

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 has their arms outstretched and is holding a small paper airplane. The scene is set against a warm, golden sunset sky with silhouettes of mountains in the distance. The overall mood is nostalgic and hopeful.

What did you want to be
when you grew up?



App Developer



Data Miner



Social Media Manager



Cloud Services Specialist



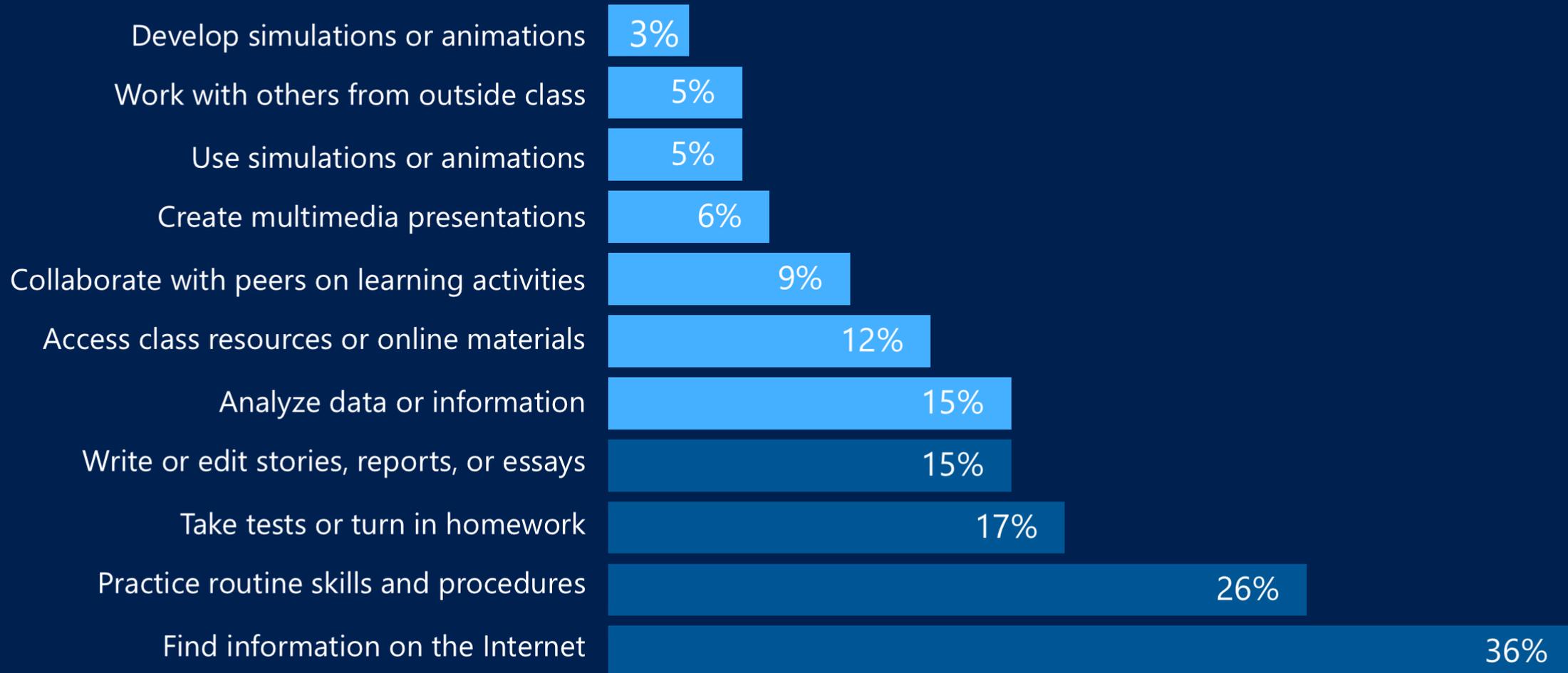
Avatar Manager

...anything but a teacher!

