

# Trends in Education

Future Technologies



Trent Ray


Collective Education Australia

 @ray\_trent #WAES





What do you want to be  
when you grow up?

A person is seen from behind, carrying a young child on their shoulders. The child is wearing a pink t-shirt and has their hair in a bun. The person is wearing a plaid shirt. They are standing in an open field with mountains in the distance under a sunset sky. The child's right arm is extended, holding a small paper airplane.

What did you want to be  
when you grew up?



App Developer



Data Miner



# Social Media Manager



Cloud Services Specialist





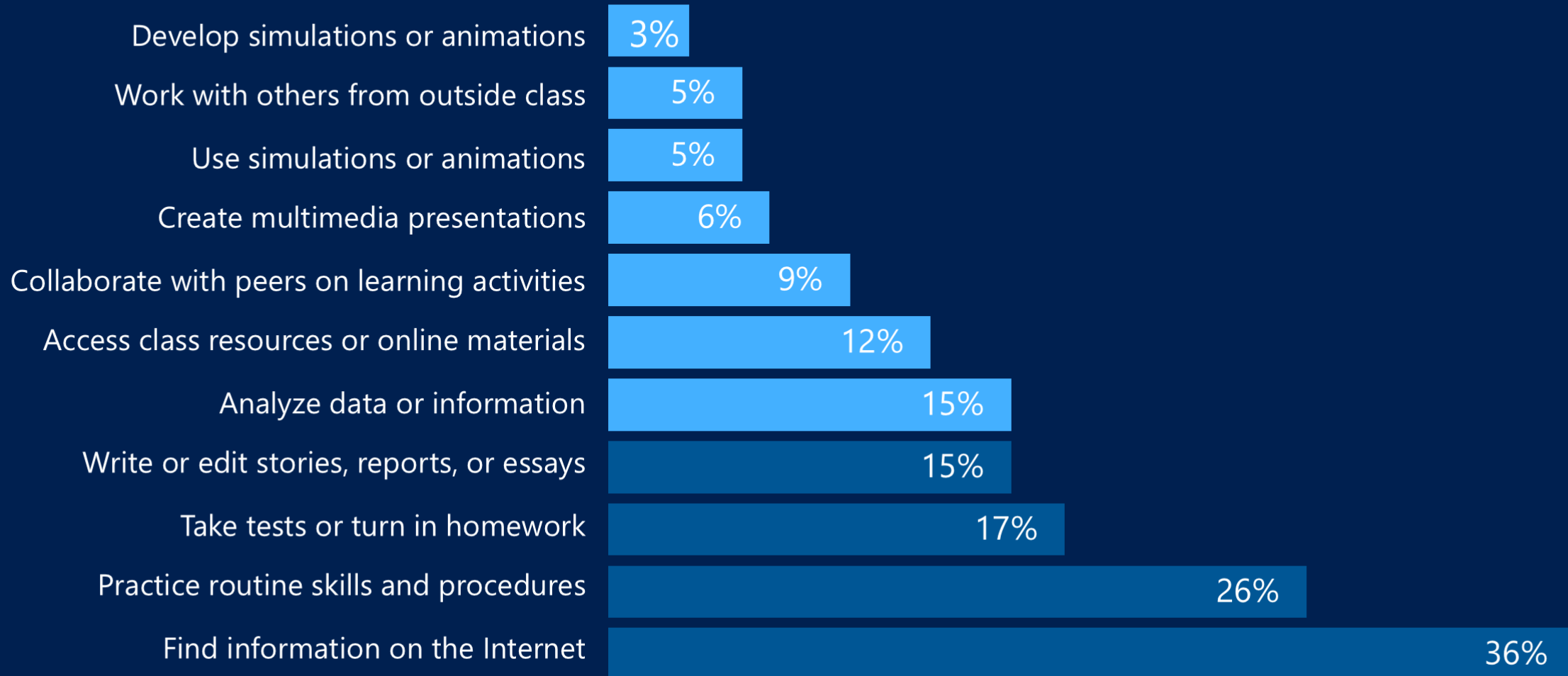
Avatar Manager

...anything but a teacher!

If a visitor to your school walks into a **typical classroom**. What might we see students doing with technology?

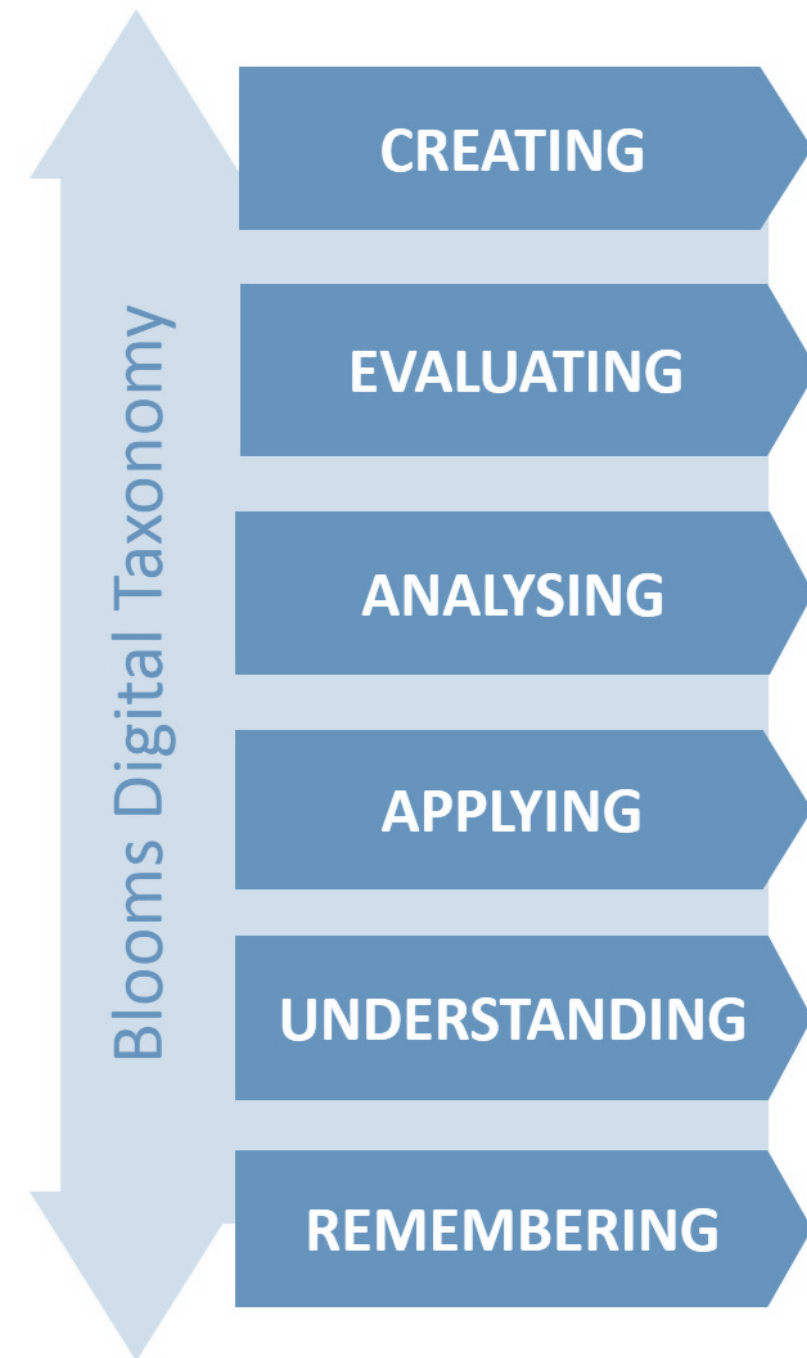
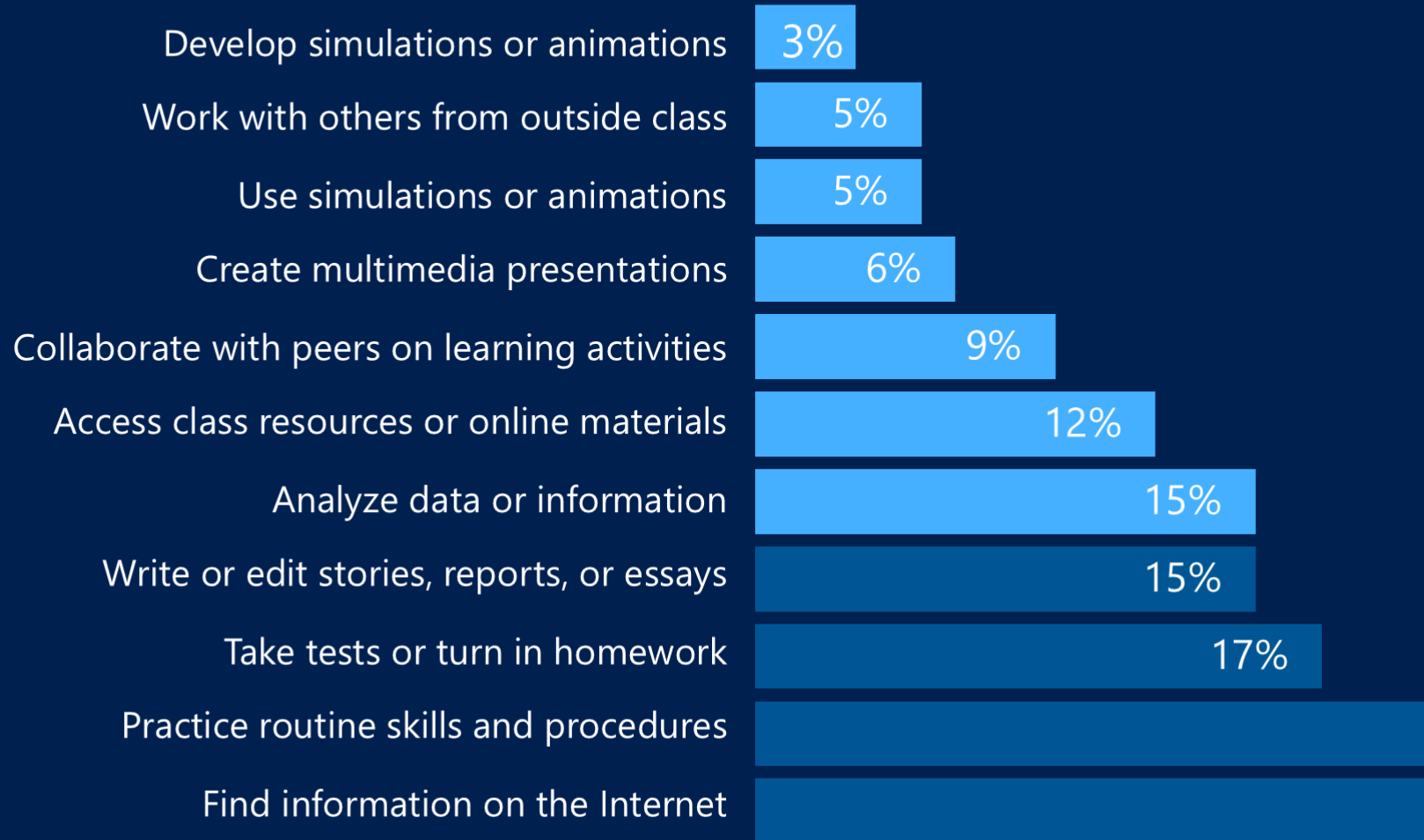
# ITL research findings

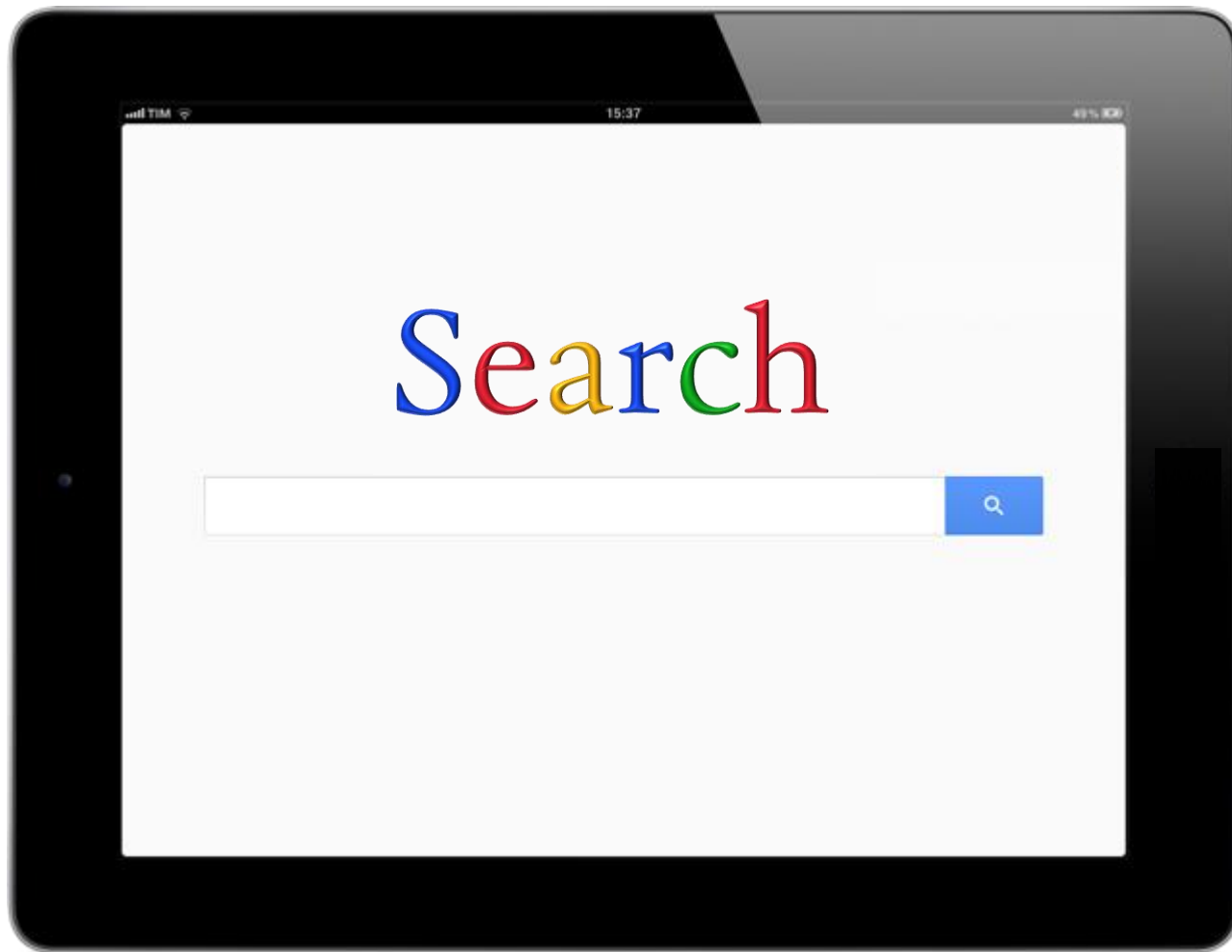
## ICT uses for class-related activity



# ITL research findings

## ICT uses for class-related activity





How do you use your device in class?

