

# REIMAGINING TECHNOLOGY ENHANCED LANGUAGE LEARNING:

## LOOKING BACK, MOVING FORWARD

JALT PanSIG2022 Conference

The University of Nagano  
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# ABOUT ME

- 2014/10-2016/03 Research Student  
Graduate School of Language and  
Culture, Osaka University
- 2016/04-2019/03 PhD (Interdisciplinary)  
Graduate School of Information Science  
and Technology, Osaka University



# ABOUT ME

- 2019/04-2022/03 Cybermedia Center, Osaka University
- 2022/04-Present Department of IT, International Professional University of Technology



 大阪国際工科専門職大学

# **(Re)imagining language education**

PanSIG2022

# I AM A DIGITAL IMMIGRANT!



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In the interest of clarity and accessibility,  
this talk will cover the basics.

# SAMR MODEL

**REDEFINITION**

**R**

**MODIFICATION**

**M**

**AUGMENTATION**

**A**

**SUBSTITUTION**

**S**

Puentedura, R. R. (2013, May 29). *SAMR: Moving from enhancement to transformation* [Weblog post]. Retrieved from <http://www.hippasus.com/rrpweblog/archives/000095.html>

# TODAY'S TALK

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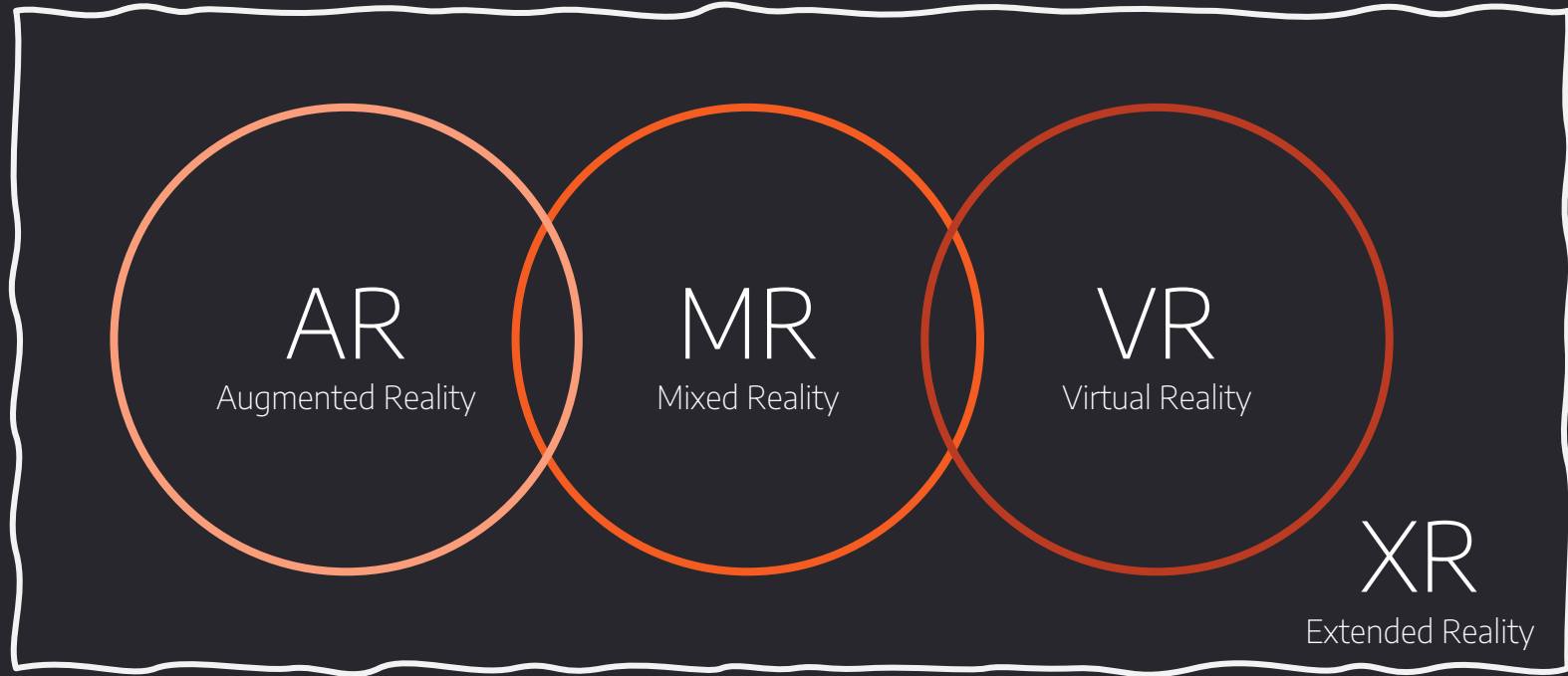