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

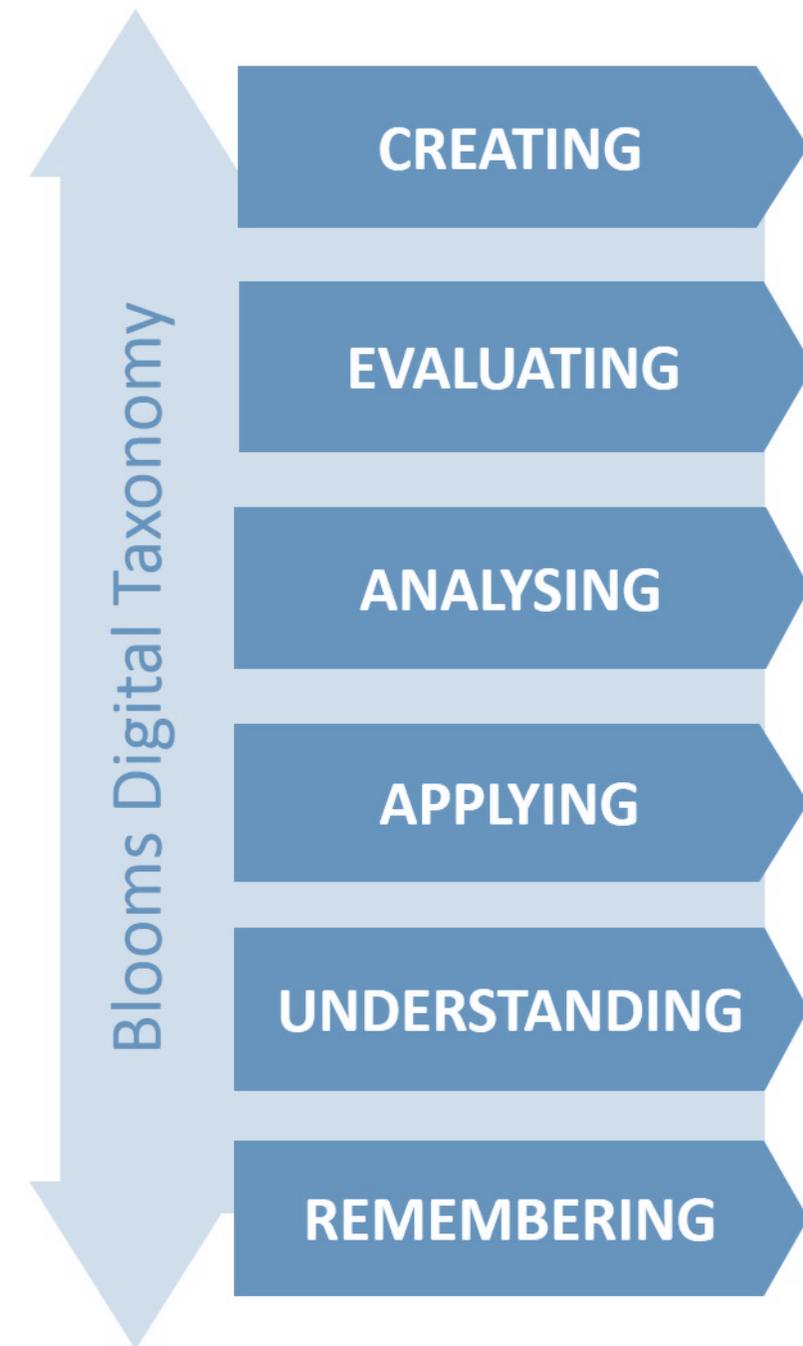
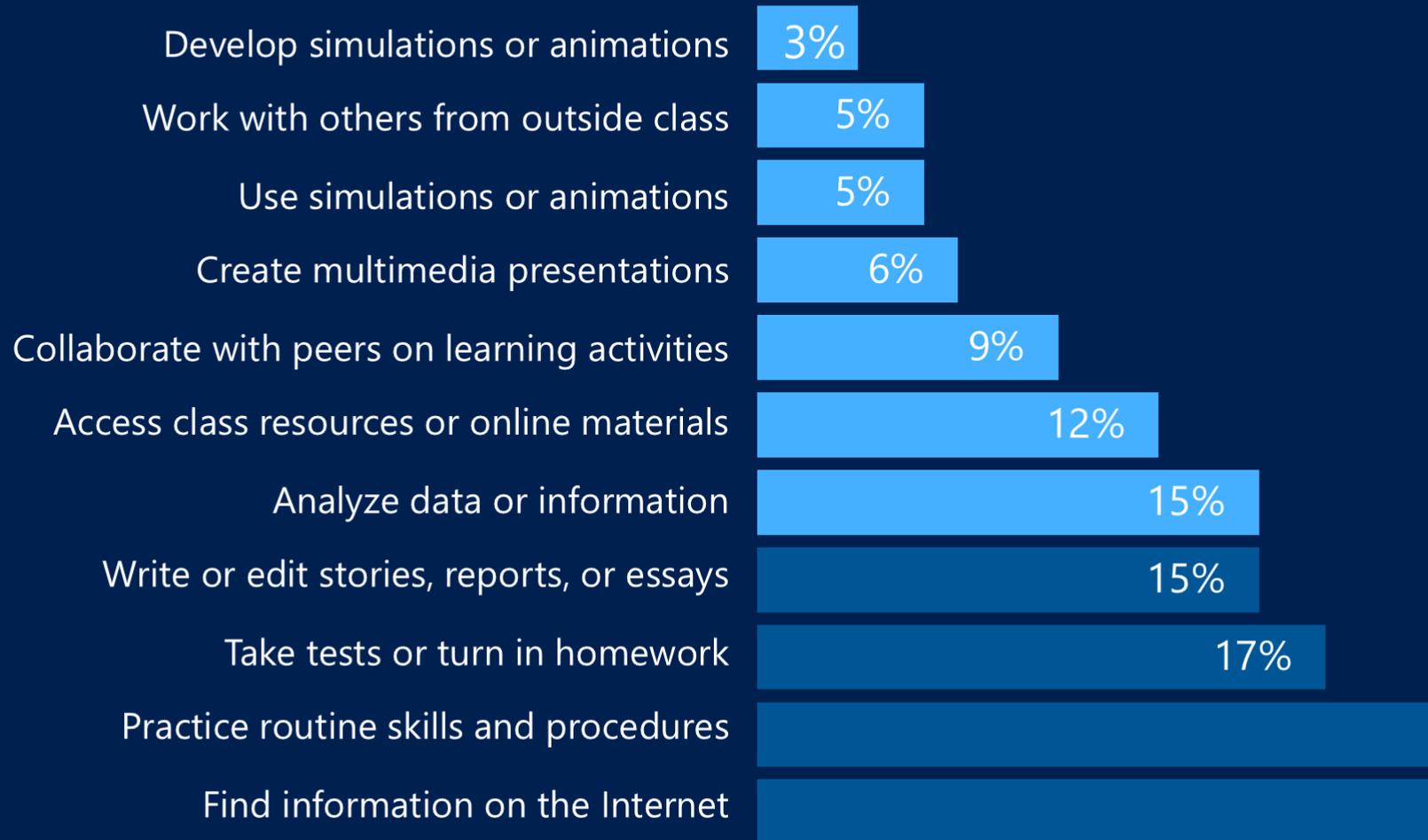
ITL research findings