Trent

We use it to look up research and make things for our projects.

Josh

What subjects do you use your device in?

Trent

Mostly in Maths. We get onto Mathletics.

Josh

Can you think of any other ways you use it?

Trent

Nah, not really.

Josh

A photograph of a classroom scene, overlaid with a purple tint. In the foreground, a woman with curly hair sits at a desk, looking towards the right. In the background, a man in a light-colored shirt is leaning over a desk, and two other people are seated at a desk, engaged in conversation. The text "where he will learn" is centered in white.

where he will learn

where he will work



Research & Development Group



**Brad** V.P. of Product

We need to cut down on our frame's weight to stay competitive. Any ideas?

Like • Reply



**Giorgio** Lead Engineer

We've been considering a new design.

Like • Reply

Reply





the work he does

The future

# | The future is here.

➤ Cloud Platforms

➤ AR, VR, MR...

➤ Artificial Intelligence

➤ Cognitive Services

➤ Analytics Technology

➤ Machine Learning

➤ 3D Design & Printing

➤ Virtual Worlds

How do you see  
these technologies  
impacting learning?

➤ Cloud Platforms

➤ AR, VR, MR...

➤ Artificial Intelligence

➤ Analytics Technology

➤ Machine Learning

➤ Virtual Worlds

➤ 3D Printing

# ➤ Moving to the Cloud





Want an even faster, more collaborative experience? Download the desktop app. [Download](#)

Search

Favourites

21st Century Learning Design Project

### 21st Century Learning Design Project > General

Conversations Files Wiki 21CLD Workbook


Rory McCaughey 20/04 3:50 PM  
Hi Trent, I'm Rory. This is my first year at MGG5 and I am loving it so far. I have quite a bit of experience using technology to enhance learning in the classroom. Prior to working at MGG5 I worked at a Catholic primary school where I led a team that rolled out 1:1 Chromebooks in Grades 3-6. I have quite a lot of experience using G Suite tools and very little experience with Microsoft tools, which is why I am here! Looking forward to developing my skills!

Christophe Taylor 20/04 3:55 PM  
Hi everyone. I have enjoyed using OneNote and Powerpoint Mix this year to enhance my teaching and look forward to using Microsoft software even more to improve the delivery of pedagogy.

Suzanne Taylor 20/04 3:56 PM  
Hi Trent, My name is Suzanne and I am teaching Year 2 at Morris Hall. I'm really looking forward to using 21CLD in my teaching.

Trent Ray 20/04 10:46 AM Edited  
Hi Everyone. Welcome to our TEAMS Space for the 21CLD Project. It would be great for you to reply to this thread with a quick introduction so I can get to know you!

Introduce



# Teams

Creating a culture of  
Collaboration

2 - Warm up: Hand Battery - OneNote

File Home Insert Draw History Review View

Insert Space Table File File Spreadsheet Diagram Screen Clipping Pictures Online Pictures Online Video Link Record Audio Record Video Date Time Date & Time Page Templates Equation Symbol

Year 7J 2016 Alex Darrow Welcome Homework Essay Drafts History English Science History 2 Assignment 1


## 2 - Warm up: Hand Battery

Monday, November 9, 2015 7:54 PM

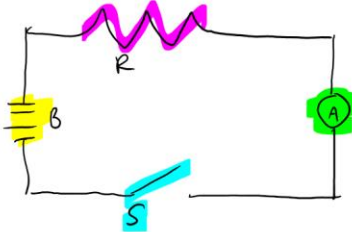

### Materials

- A DC ammeter capable of reading 100 microamps.
- From <http://www.physicsphenomena.com/SimpleCircuit.JPG>
- An aluminum plate and a Copper plate, each the size of a hand.
- 2 electrical lead wires with alligator clips at both ends.

The parts



Assembled



Windows taskbar: Start button, taskbar, and system tray icons (volume, network, battery, clock).

# OneNote

## Class Notebooks



➤ **Virtual** Reality

➤ **Augmented** Reality

➤ **Mixed** Reality



# A New Reality



**V**irtual  
**R**eality



**A**ugmented  
**R**eality



**M**ixed  
**R**eality





CASE WESTERN RESERVE  
UNIVERSITY  
COLLEGE OF ARTS AND SCIENCES

# MIXED REALITY CHANGING HOW WE LEARN



HoloLens







Kids won't get a job out of having  
*experienced* AR, VR and MR....



Kids will a job out of having  
*developed* for AR, VR and MR....

