescription medications

Questions

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C

1

Implement systematic "clinical" trial for all learning resources (DL product). Identify what does not work and let the consumers (learners) know "side effect"

2   ?

3. **What are the primary challenges that will have to be addressed in the post-pandemic era?**

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Questions

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Questions

AI may be the source of all the problematic issues. Use AI carefully d?

3. What are the primary challenges that will have to be addressed in the post-pandemic era?

4. **What role might AI play in addressing those challenges?**

Mr. Evan Oster, Aptima, Inc.

Distributed Learning Opportunities for the Post-Pandemic Era

Evan Oster

Pandemic Learning Insights

ACCESS

PRIVACY

TIME

Inhibits Performance

Threatens Focus

Contributes to Anxiety

Pandemic Learning Insights

"How can AI help?"

Troubleshooting connectivity issues
Provide recommendations for more reliable connections

Provide a cyber risk analysis
Detect and stop cyber threats

Deliver adaptive learning paths tailored to the user
Analyze learning data to update curricula

TIME MANAGEMENT

PRIVACY

ACCESS
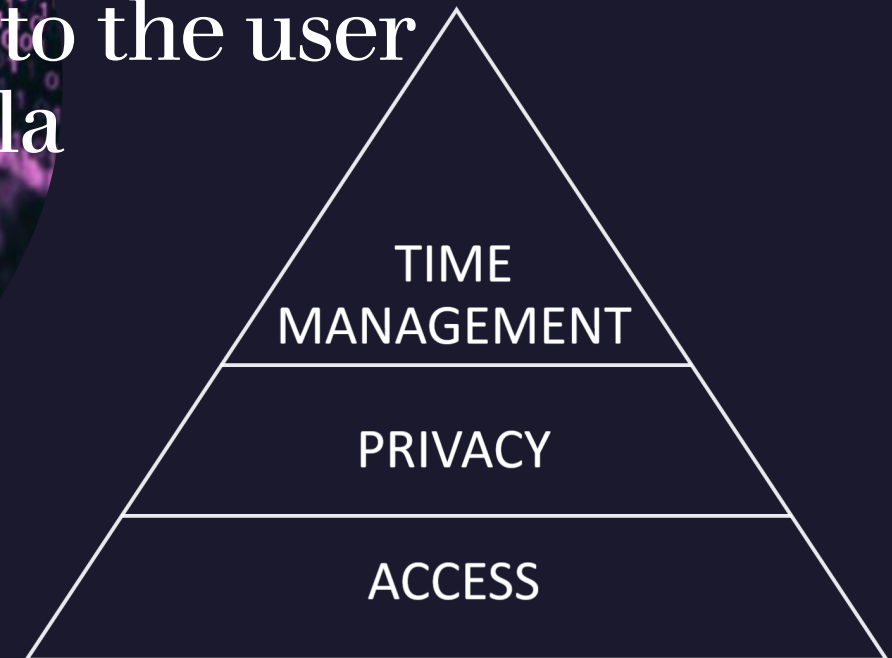
What if we enhance the Distributed Learning model?

Analysis Curriculum Learning Experience Data

Thank you

Evan Oster

Learning Solutions Architect

Aptima, Inc.

Audience Participation Activity

- Question #1: What are the major challenges associated with DL experiences post pandemic?

Audience Participation Activity

- Question #2: What do you see as the major AI solutions to current and emerging DL challenges?

9/2/2022

Expert Panel Q&A

- Audience questions

Folks at this conference might also be interested in…

- **Adaptive instruction**
- **Adaptive training**
- **Adaptive learning**
- **Adaptive education**

Announcement:

The Adaptive Instructional Systems (AIS) Consortium… part of the IEEE Industry Standards & Technology Organization (ISTO) will be conducting its first consortium conference in Orlando, Florida (11-13 April) and will include:

- **F2F and Online attendees**
- **Keynote speakers**
- **Networking sessions**
- **Business how-to sessions**
- **Tutorials, papers, and posters**

Learn more about:

- **AIS Consortium… www.aisconsortium.org**

- **AIS Consortium Conference… contact Bob Sottilare at bob.sottilare@soartech.com**

Thank you for your attention…

- Thank you to our expert panel members: Dr. Hu, Mr. Oster and Dr. Robson

- Thank you to our audience

- Additional questions?

- Please email me at bob.sottilare@soartech.com or any of our panelists directly:

  - Dr. Hu – xhu@memphis.edu
  - Mr. Oster – eoster@aptima.com
  - Dr. Robson – robbyrobson@eduworks.com

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BACKUP SLIDES