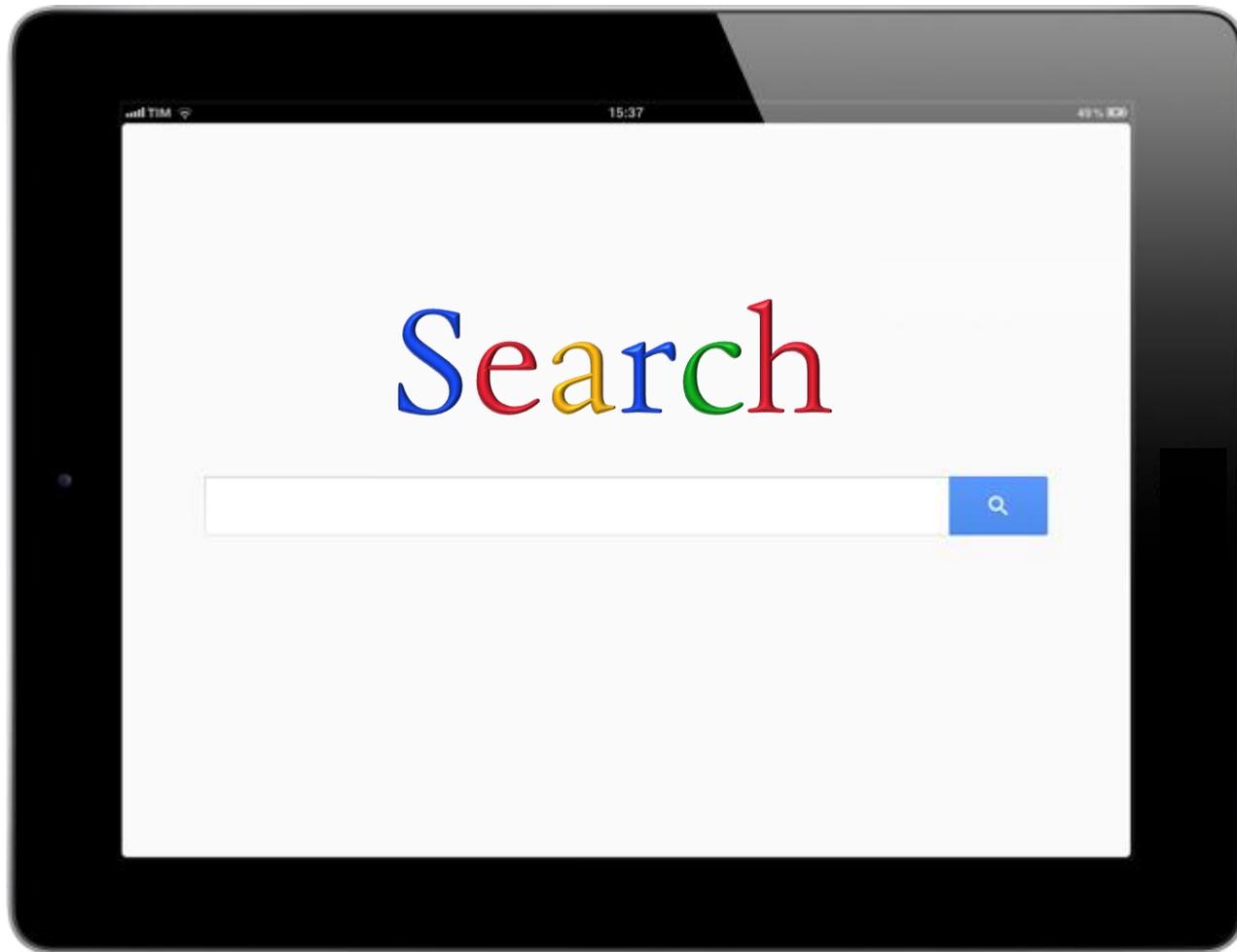
ICT uses for class-related activity



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, possibly a teacher. Other students are seated at desks, some looking towards the camera and others looking away. The text "where he will learn" is centered in white, lowercase letters.

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

A blue-tinted photograph of a window looking out onto a city street. In the foreground, a dark silhouette of a robot is visible, looking out the window. The street outside is lined with trees and buildings. The text "the work he does" is overlaid in white at the bottom.

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

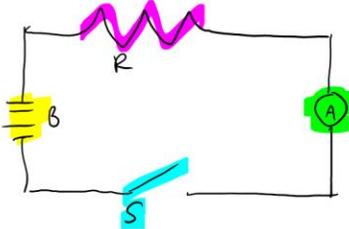
Materials

- 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



Virtual
Reality



Augmented
Reality



Mixed
Reality





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....