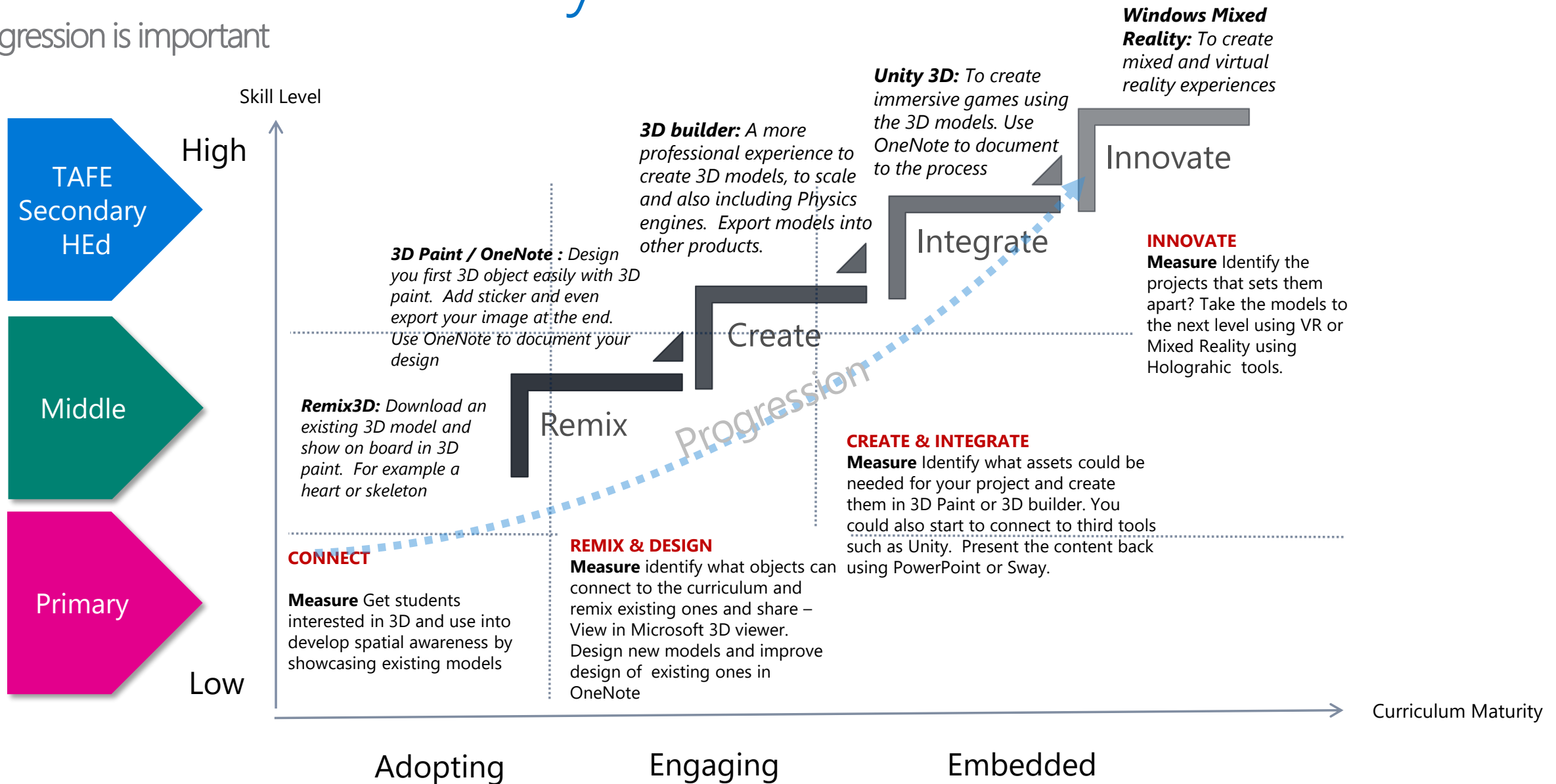
from consumers to creators

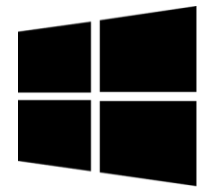
from consumers to **creators**



# 3D to Mixed Reality

Progression is important

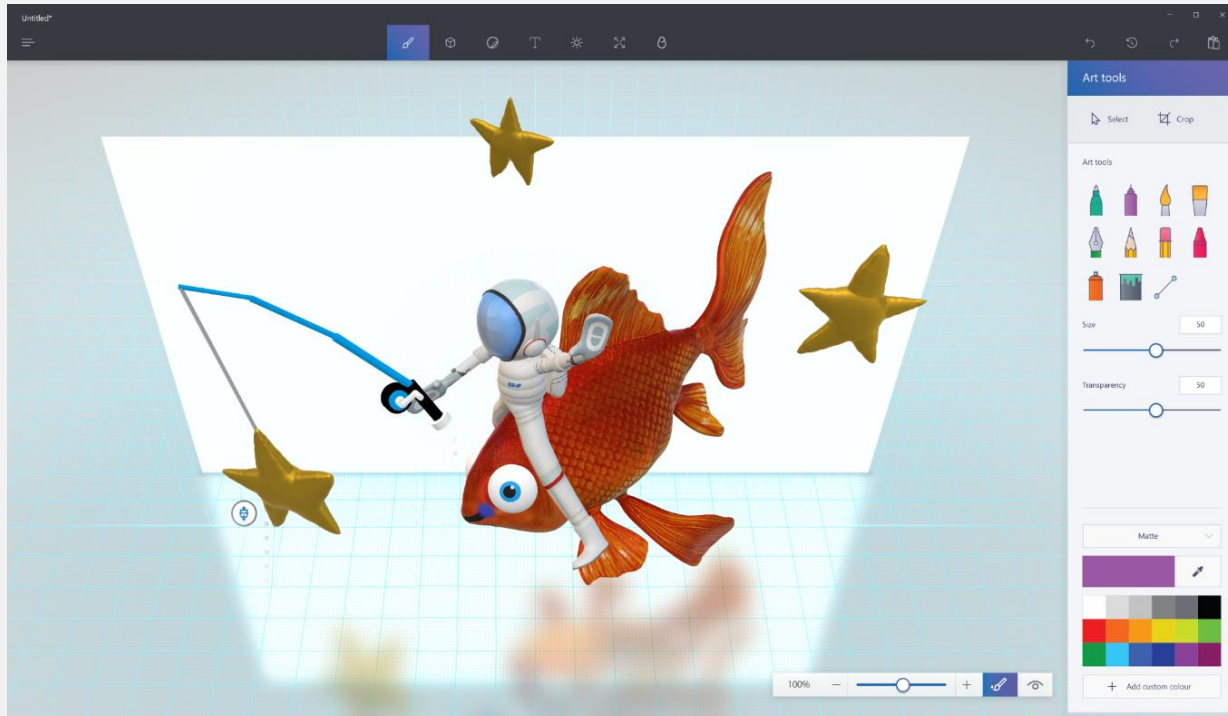




Windows 10

creators update

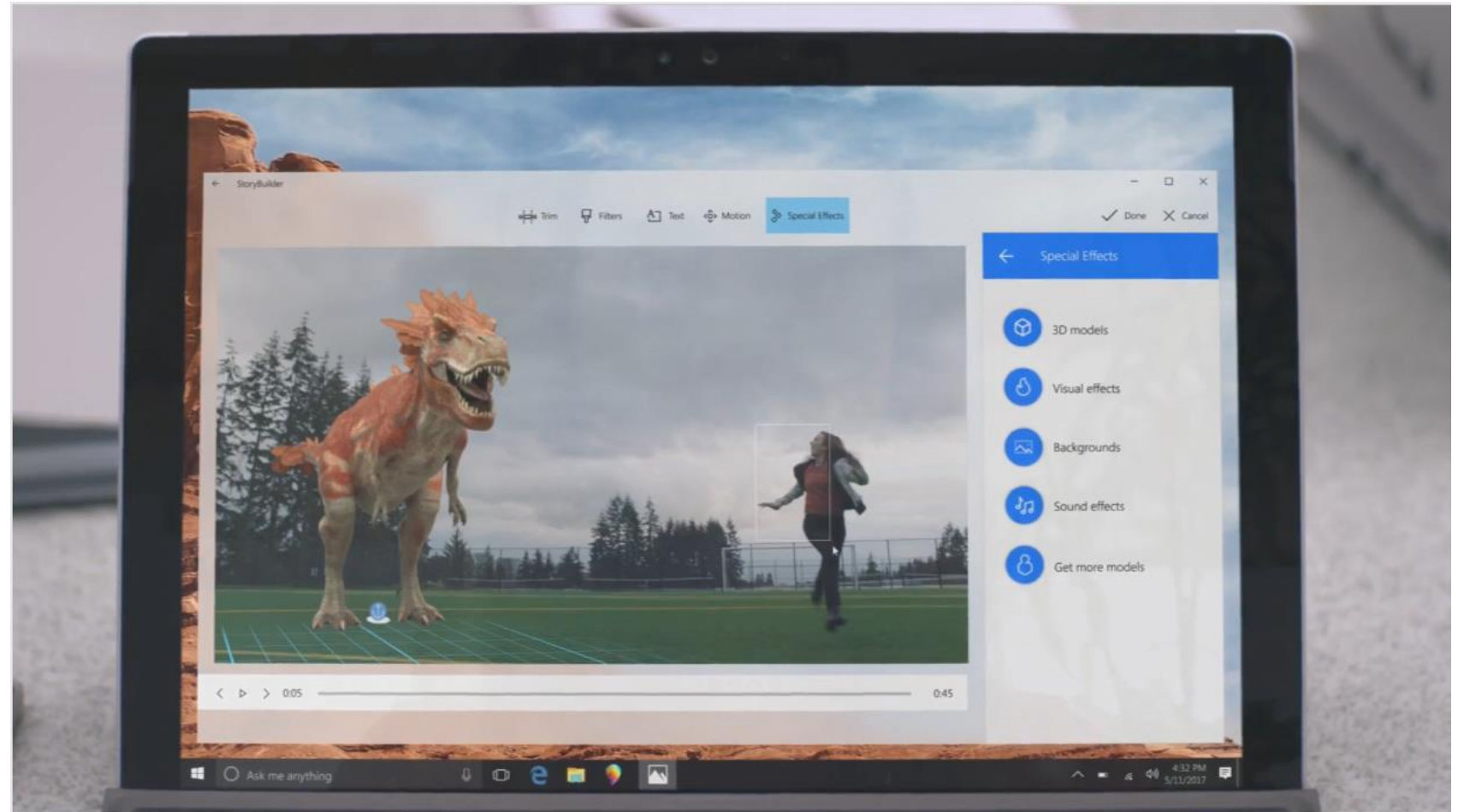
# Learners as Creators



# Story Remix



The reimagined **Story Remix** makes it so anyone can create a story with their photos and videos. You can ink directly into your videos and have it follow objects. You can add 3D objects and make your video come to life incorporating AI





Seek

0:0

c|net

0:12

Search Remix 3D



## Fireball

Microsoft

PLACE IN PROJECT



effect

fire

fireball

smoke

## Description

It's a bird! It's a plane! It's a flaming meteor heading straight toward earth!

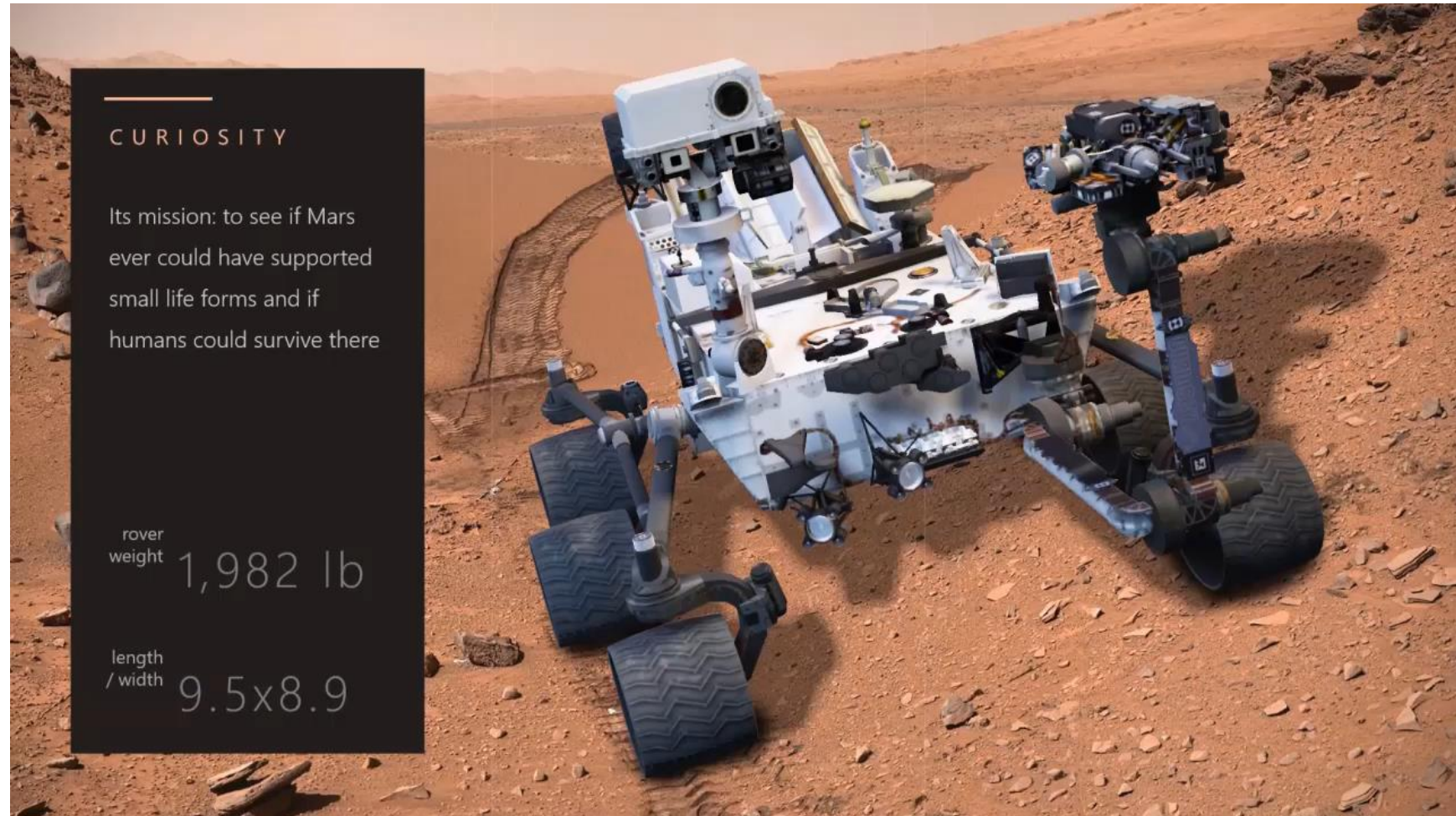
4/26/2017

Made with Other

Remixes

# Integrate 3D objects

You can enhance comprehension, productivity and expression of ideas by placing 3D objects into Office apps like **Word and PowerPoint**. Use the morph animation to rotate the object in different directions. View, resize, & rotate a 3D object with the 360 rotation handles.



# Mixed Reality Viewer



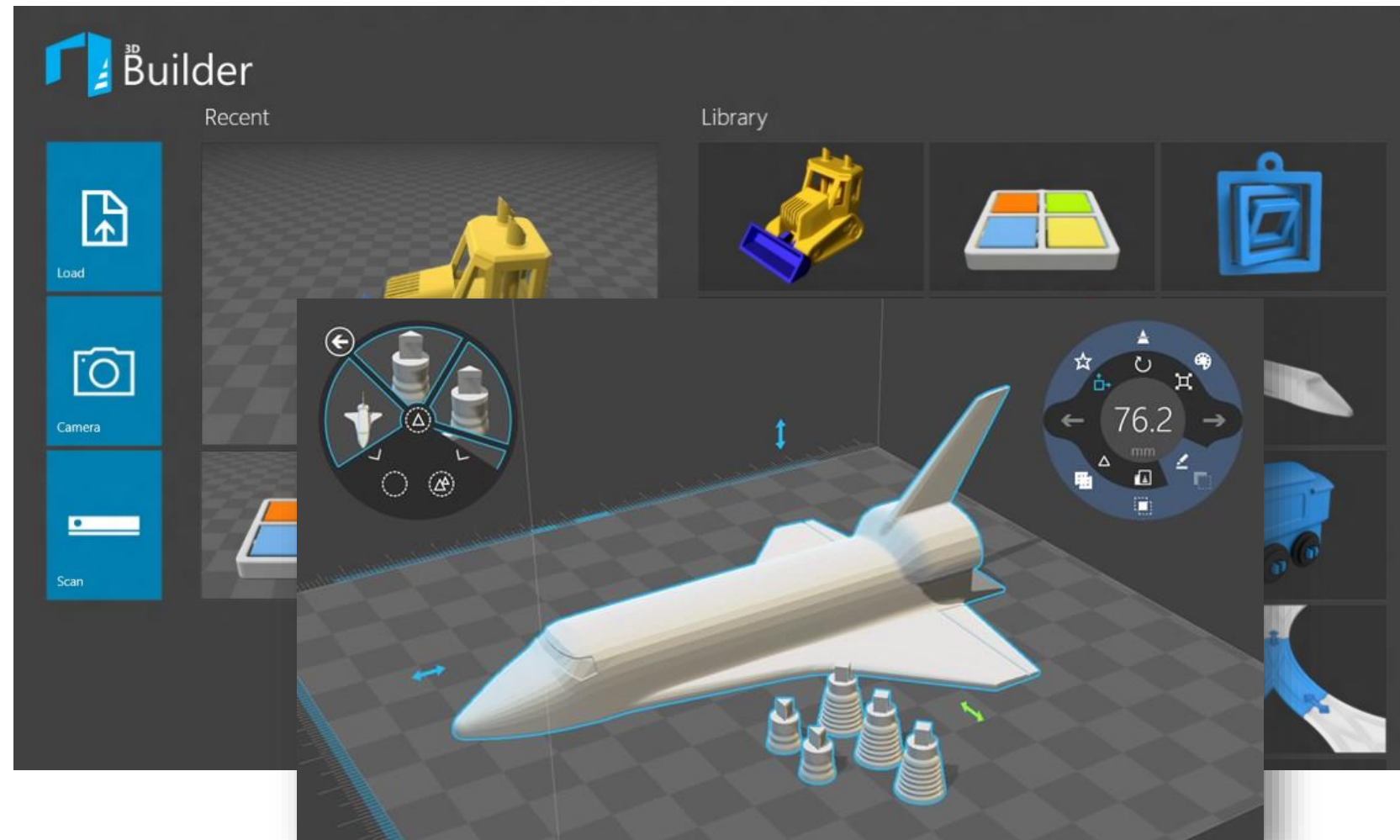
Transform your world by bringing digital **3D art into your real world** via View 3D. This feature utilizes your world facing camera to create magical moments. Rotate, resize, and move the object to create fun playful moments



# 3D Builder



The **3D Builder** app has model visualization options and editing capabilities, and can **print to a 3D printer** that has a Windows-compatible printer driver. The app can be used as a reference and a test tool for 3D-editing, and for validating 3MF files that you create.

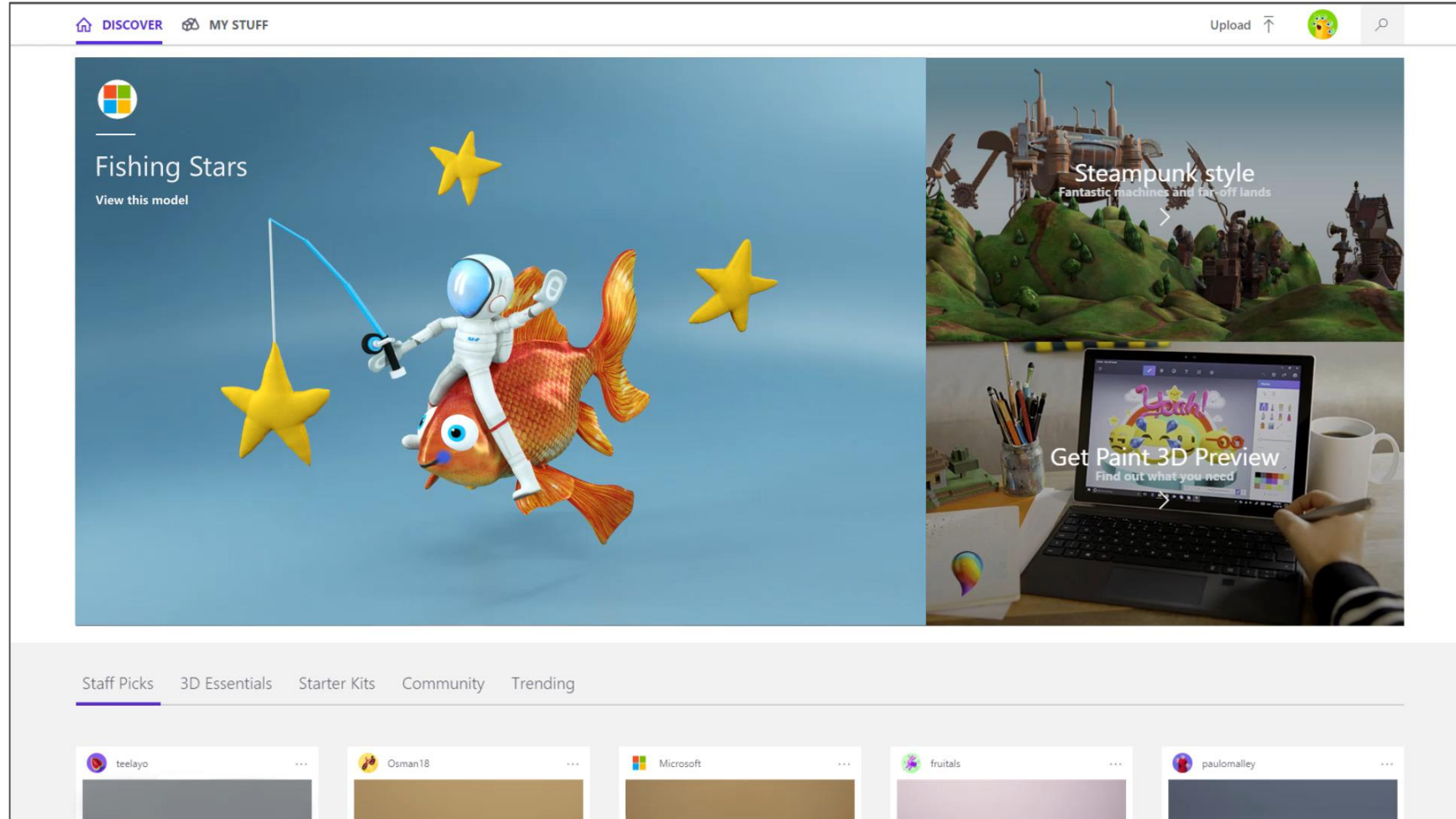




# Find inspiration on the Remix 3D (remix3d.com)

*Available October 17th*

The Remix 3D Community (Remix3D.com) is a free **3D sharing website** that makes it easy to explore and consume 3D content online. You can even create, remix and **upload your own 3D content** to share with others.