# 1. Immersive Technologies



# IMMERSIVE TECHNOLOGIES



# AUGMENTED REALITY (AR)

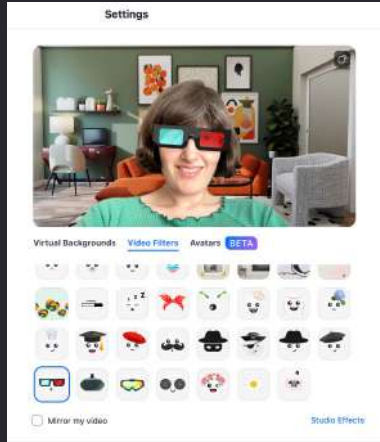
- Digital 2D or 3D objects overlaid on the real world



Pokemon Go Mobile AR Game

# AUGMENTED REALITY (AR)

Zoom video filters



JINS app (left)  
Ikea Place app (right)



Google Lens



# AUGMENTED REALITY (AR)



Education



Vocational Training

# TYPES OF AR

- Marker-based AR



<https://help.evolvear.io/viewing-ar-content/>

- Markerless AR



# EXAMPLES OF MARKER-BASED AR

## ARientation Project



<https://youtu.be/OKltBBddYk4?t=12>

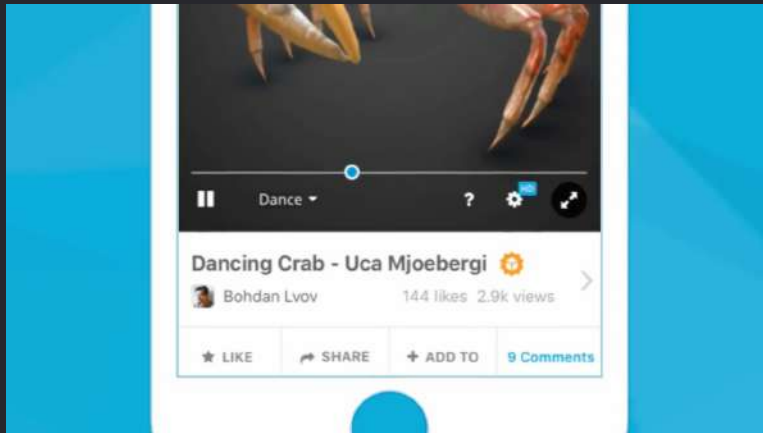
## QuiverVision app



<https://youtu.be/jv-V5ZmS-A4?t=5>

# EXAMPLES OF MARKERLESS AR

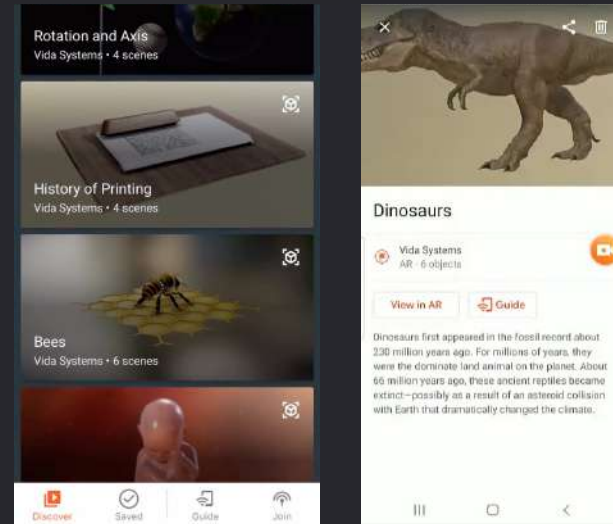
## Sketchfab



<https://youtu.be/80DkL6eb5W8>

## Google Expeditions AR

(Closed down on June 30, 2021)





# MOBILE AR

- LiDAR  
(Light Detection and Ranging)
- 3D scanning



[https://youtu.be/KYXIIB\\_JIYU](https://youtu.be/KYXIIB_JIYU)

## AR: LEARNING THEORIES & USE CASES

- Constructivism
  - Socio-cultural theory
  - Situated learning
  - Inquiry-based learning
  - Discovery-based learning
  - Connectivism
- Content learning
  - Campus tours
  - Scavenger hunts
  - Library & self-access learning center guides
  - And more ...