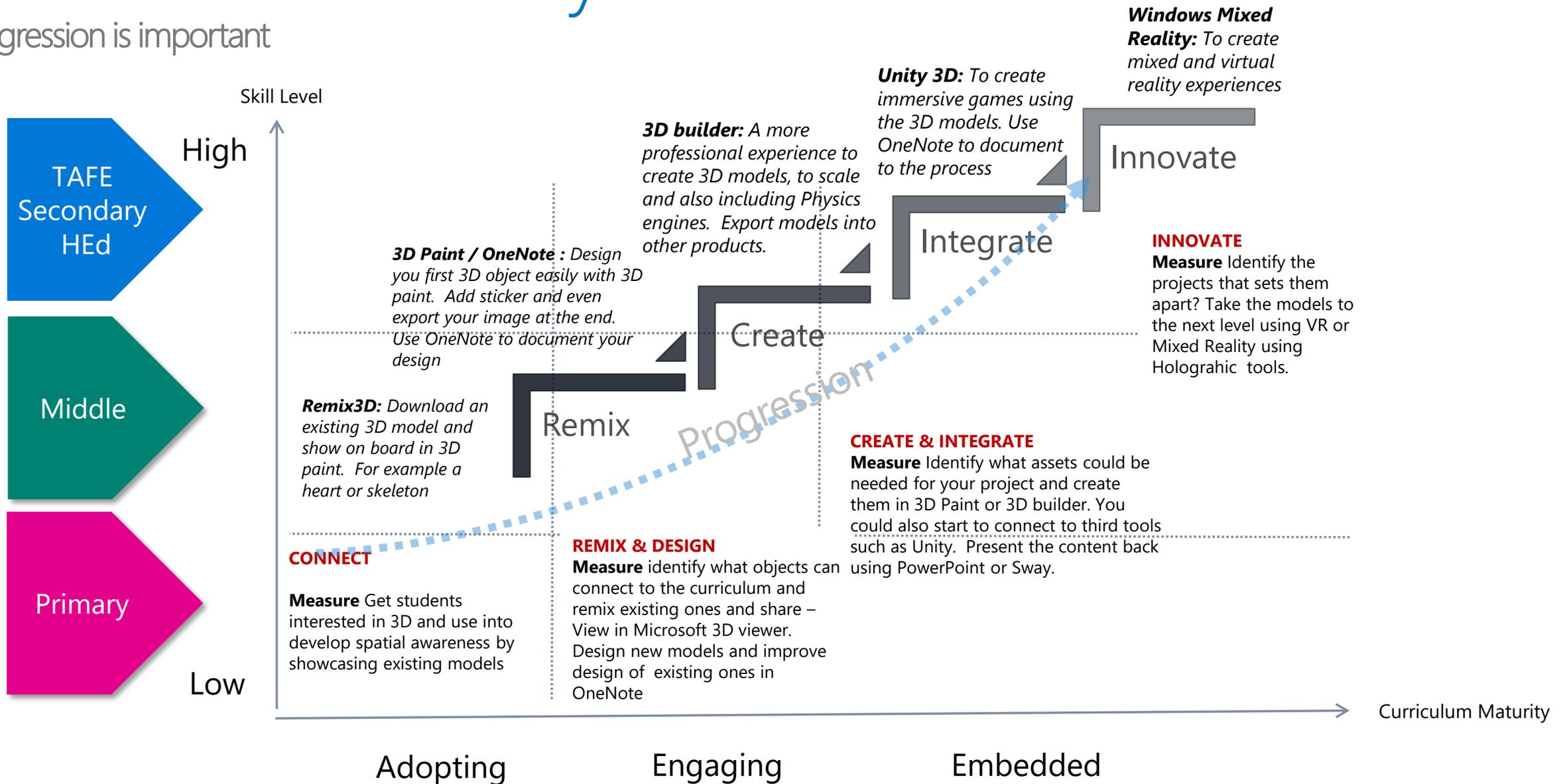
Kids will a job out of having
developed for AR, VR and MR....