 Virtual Worlds

# GAME-BASED LEARNING

KnoxP



MichaelT



RandyM



KettiJ



BrockP  
CarmenC  
ColeP



BenK  
ChrisM



MarcellaP



# ChrisH



# Creativity and Expression

// 12% increase in learning outcomes when games are used to reinforce concepts //

<https://www.sri.com/work/projects/glasslab-research>

## EXAMPLE LESSON

**SUBJECT:** Ecology/Biology

**AGE RANGE:** Intermediate

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### RIVER ECOSYSTEM PROJECT:

Students model a river ecosystem and present to class, use field work as baseline for measurements

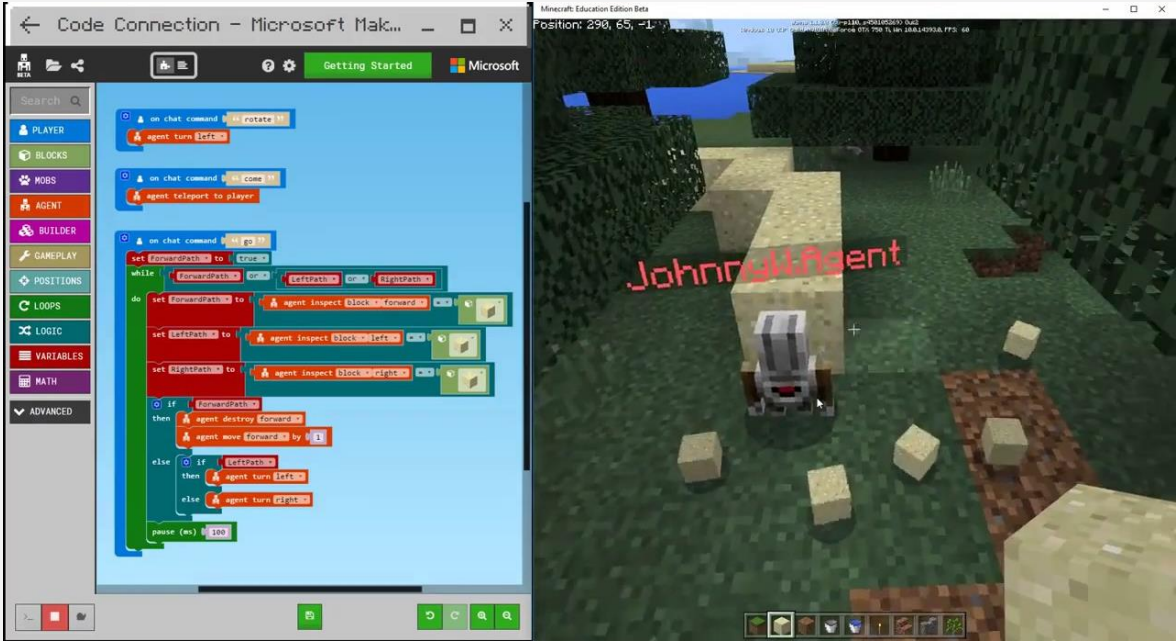
### LEARNING OBJECTIVES:

- Understand salmon habitat requirements
- Topography and cubic volumes
- Current and water flow (how use of dams affect ecosystem)

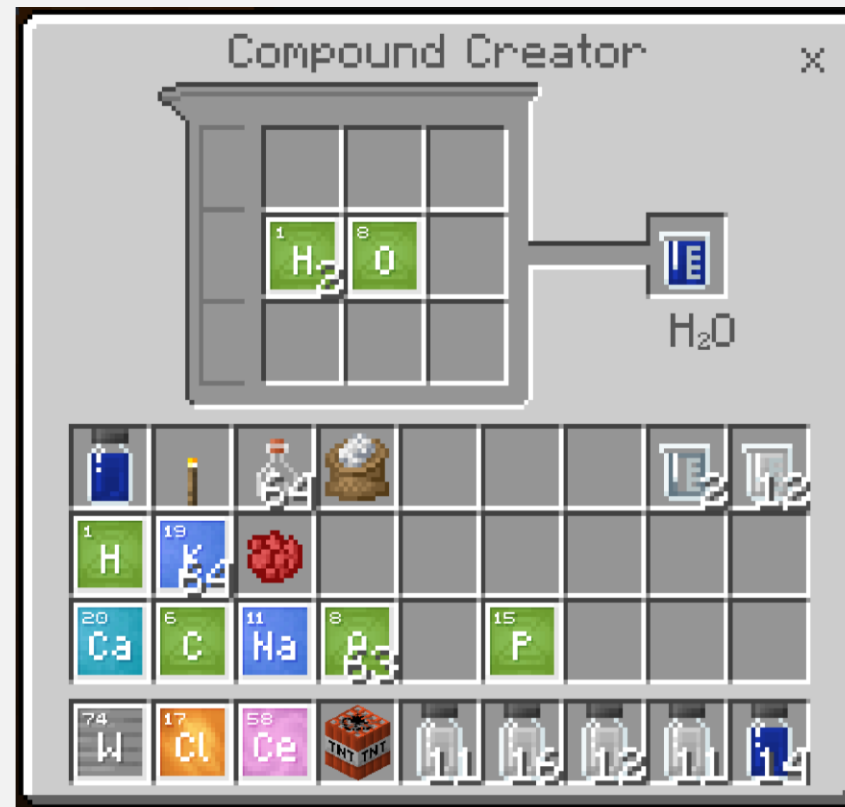
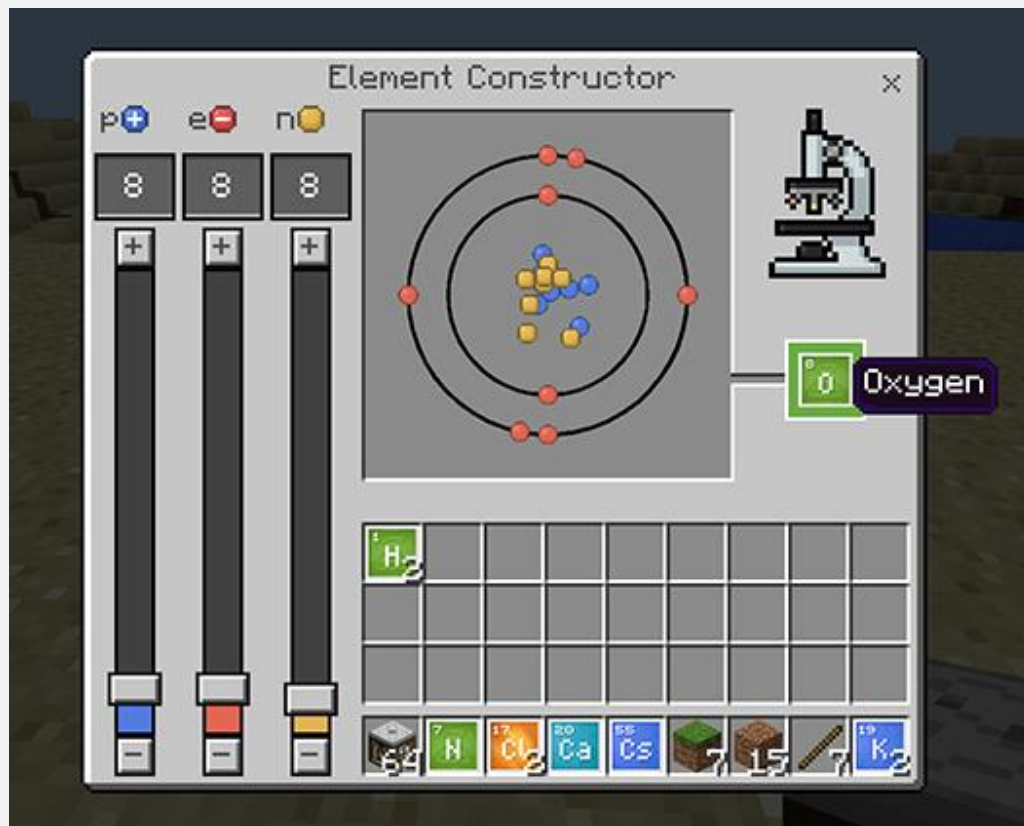


RIVER ECOLOGY SIMULATION

# Computational Thinking



# Chemistry



# Export to 3D



# ➤ Machine Learning



“You did what?”



# Machine Learning





# Machine Learning

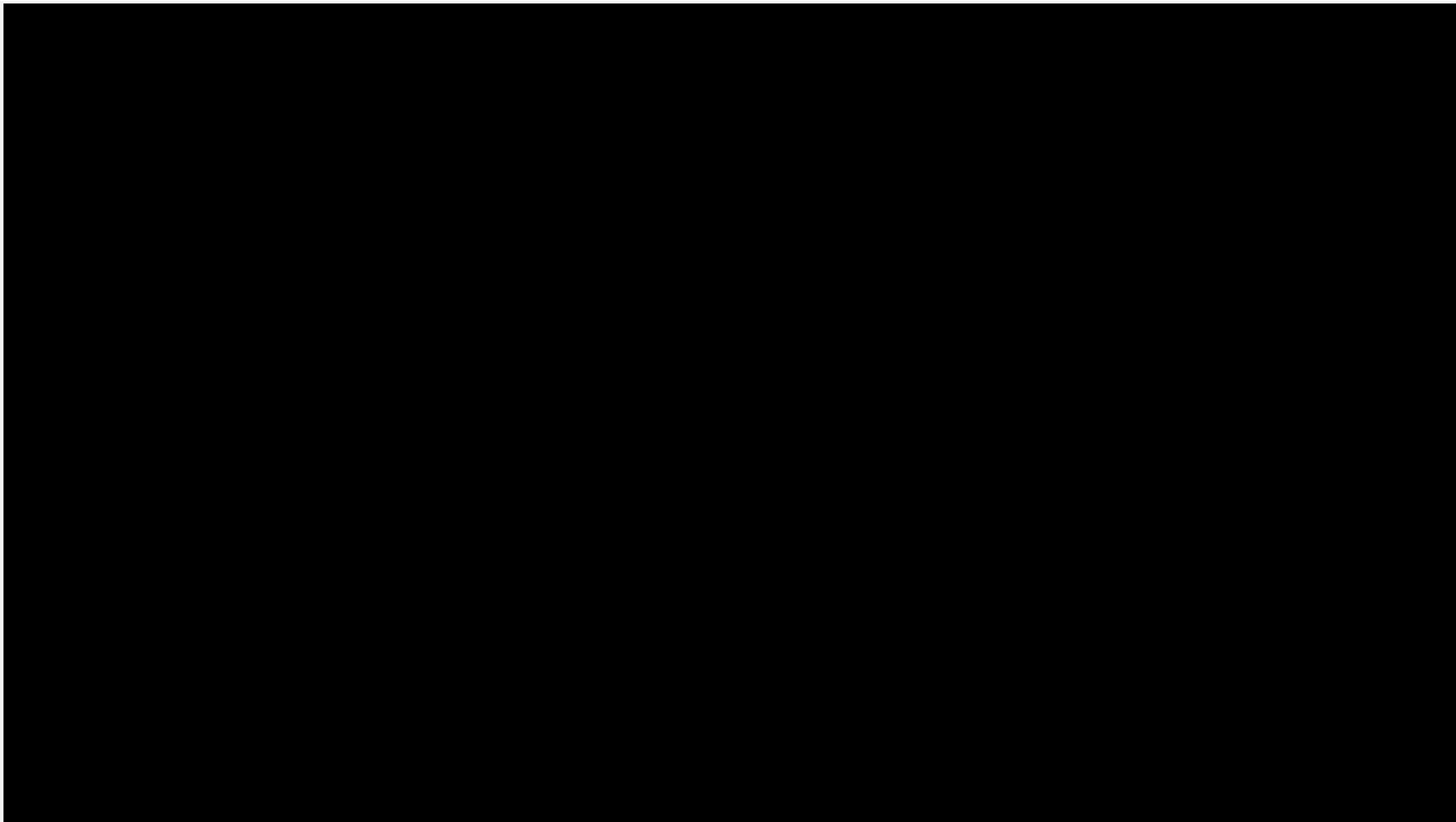
[www.machinelearning.ai](http://www.machinelearning.ai)

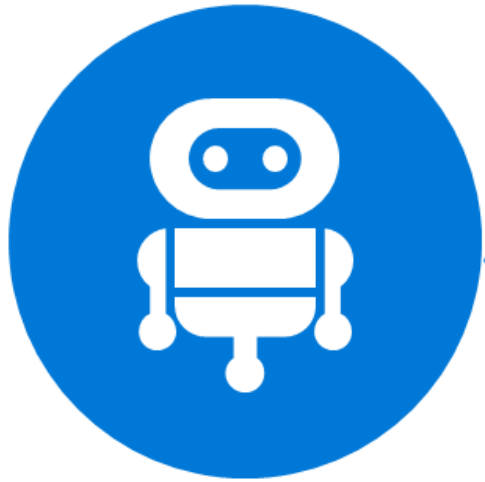
➤ Artificial Intelligence

➤ Cognitive Services



# Artificial Intelligence



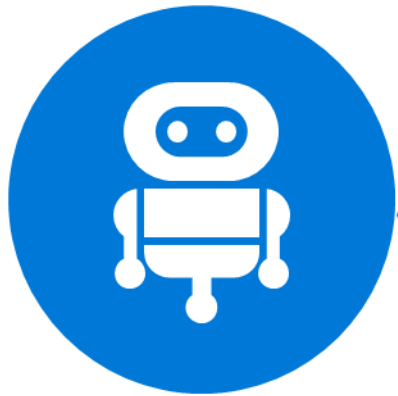


Make your own Chatbot!