1. Hockly, N. (2019). Augmented reality. *ELT Journal*, 73(3), 328–334.
2. Zhang, D., Wang, M., & Wu, J. G. (2020). Design and implementation of augmented reality for English language education. In V. Geroimenko (Ed.), *Augmented reality in education* (pp. 217-234). Springer.

## CHALLENGES OF AR IN EDUCATION

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- Lack of AR authoring tools
- hardware dependence
- Insufficiency of teacher training

## VIRTUAL REALITY (VR)

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- “An immersive computer-enabled technology that replicates an environment and allows a simulation of the user to be present and interact in that environment”

Lloyd, A., Rogerson, S., & Stead, G. (2017). Imagining the potential for using virtual reality technologies in language learning. In M. Carrier, R. M. Damerow, & K. M. Bailey (Eds.), *Digital language learning and teaching: Research, theory, and practice* (pp. 222-234). New York, NY: Routledge.



# VIRTUAL REALITY (VR)

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- PC (or mobile device)
- head-mounted display (HMD)
- cave automatic virtual environment (CAVE)

## Degree of Immersion

“The extent to which the system is capable of shutting out the outside world”

Makransky, G. & Petersen, G. B. (2021). The Cognitive Affective Model of Immersive Learning (CAMIL): A theoretical research-based model of learning in immersive virtual reality. *Educational Psychology Review*.

# AltspaceVR on PC





Meta Quest 2 HMD

# AltspaceVR on HMD



# AFFORDANCES OF VR FOR EDUCATION

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- Immersion
- Sense of (co-)presence
- Cognitive embodiment
- Increased engagement and motivation
- Empathy, ...

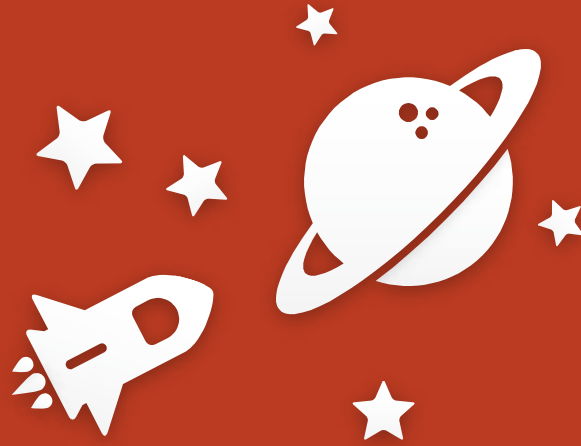
1. Tan, S. (2019). The rise of immersive learning. *Journal of Applied Learning and Teaching*, 2(2), 91-94.
2. Parmaxi, A. (2020). Virtual reality in language learning: A systematic review and implications for research and practice. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2020.1765392>



# VR EDUCATIONAL APPS

- Immersive documentaries
- Content-specific
- Social VR
- Games





# Metaverse

“The concept of a future iteration of the Internet, made up of persistent, shared, 3D virtual spaces linked into a perceived virtual universe”

# Science Fiction Coming True

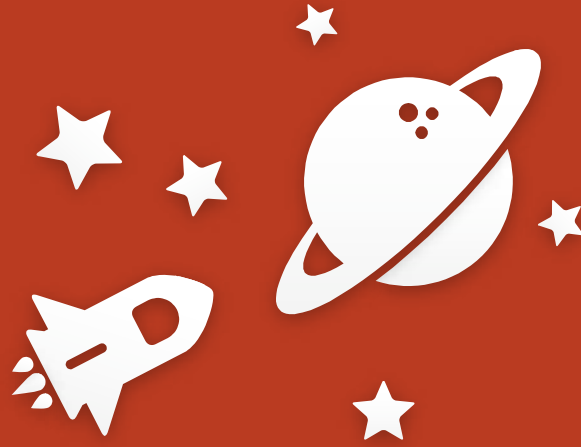


1992 Novel by Neal Stephenson



2011 Novel by Ernest Cline

# Metaversity



# Digital Twins

“A virtual representation that serves as the real-time digital counterpart of a physical object or process”

## Examples of Digital Twins

Natural History Museum  
London



Digital Singapore by National  
Research Foundation Singapore



<https://www.nhm.ac.uk/press-office/press-releases/natural-history-museum-launches-3d-virtual-tour-technology/natural-history-museum-launches-3d-virtual-tour-technology.html>

<https://youtu.be/y8cXBSI6o44>

# OPEN VR: MOZILLA HUBS

Navigate in VR



React and chat



Add digital content



Break out into groups



# CREATE YOUR OWN ENVIRONMENT

The screenshot shows the Spoke by Mozilla website interface. At the top, there is a navigation bar with links for 'What's New', 'Source', 'Community', and 'Hubs' on the left, and 'Projects' and 'Logout' on the right. The main content area features the Spoke logo with the tagline 'make your space' and the text 'Create 3D social scenes for Hubs'. A prominent blue 'Get Started' button is positioned below the text. To the right of the text is a large image of the Spoke web editor interface, which displays a 3D scene of an outdoor area with a blue canopy and a red circular seating area, alongside various tool panels and a scene hierarchy list.