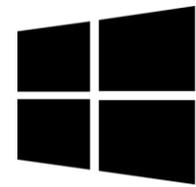
from **consumers** to creators

from consumers to **creators**

3D to Mixed Reality

Progression is important

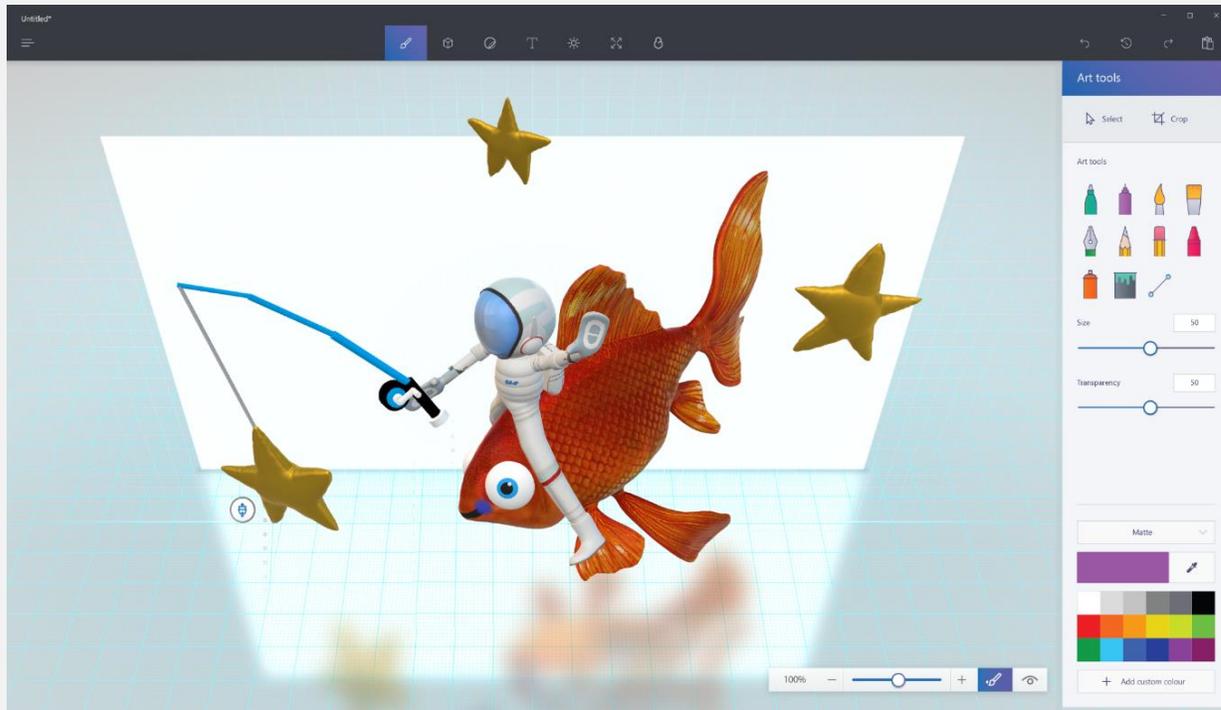




Windows 10

creators update

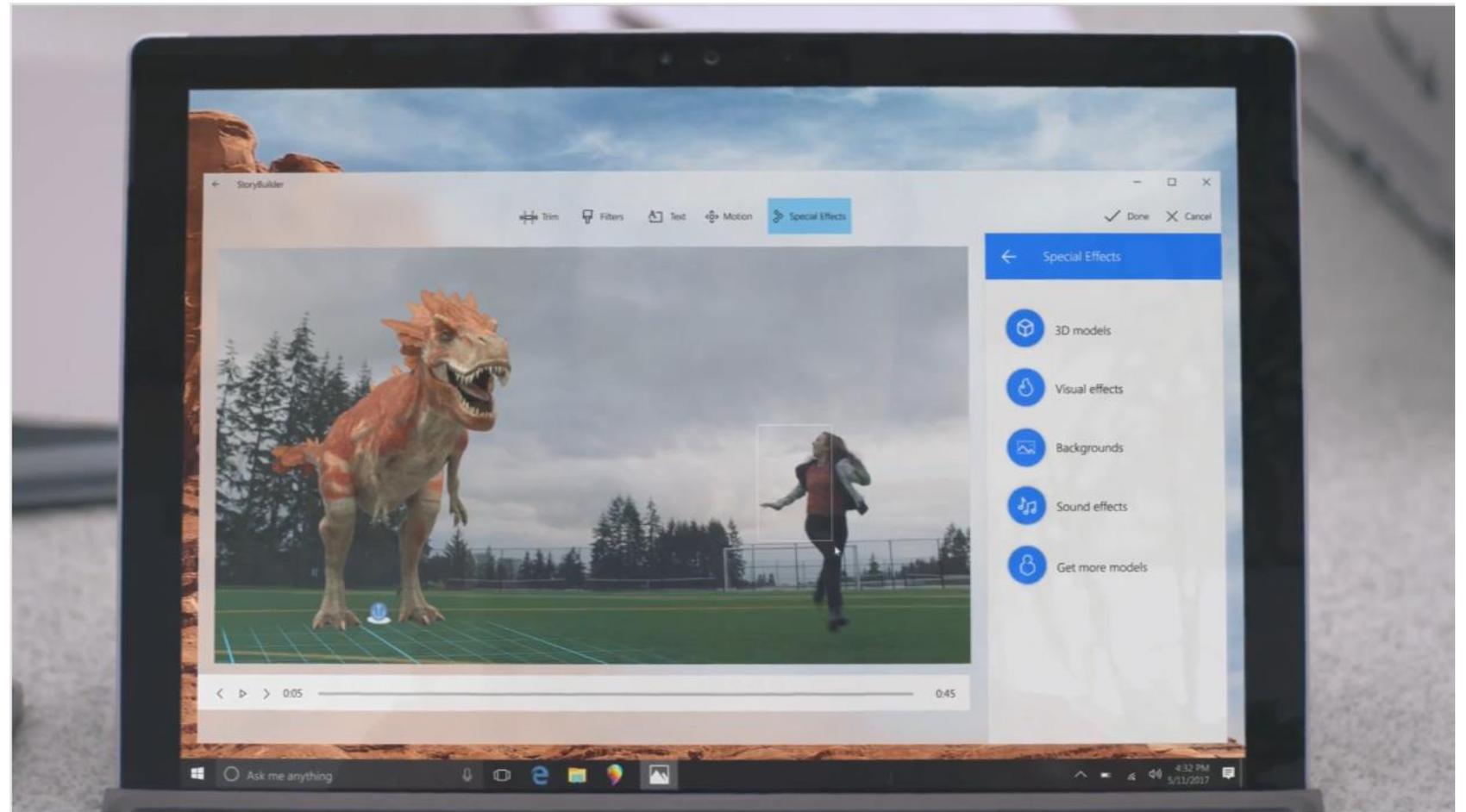
Learners as Creators



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

0:00

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!