<http://qnamaker.ai>



Intelligence



Get answers



Take action

# 'Cognitive Services'



## Vision

From faces to feelings, allow your apps to understand images and video



## Speech

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent



## Language

Process text and learn how to recognize what users want



## Knowledge

Tap into rich knowledge amassed from the web, academia, or your own data



## Search

Access billions of web pages, images, videos, and news with the power of Bing APIs

# Emotion APIs



Neutral:   
Happiness:   
Surprise:   
Sadness: 

Anger:   
Disgust:   
Fear:   
Contempt: 



Get started for free at [projectoxford.ai](https://projectoxford.ai)



# COGNITIVE APIs

The screenshot shows the 'DEMONS' section of the Microsoft Cognitive Services website. It features a dark-themed interface with a navigation menu on the left and a grid of demo cards on the right. The navigation menu includes sections for 'Filter by', 'Category', and 'Technology', each with a list of checkboxes and descriptive text. The demo cards are arranged in a grid and each includes a representative image and a title. The 'Filter by' section has a 'Sort by' dropdown set to 'Recently added'. The 'Category' section lists 'Autonomous', 'Enterprise', 'Fun', and 'Guided'. The 'Technology' section lists 'Bing Autosuggest', 'Bing Images', 'Bing News', and 'Bot Framework'. The demo cards include: 'Image Collection Insights' (magnifying glass icon), 'Bing Visual Search' (path and images), 'Vision API Explorer' (bicycles), 'Greeting Kiosk' (speech bubble), 'Realtime Driver Monitoring' (steering wheel), 'Holiday Photo Booth' (antlers), 'Realtime Face Effects' (cat face), 'Crankify Kiosk' (kiosk screen), 'Bing News Analytics' (news dashboard), 'Realtime Video Insights' (video analytics charts), 'Caption Bot' (diamond icon), 'Emotion Photo Booth' (emotion faces), 'What Dog' (dog photo), 'Emotion Match' (baby face), 'What If' (robot head), and 'Realtime Crowd Insights' (bar chart).

**DEMONS**

Filter by

Sort by: Recently added

**Category**

- Autonomous  
*Hands-free and autonomous. Great for attracting people in a crowd and for unattended deployments.*
- Enterprise  
*Enterprise oriented scenarios (e.g. Demographics Insights and Target Advertisement).*
- Fun  
*Fun and social experiences. Great for events.*
- Guided  
*Manually guided. A good fit when presenting to an audience.*

**Technology**

- Bing Autosuggest
- Bing Images
- Bing News
- Bot Framework

Image Collection Insights

Bing Visual Search

Vision API Explorer

Greeting Kiosk

Realtime Driver Monitoring

Holiday Photo Booth

Realtime Face Effects

Crankify Kiosk

Bing News Analytics

Realtime Video Insights

Caption Bot

Emotion Photo Booth

What Dog

Emotion Match

What If

Realtime Crowd Insights

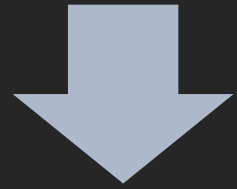
<https://www.microsoft.com/cognitive-services/>

# ➤ Analytics Technology



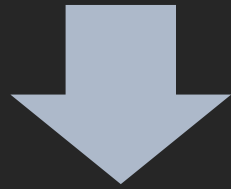
Power BI

TEACHER-LED  
**CLASSROOMS**



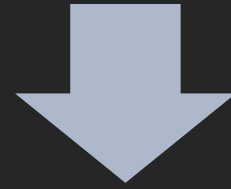
PROJECT-BASED  
**LEARNING**

**TRADITIONAL**  
CLASSROOMS



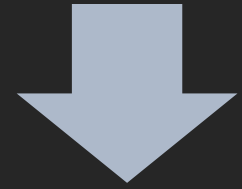
**FLIPPED**  
CLASSROOMS

**INDEPENDENT**  
LEARNING



**COLLABORATIVE**  
LEARNING

**LOCK STEP**  
LEARNING



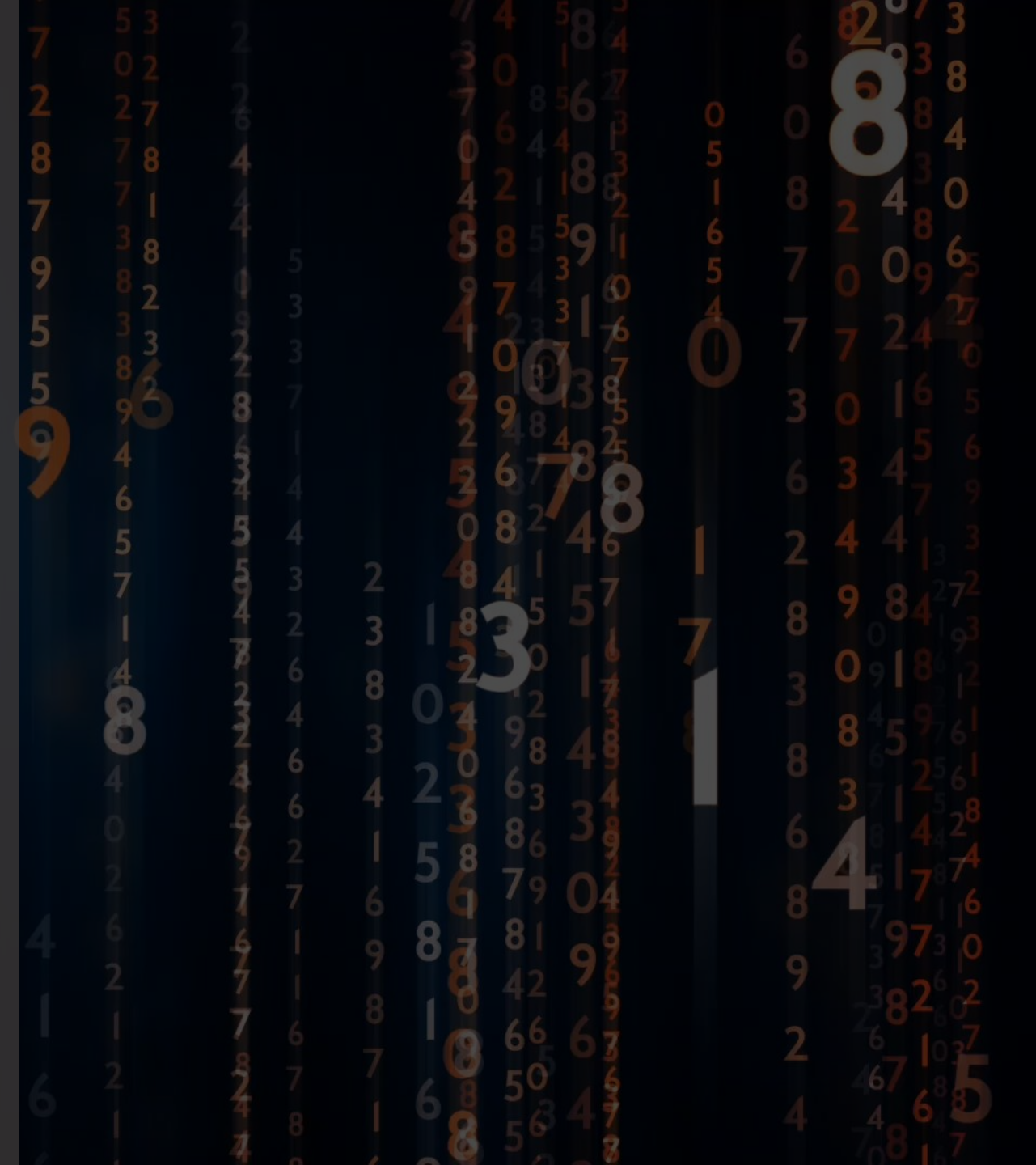
**PERSONALIZED**  
LEARNING

# Intelligent Platform

The screenshot shows a Microsoft Teams profile page for Jacob Safarova. The header includes a 'TEACHER HUB' label, a search bar with the text 'Hey Jacob, ask me anything...', and the user's name 'JACOB SAFA...' next to a profile picture. The profile card on the left features a circular profile picture, the name 'Jacob Safarova', and the affiliation 'SANTA MARIA COLLEGE'. Below this are sections for 'My development' (listing accreditation and seminars), 'My classes' (listing Year 10 Biology, Year 9 Chemistry, and Year 8 Science), and 'Being recognised' (featuring a quote from Kirk Chapel). The main content area is divided into three sections: 'People I'm working with' (showing four colleagues: Rina Hagatha, Kirk Chapel, Jennifer Stevens, and Nina Ivinthia), 'My recent documents' (showing four OneNote documents: Genetics, Year 10 Curriculum, Organisms Field Research Template, and Year 10 Biology Quiz), and 'Items recommended for me' (showing four items: a Delve document, two CLANED presentations, and another Delve document).

What should I teach today?...and how?