**spoke** by mozilla  
make your space

Create 3D social scenes for Hubs

[Get Started](#)

**Discover**

Explore images, video, and 3D models from around the web, all without opening up a new tab. With media integrations from Bechfish, you'll be on your way to creating a scene in no time.

**Create**

No external software or 3D modeling experience required - build 3D scenes using the Spoke web editor so you can have a space that's entirely custom to your needs. From a board room to outer space and beyond, your space is in

**Share**

Invite people to meet in your new space by publishing your content to Hubs immediately. With just a few clicks, you'll have a world of your own to experience and share - all from your browser.

# VR PROJECTS FROM MAVR TEAM

## VR & Public Speaking Anxiety





# VR PROJECTS FROM MAVR TEAM

## Virtual Tour-Based Learning



## VR PROJECTS FROM MAVR TEAM

### Immersive Story-telling & Tourism Education



<https://youtu.be/BzKvXHZAEyl>

# CHALLENGES OF VR IN EDUCATION

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- Scarcity of educational VR apps
- Device accessibility
- Computing power
- Cybersickness

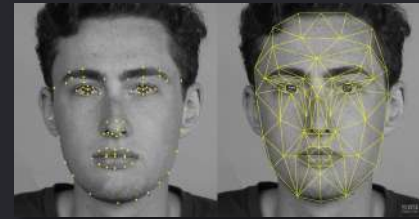
1. Southgate, E. (2020). *Virtual reality in curriculum and pedagogy: Evidence from secondary classrooms*. Routledge.
2. Rebenitsch, L., & Owen, C. (2016) Review on cybersickness in applications and visual displays. *Virtual Reality*, 20(2),101-125.

# 2. Artificial Intelligence



# ARTIFICIAL INTELLIGENCE (AI)

- Also known as **weak/narrow AI**
- Performs specific tasks
- Examples of Narrow AI:
  - Google search
  - Image recognition software
  - Personal assistants