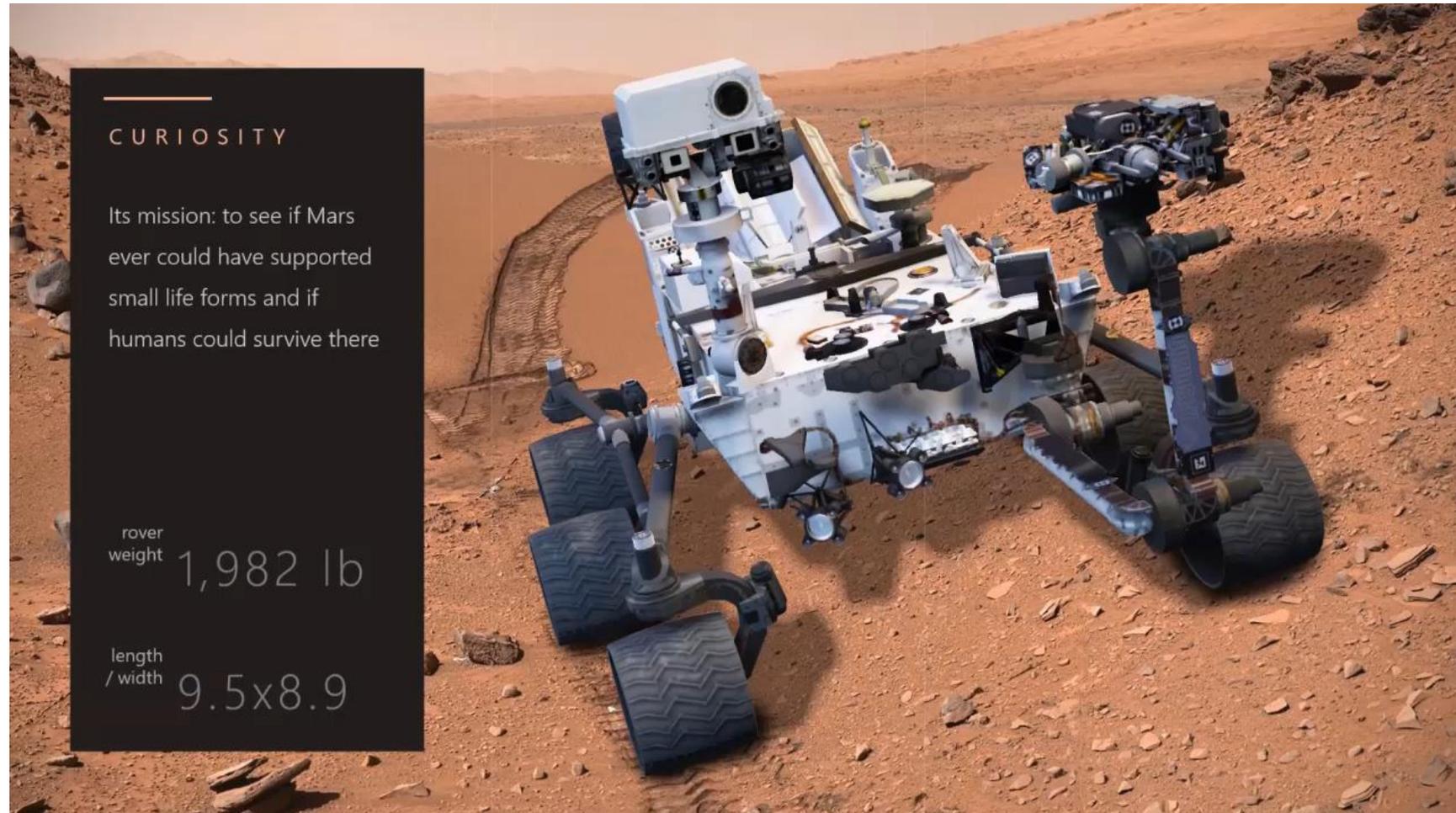
4/26/2017

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



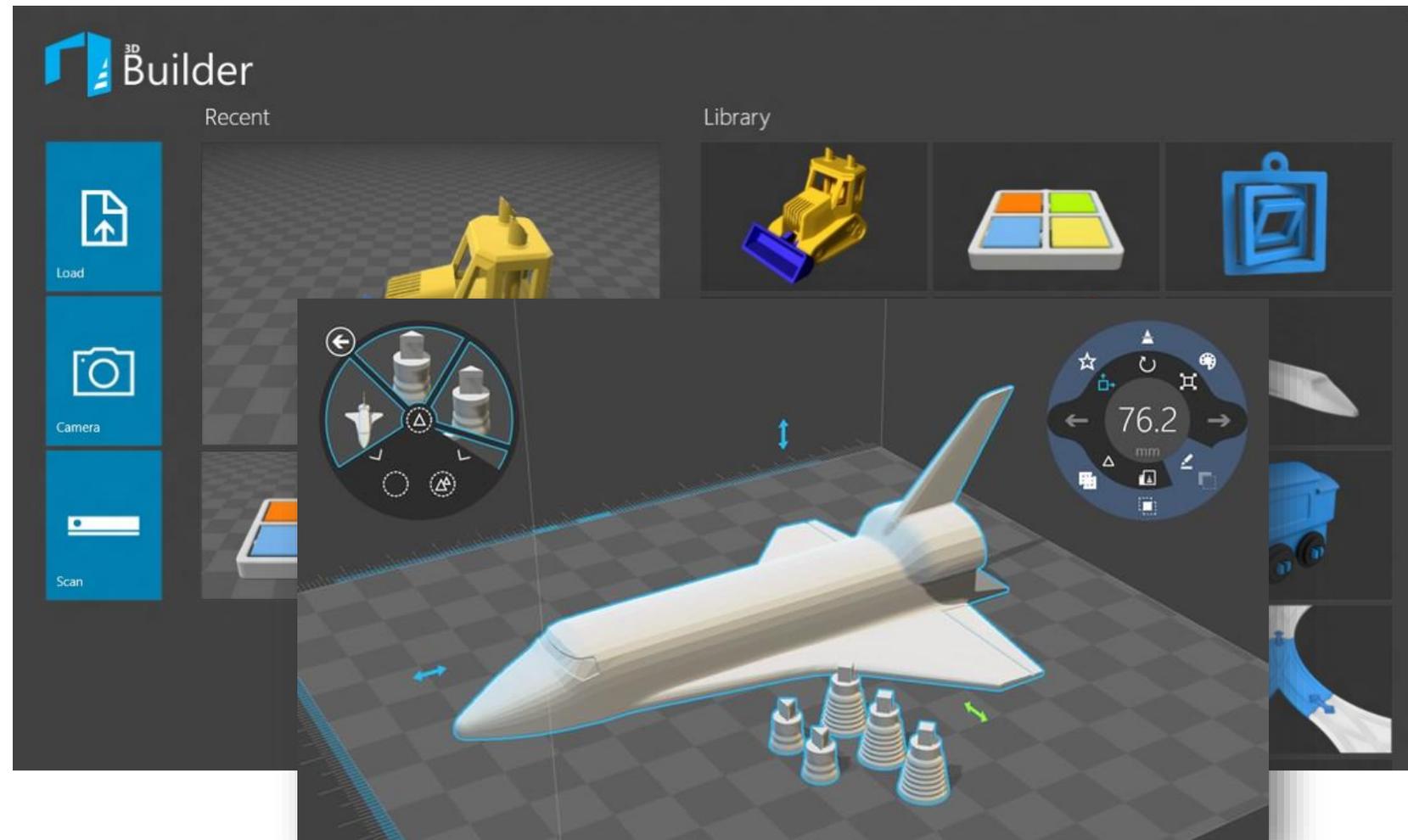
Transform your world by bringing digital **3D art into your real world** via View 3D. This feature utilizes your world facing camera to create magical moments. Rotate, resize, and move the object to create fun playful moments