A JOURNEY  
POWERED BY  
**DATA**



# Advanced Analytics

*according to Gartner, INC.*

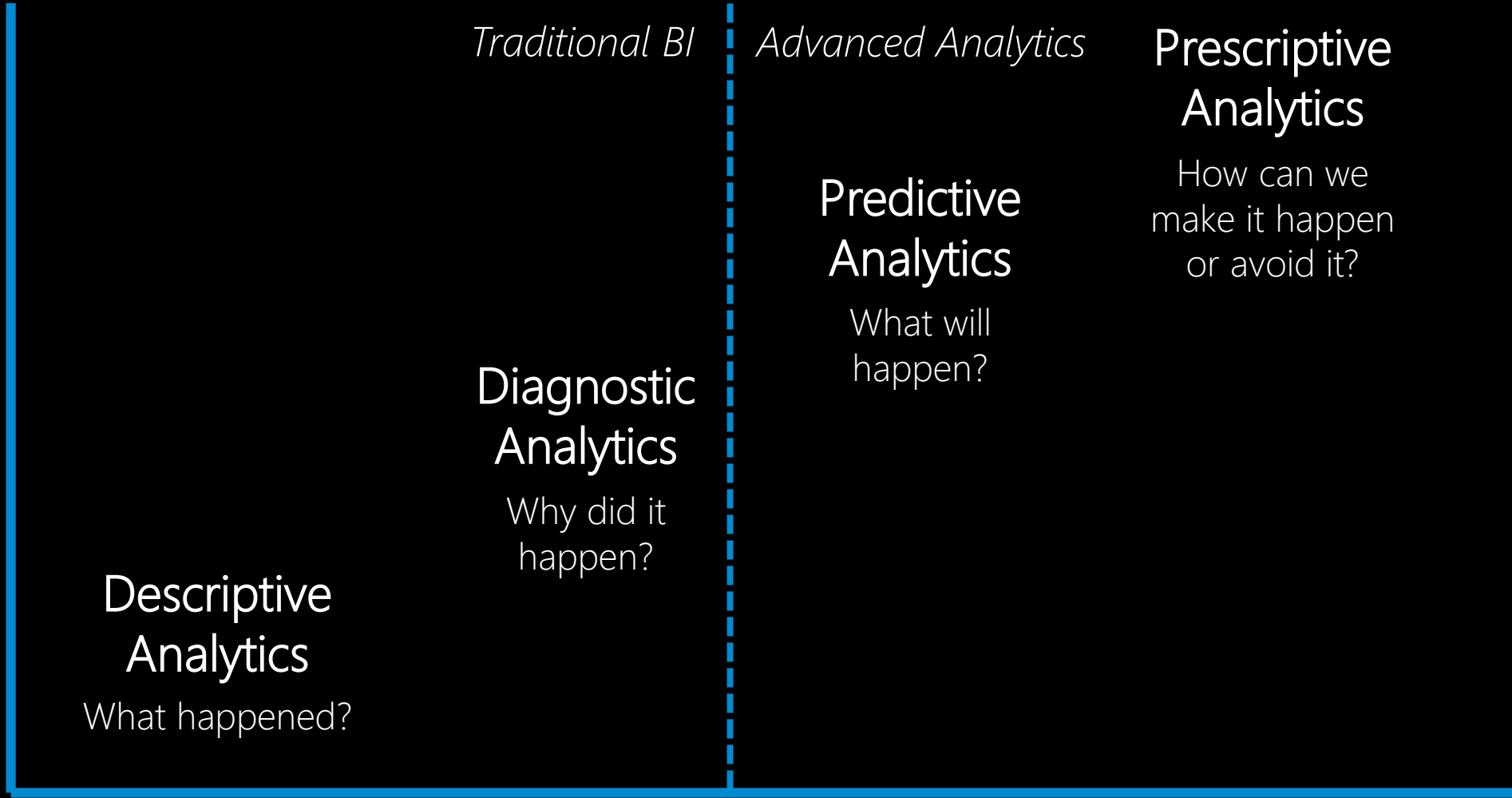


**Descriptive  
Analytics**  
What happened?

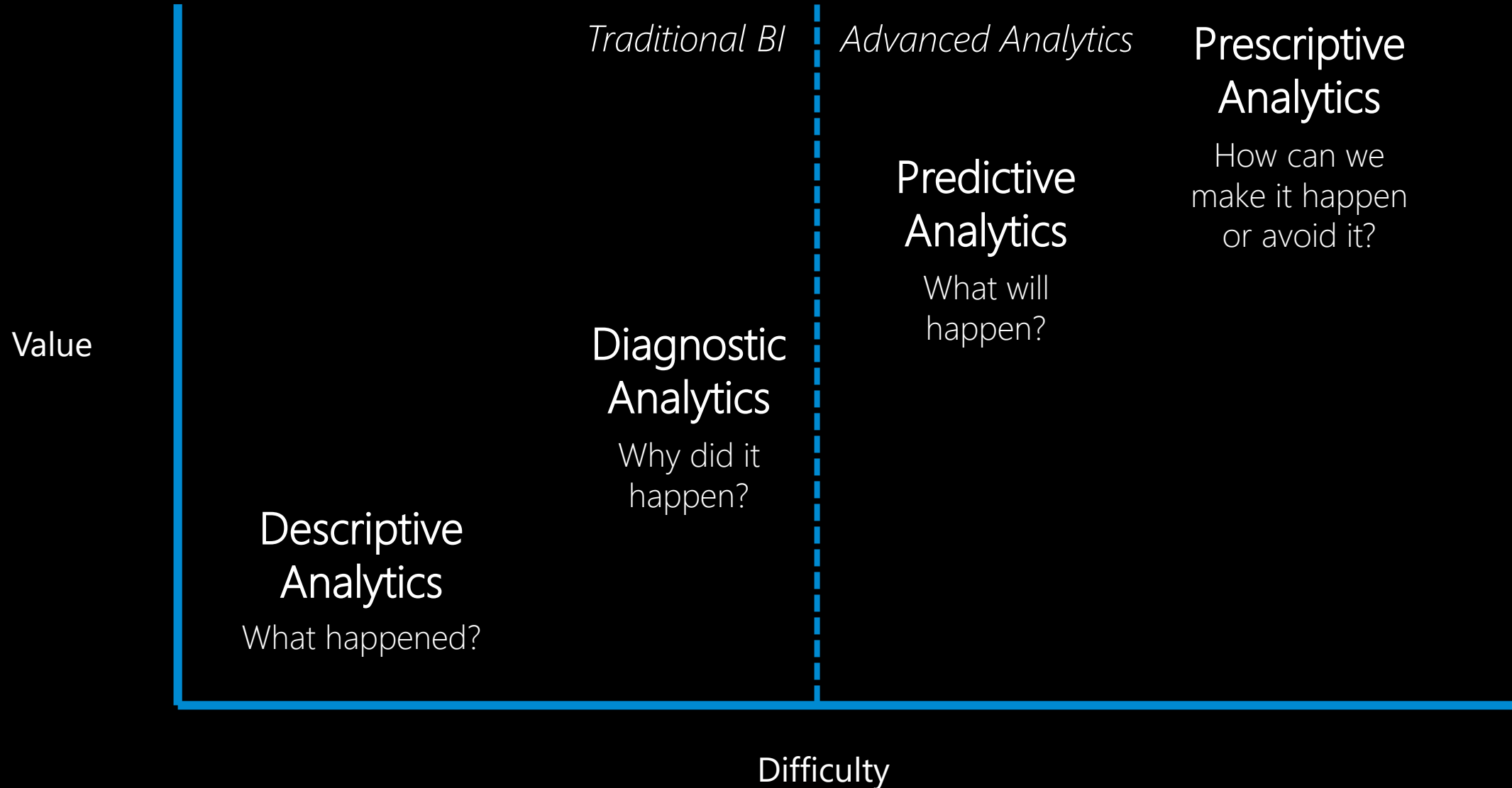
**Diagnostic  
Analytics**  
Why did it  
happen?

# Advanced Analytics

*according to Gartner, INC.*



# Advanced Analytics *according to Gartner*





# Advanced Analytics

*Analysis of  
Grades*

**Descriptive  
Analytics**

What happened?

*What Caused  
those Grades*  
**Diagnostic  
Analytics**

Why did it  
happen?

**Predictive  
Analytics**

What will  
happen?  
*Who is  
'At risk'  
and why?*

**Prescriptive  
Analytics**

How can we  
make it happen  
or not happen?

*What should we do  
about it?*

# Technology has landed



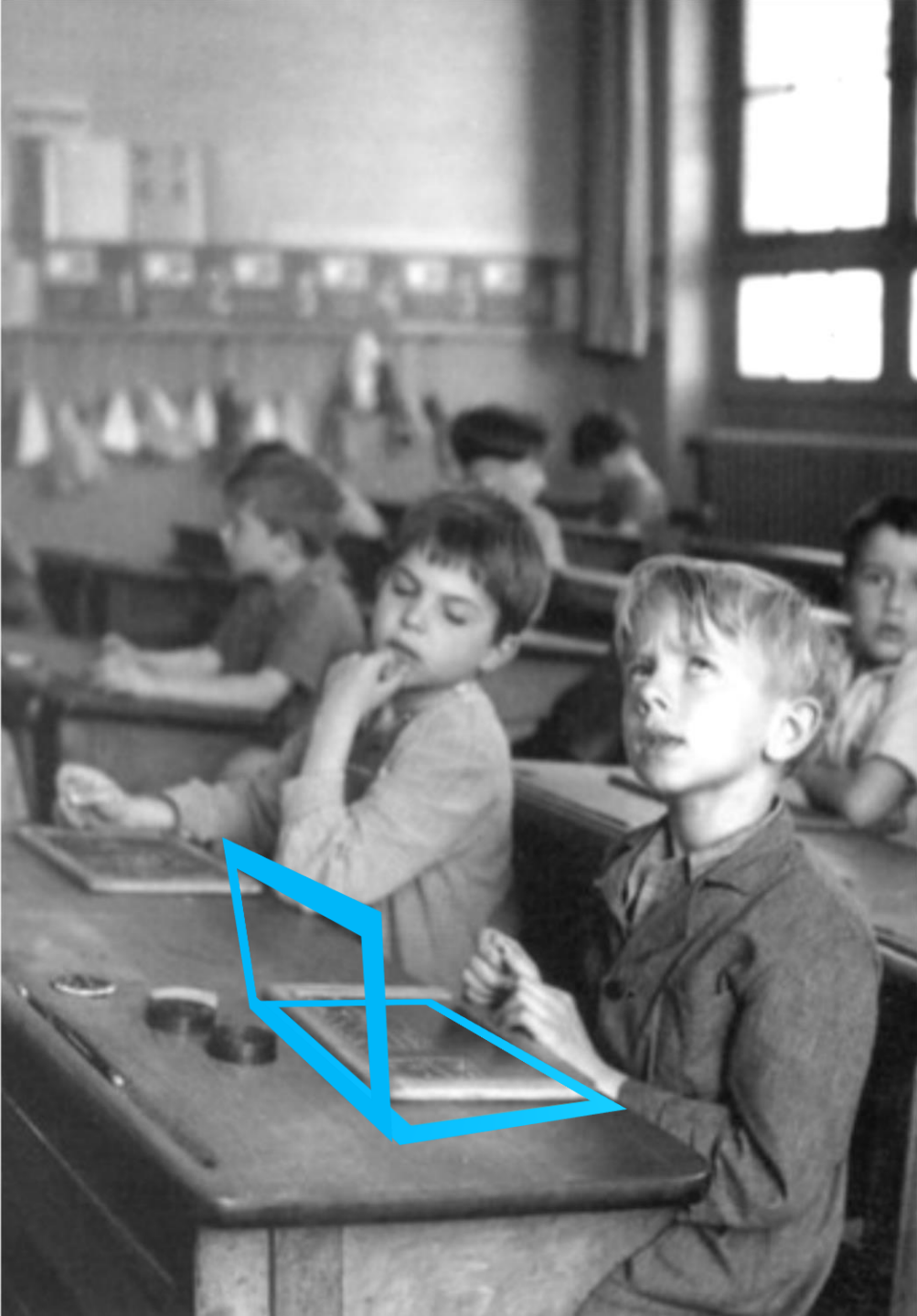


“Innovation” hubs  
are popping up



# Tinker Toys

“Which ones should we buy?”



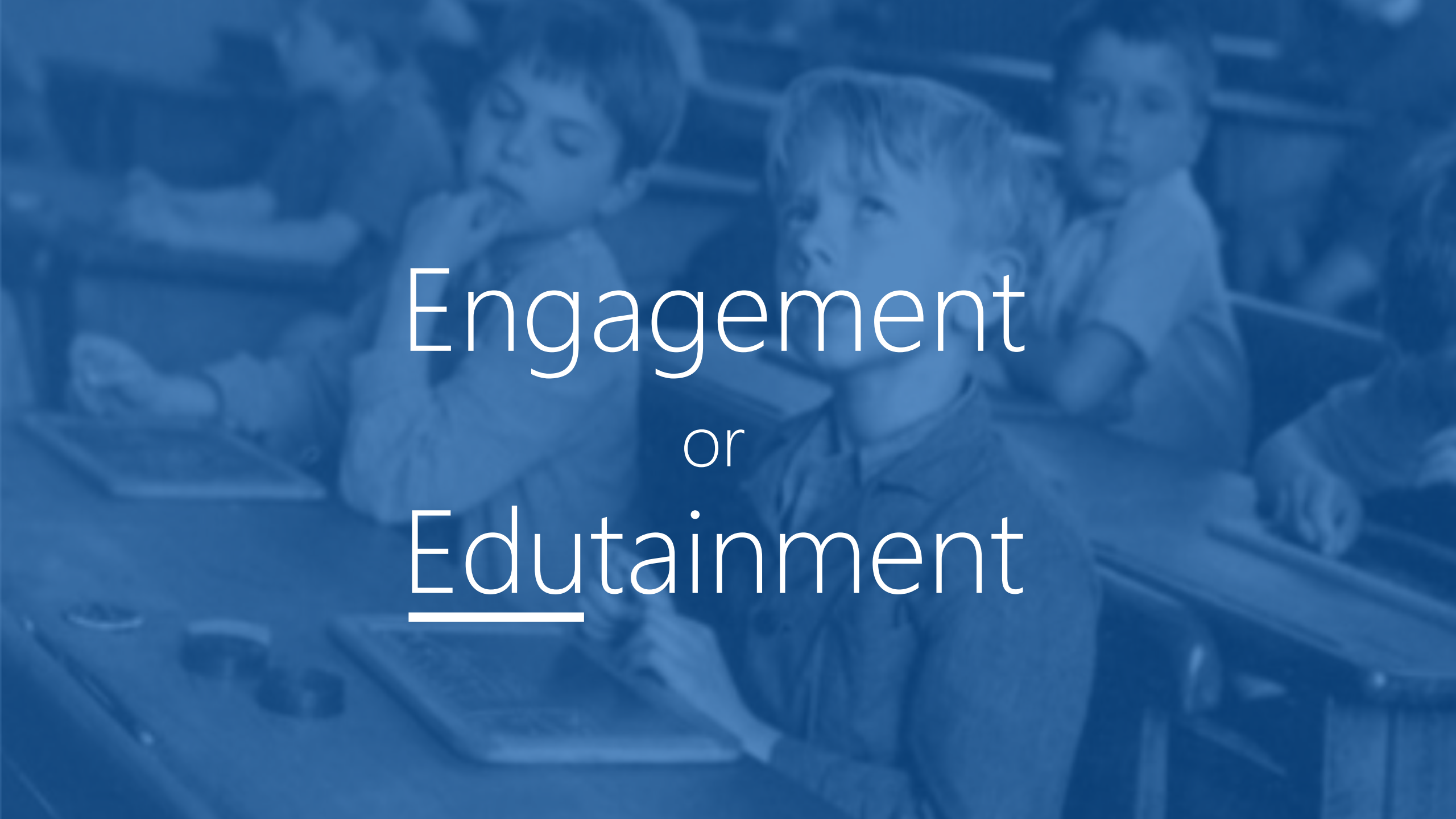
Does putting a **device** in the hands of a student automatically mean they are engaged in **deep** learning?



Does putting a **gadget** in the hands of a student automatically mean they are engaged in **deep** learning?




Does putting a **headset** on the face of a student automatically mean they are engaged in **deep learning**?