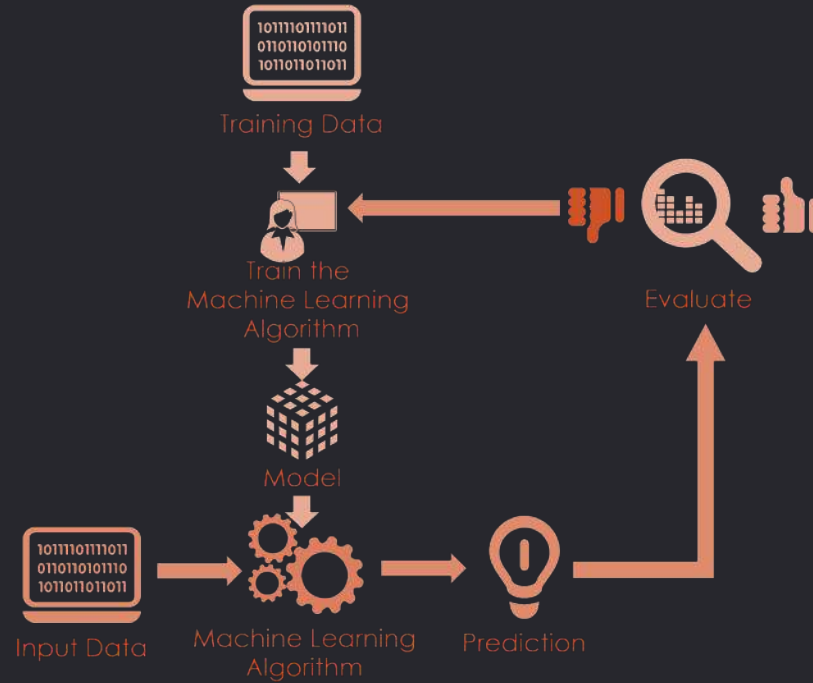


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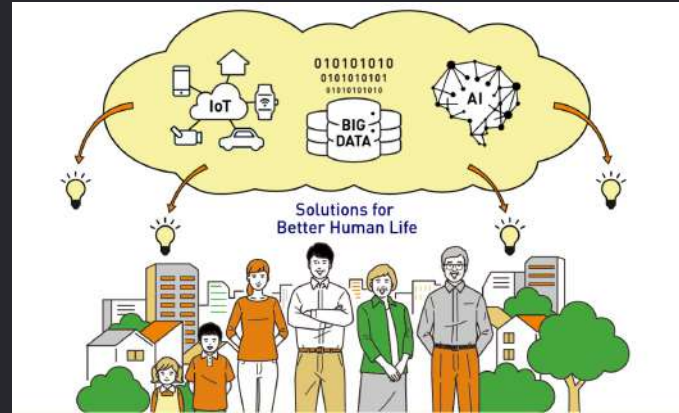
**Machine learning** is a branch of AI focused on building applications that learn from data and improve their accuracy over time without being programmed to do so.

# HOW MACHINE LEARNING WORKS



# SOCIETY 5.0

- Japan's new blueprint for a super-smart society
- Society 5.0 will follow
  - Society 1.0 (hunter-gatherer)
  - Society 2.0 (agricultural)
  - Society 3.0 (industrialized)
  - Society 4.0 (information)



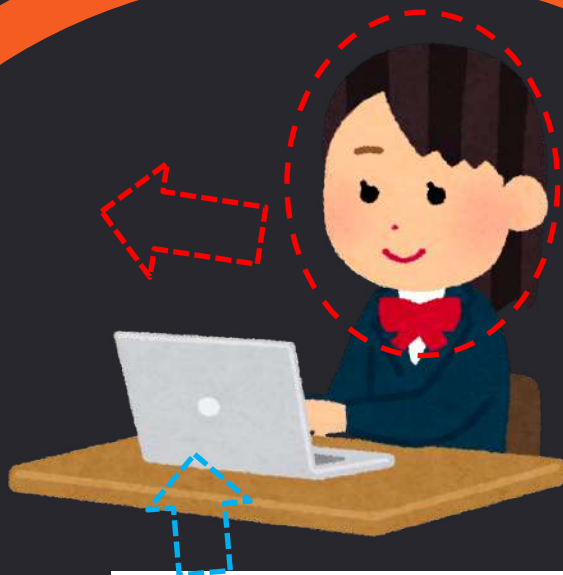
<https://www.unesco.org/en/articles/japan-pushing-ahead-society-50-overcome-chronic-social-challenges>



## e-Learning system

**Sensing**

- Facial expressions
- Gaze points
- Heart rate



**Inner State Estimation**

- Engagement
- Comprehension

**Learning Experience Personalization**

- Learning content
- Progress speed

## Collaborative Learning Support System

### Sensing

- Facial expressions
- Gaze points
- Audio



### Analyzing Communication

- Engagement in the activity
- Contribution to group work

### Support for Communication

- Identifying groups in need of help

## AI: A THREAT OR A BLESSING?

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- AI in education  $\neq$  machines replacing teachers
- AI in education = Helping teachers make more informed decisions

# AI IN LANGUAGE LEARNING

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- Chatbots
- Adaptive learning
- Machine translation

# CALL FOR COLLABORATION





# AIED 2022 CONFERENCE JULY 27-31, 2022

23rd International Conference on Artificial Intelligence in  
Education - University of Durham, UK and Virtual

[SUMMARY](#)

[CONFERENCE WEBSITE](#)



# 3. Learning Analytics



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## LEARNING ANALYTICS (LA)

“The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs”

<https://www.solaresearch.org/about/what-is-learning-analytics/>



# LEARNING ANALYTICS (LA)

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- LA and Big Data: Technological trend in Horizon Report 2022
- More potential for LA since COVID-19
- Observed issues:
  - Student privacy and equity concerns
  - Lack of buy-in from faculty
  - Investment in staff and resources for data reporting

# LA DASHBOARDS

- For teachers and students
- Data visualization



MARCH 13-17, 2023 • ARLINGTON, TX, USA

# LAK23 Moves to Arlington, Texas, USA

Conference dates will now be March 13-17, 2023.

Read the full LAK23 Announcement to learn more about this change.

[LEARN MORE](#)



# 4. Ethical Issues



## User Data Handling

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- User data collection
- Privacy concerns
- Targeted advertising



# THANKS!

ANY QUESTIONS?



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