Engagement  
or  
Edutainment





If students use technology to copy and paste prefabricated answers to questions, it is unlikely to help them to become smarter. If we want students to become smarter than a smartphone, we need to think harder about the pedagogies we are using to teach them. Technology can amplify great teaching but great technology cannot replace poor teaching.

The image features a blue-tinted background of an iceberg floating in the ocean. The top part of the iceberg is above the water line, while the much larger bottom part is submerged. Overlaid on the right side of the image is a vertical flow diagram. It starts with the word "Engagement" at the top, followed by a downward-pointing arrow, then the words "Deeper Learning", and finally another downward-pointing arrow at the bottom. The text and arrows are white, contrasting with the blue background.

Engagement

Deeper Learning

# Purposeful Engagement

## PEDAGOGY



## PROFESSIONAL LEARNING



## PLATFORMS



# Purposeful Engagement

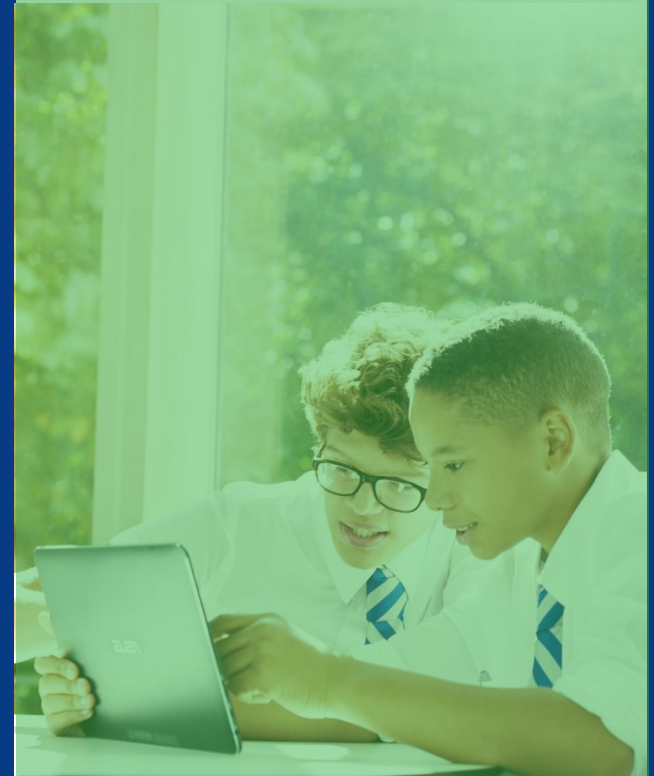
## PEDAGOGY



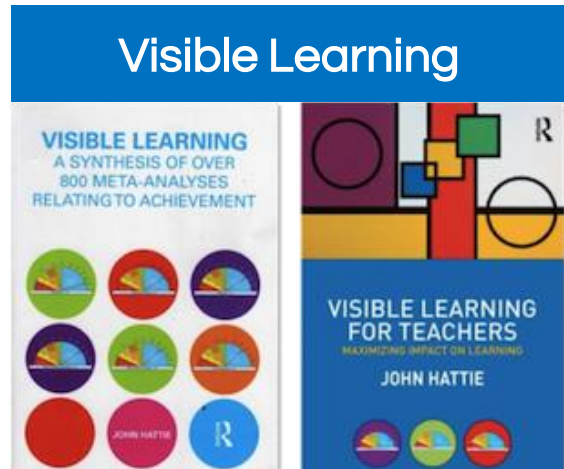
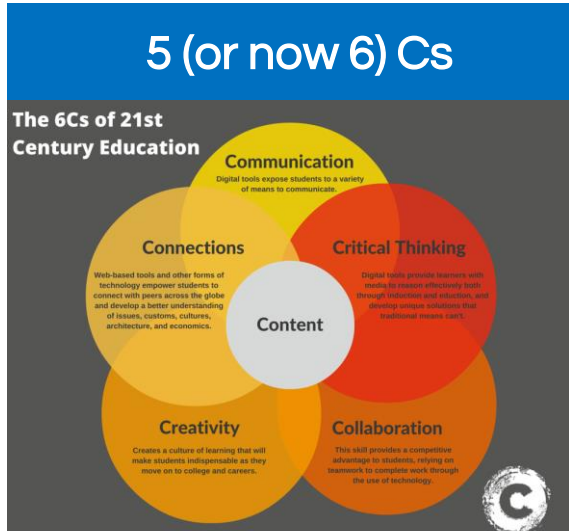
## PROFESSIONAL LEARNING



## PLATFORMS

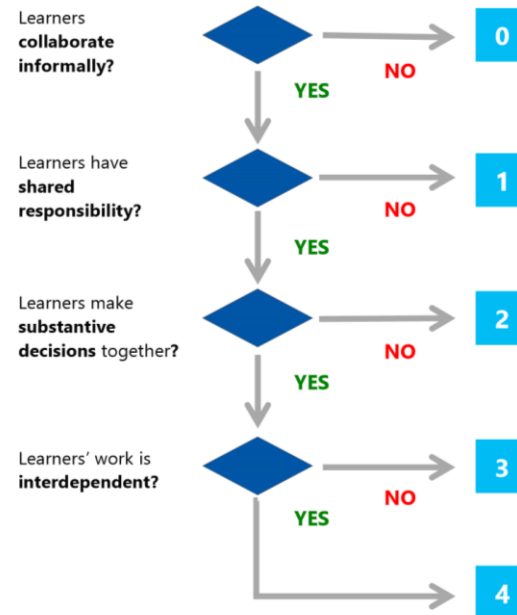


# PEDAGOGY



## 21CLD Framework

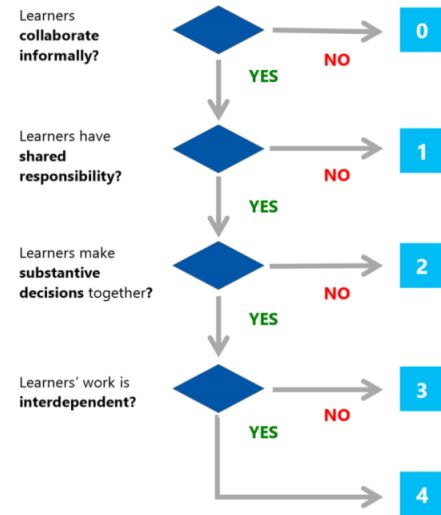
Collaboration: Decision Steps



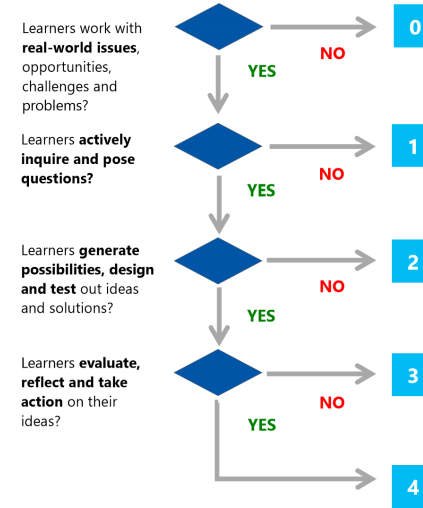
# LEARNING DESIGN FRAMEWORKS

# 21CLD Framework

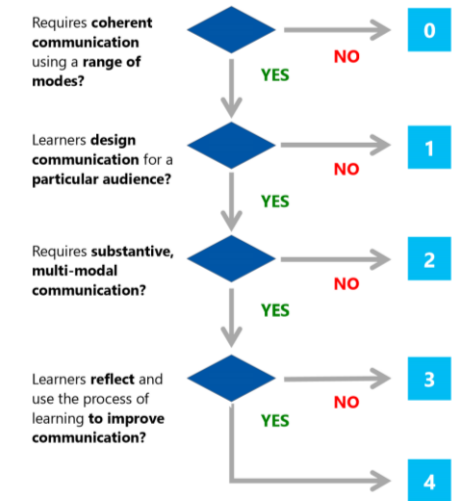
## Collaboration: Decision Steps



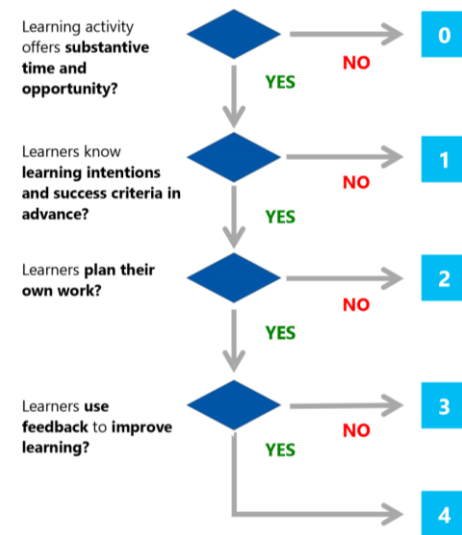
## Real-World Innovation and Problem-Solving: Decision Steps



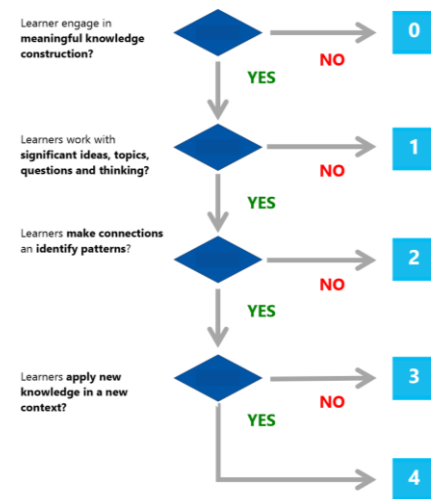
## Skilful Communication: Decision Steps



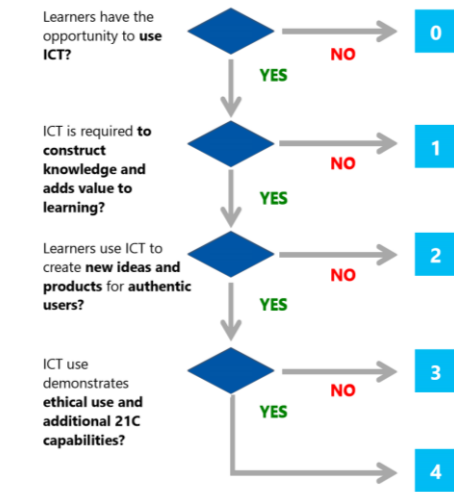
## Self-Regulation: Decision Steps



## Knowledge Construction: Decision Steps



## ICT for learning: Decision Steps

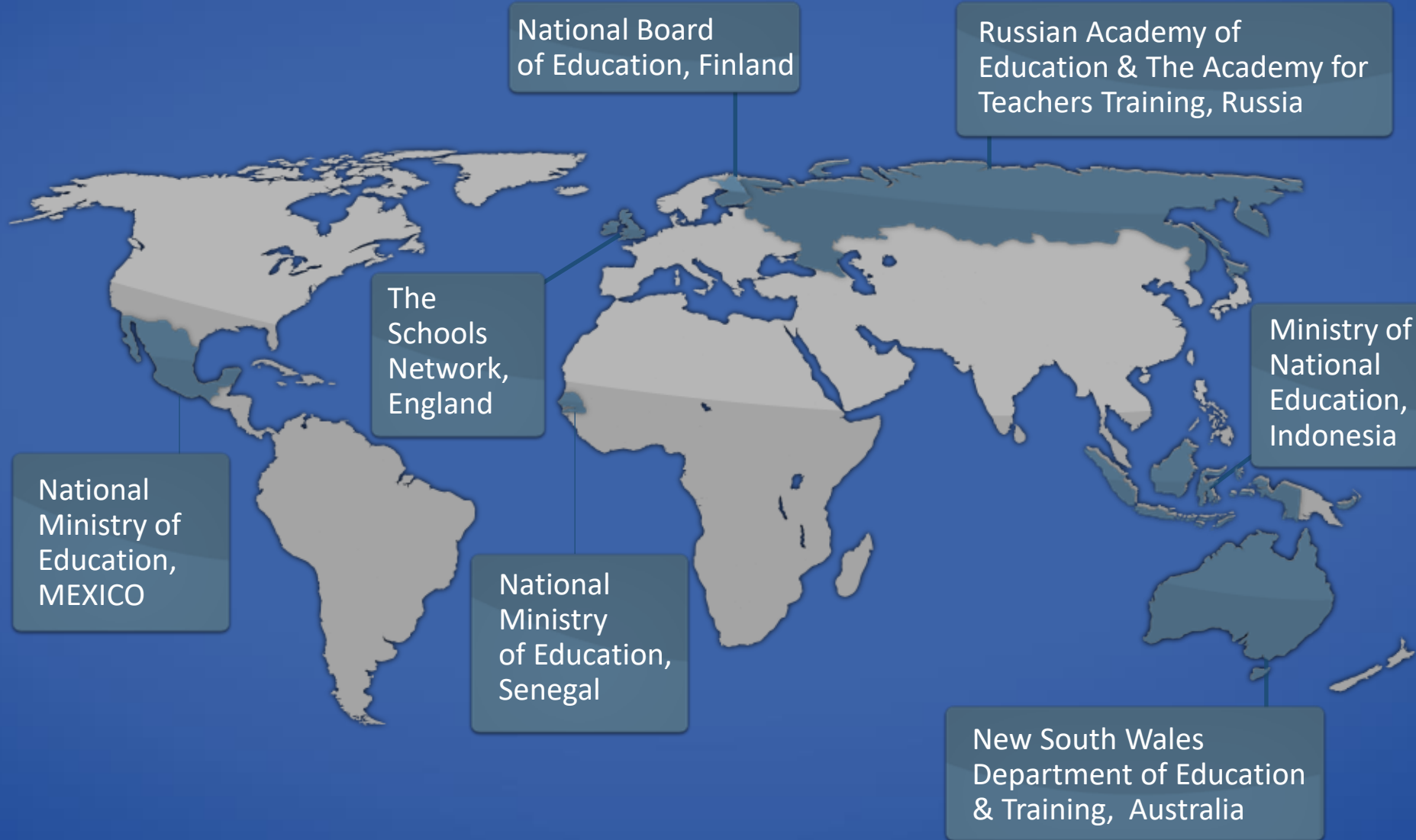




# 21<sup>st</sup> Century Learning Design Framework

# 7 COUNTRIES PARTICIPATING IN ITL

# 45+ COUNTRIES USING METHODS





# ITL RESEARCH

## Across

**159** survey schools  
**24** site visit schools

Teacher & School  
Leader Interviews

**86** teachers  
**18** school leaders

Teacher & School  
Leader Surveys

**4,038** teachers  
**159** school leaders

Classroom  
Observations

**81** classrooms

Learning Activity  
Analysis

**967** learning activities

Student Work  
Analysis

**3,367** student work

Student Focus  
Groups

**33** focus groups

Education  
System Change

School  
Leadership  
and Culture

Innovative  
Teaching  
Practices



# 21CLD Research & Resources



Search “**Microsoft ITL Research**”



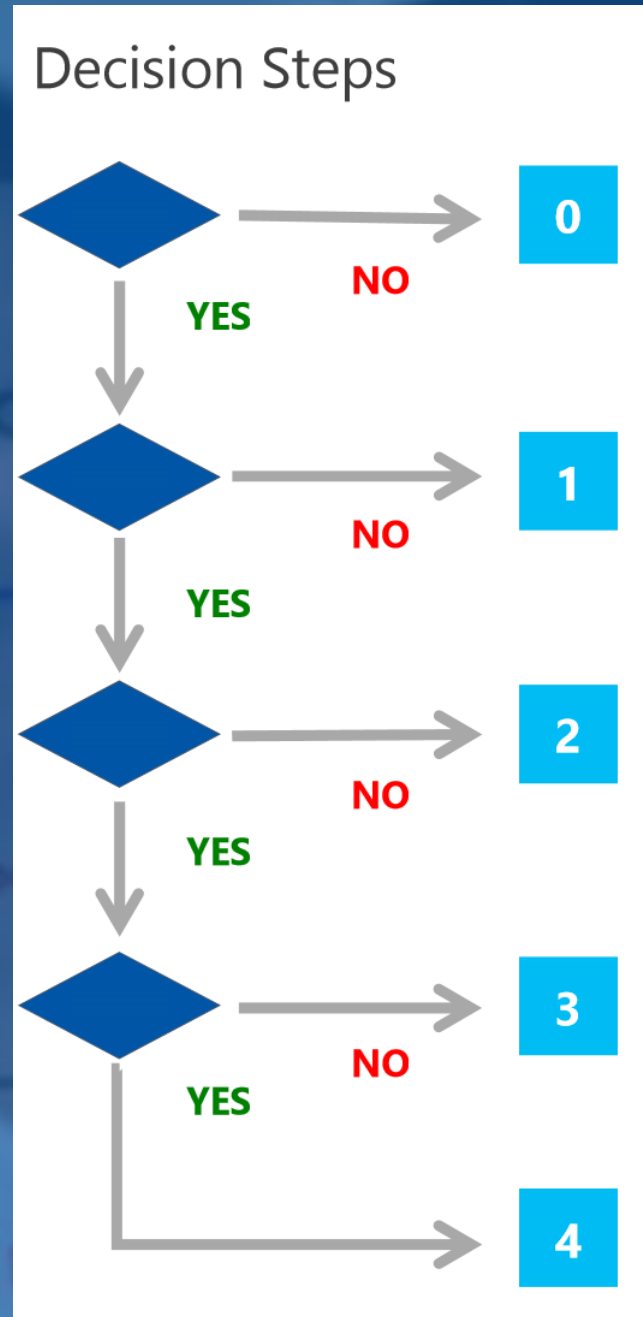
<https://education.microsoft.com/GetTrained/ITL-Research>

21CLD

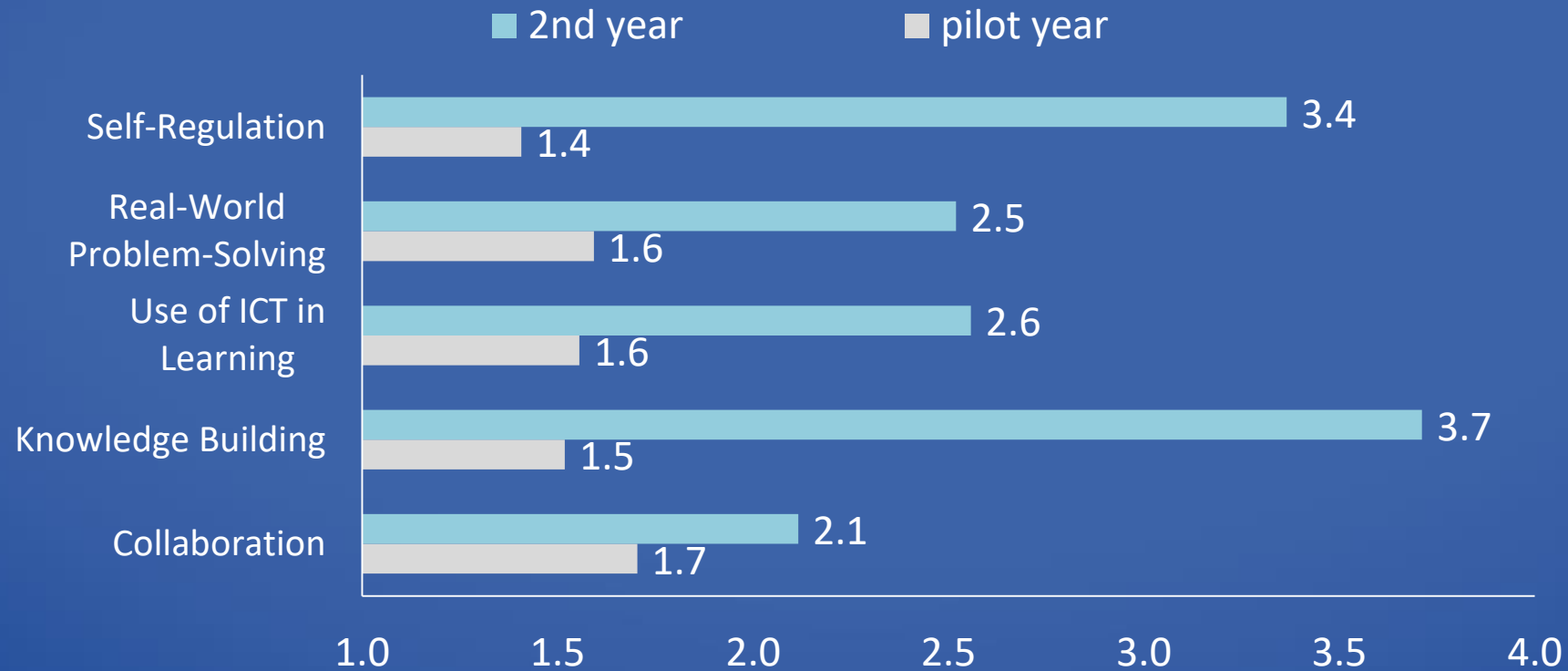


*How do we design learning to develop these skills?*

# 21CLD

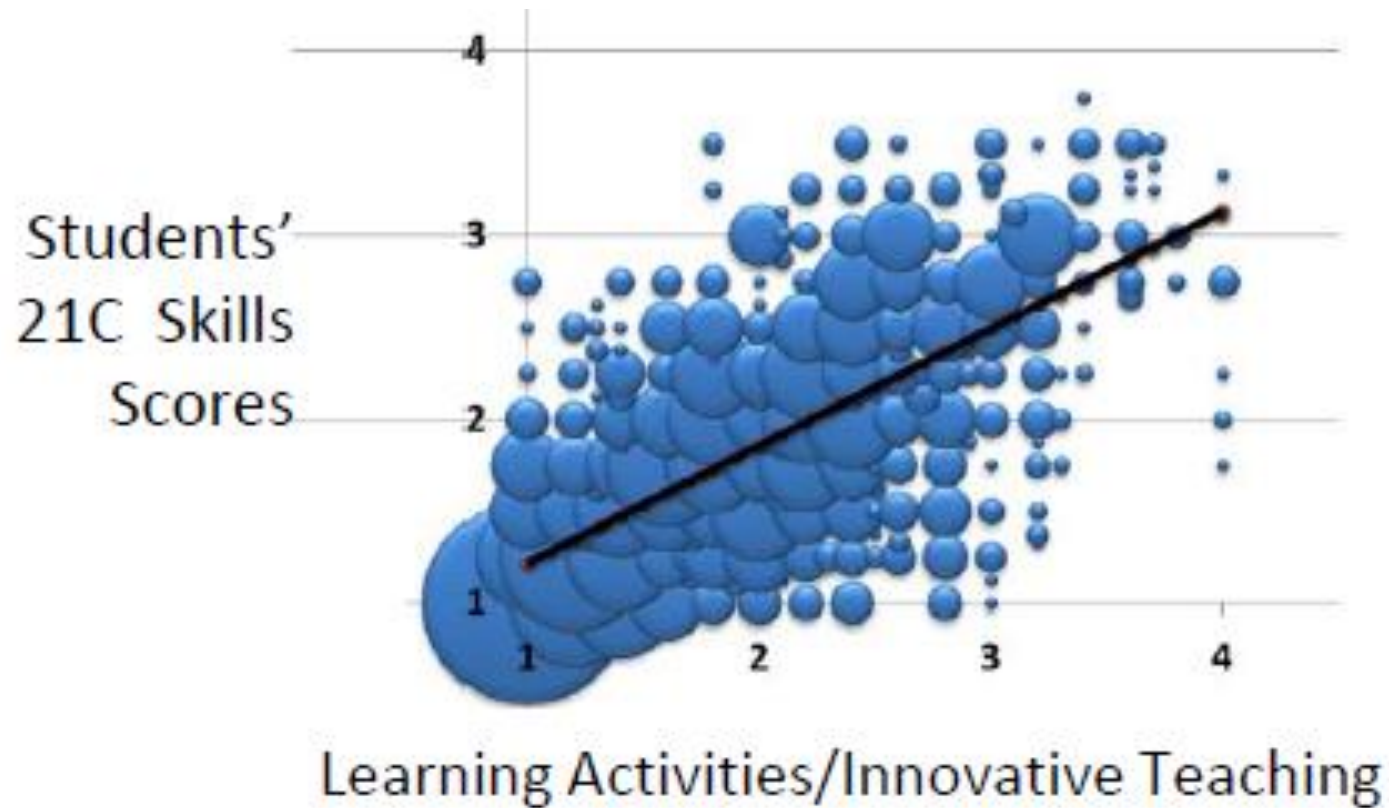


# LEARNING CAN CHANGE, DRAMATICALLY



The quality of teacher's assignment strongly predicts the quality of the work that a student does in response.

# 3,367 student work



Notes:  
a. For a given learning activity, this chart plots the learning activity's score (collapsed across dimensions) to the mean score for its corresponding pieces of student work. A larger bubble represents a higher concentration of data points.  
b. LA and SW score points can range from 1-4.  
c. Source: ITL LASW data, 2011

Based on Analysis by SRI International

**Figure 2: Learning Activity Scores Predict Student Work Scores**

Over 90% of the variance in student work scores on 21<sup>st</sup> Century skills was not due to the differences in the students but due to the task they were asked to do.



The data suggested a 'ceiling effect imposed by teacher assignments: while it is possible for students to build and exhibit a greater level of 21st Century skills than their learning activities call for, they rarely do so.

While innovative teaching practice was typically a goal at these schools, learning activity analysis suggests that most actual classroom instruction does not yet reflect these goals.

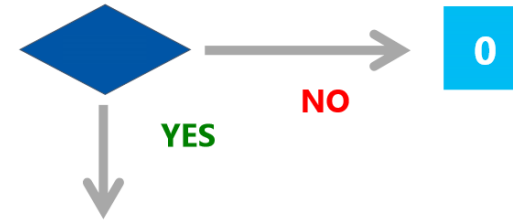
# 21CLD

## Real World Problem Solving



### Real-World Innovation and Problem-Solving: Decision Steps

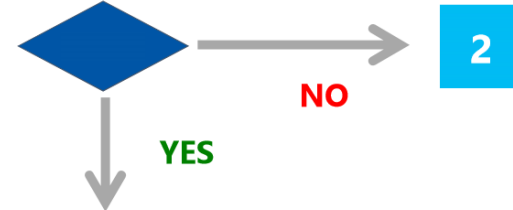
Learners work with **real-world issues**, opportunities, challenges and problems?



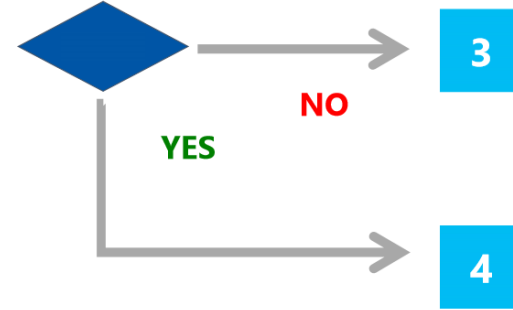
Learners **actively inquire and pose questions**?



Learners **generate possibilities, design and test** out ideas and solutions?



Learners **evaluate, reflect and take action** on their ideas?





Problems

Solve

What do you want to ~~be~~  
when you grow up?

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