3D Builder



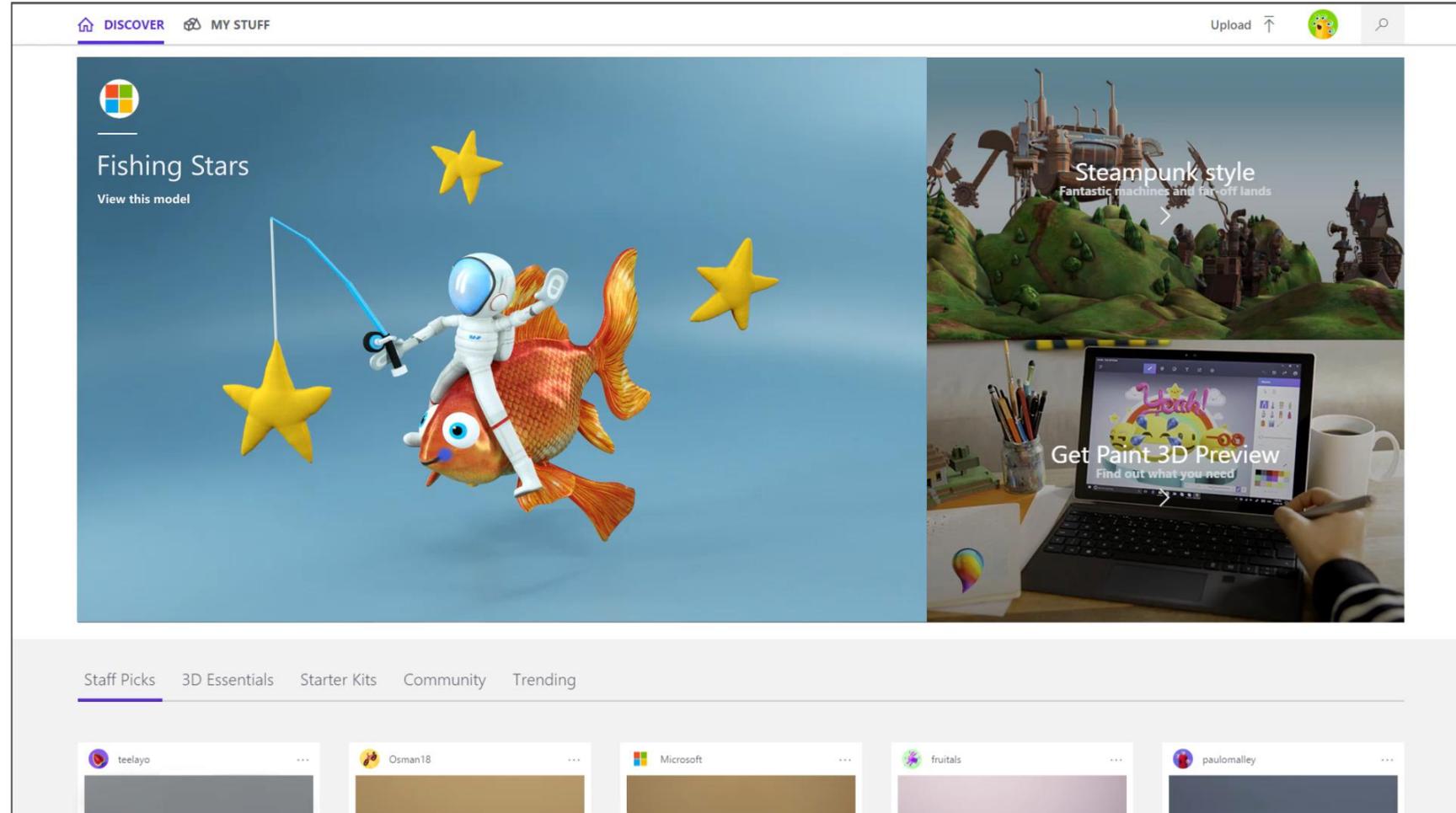
The **3D Builder** app has model visualization options and editing capabilities, and can **print to a 3D printer** that has a Windows-compatible printer driver. The app can be used as a reference and a test tool for 3D-editing, and for validating 3MF files that you create.



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



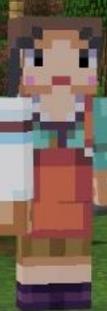
MichaelT



RandyM



KettiJ



BrookP
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

RIVER ECOSYSTEM PROJECT:

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

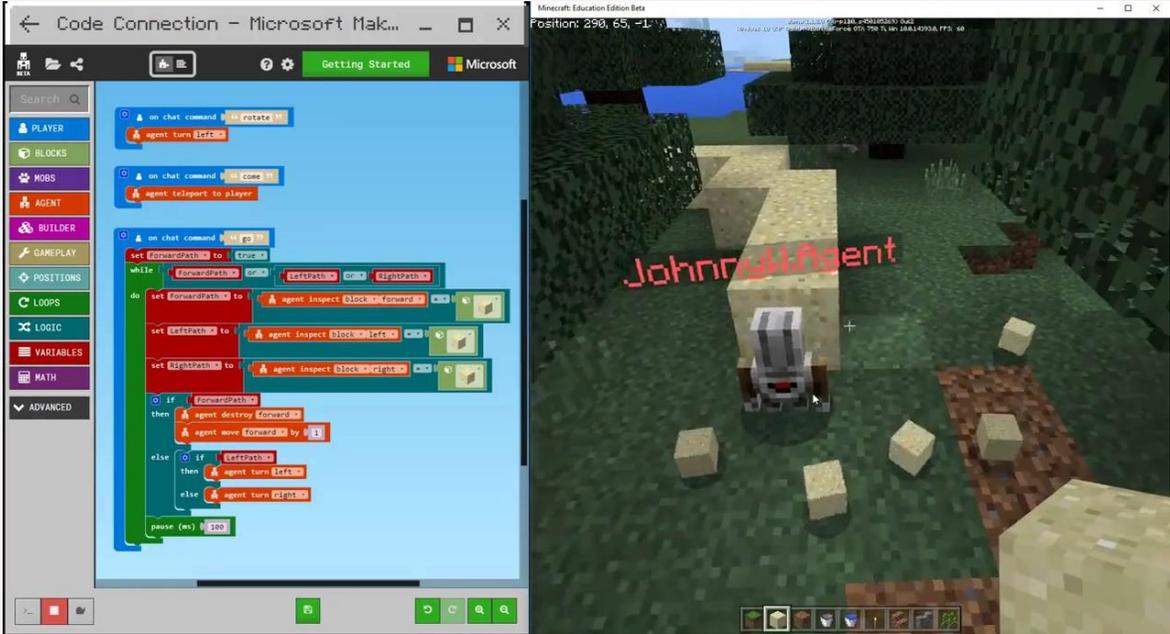
LEARNING OBJECTIVES:

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

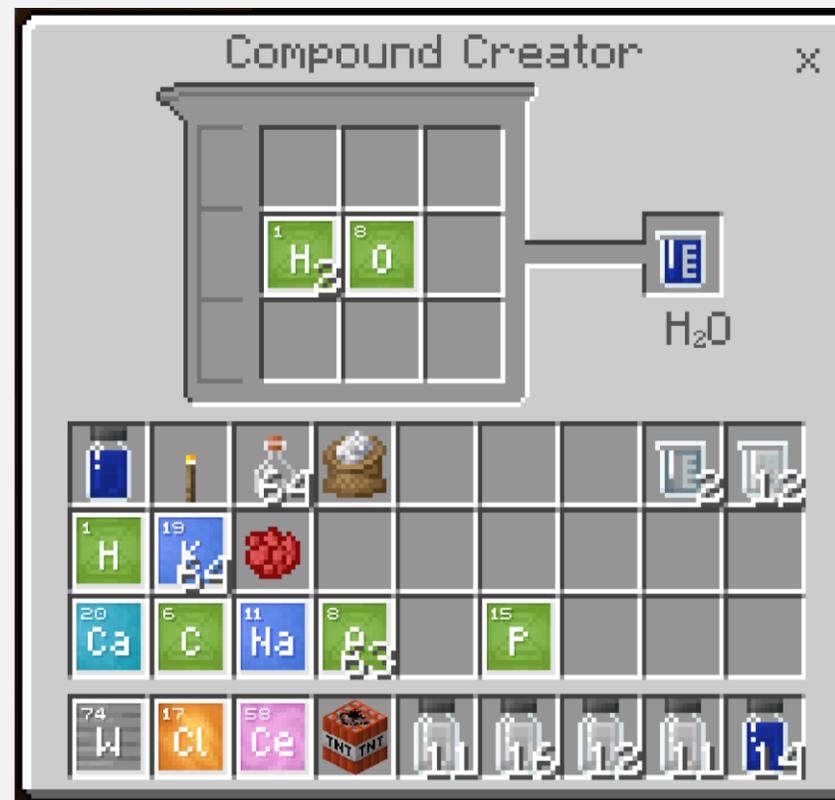
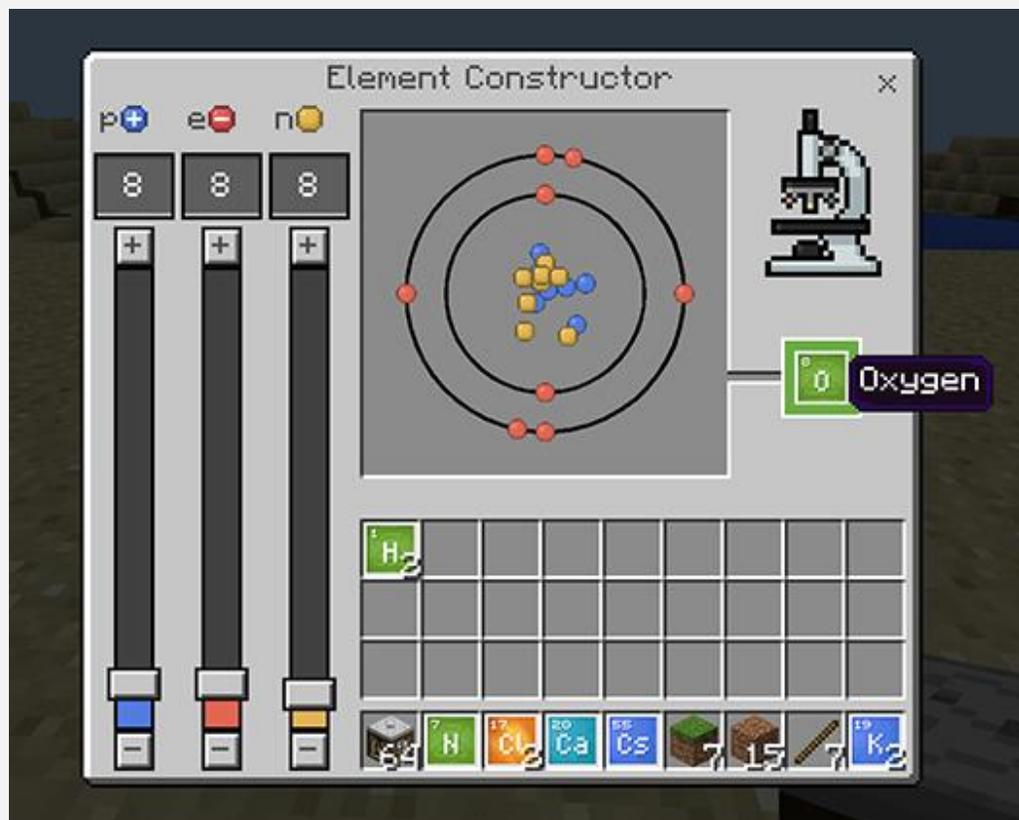


RIVER ECOLOGY SIMULATION

Computational Thinking



Chemistry



Export to 3D



➤ Machine Learning

“You did what?”



Machine Learning





Machine Learning

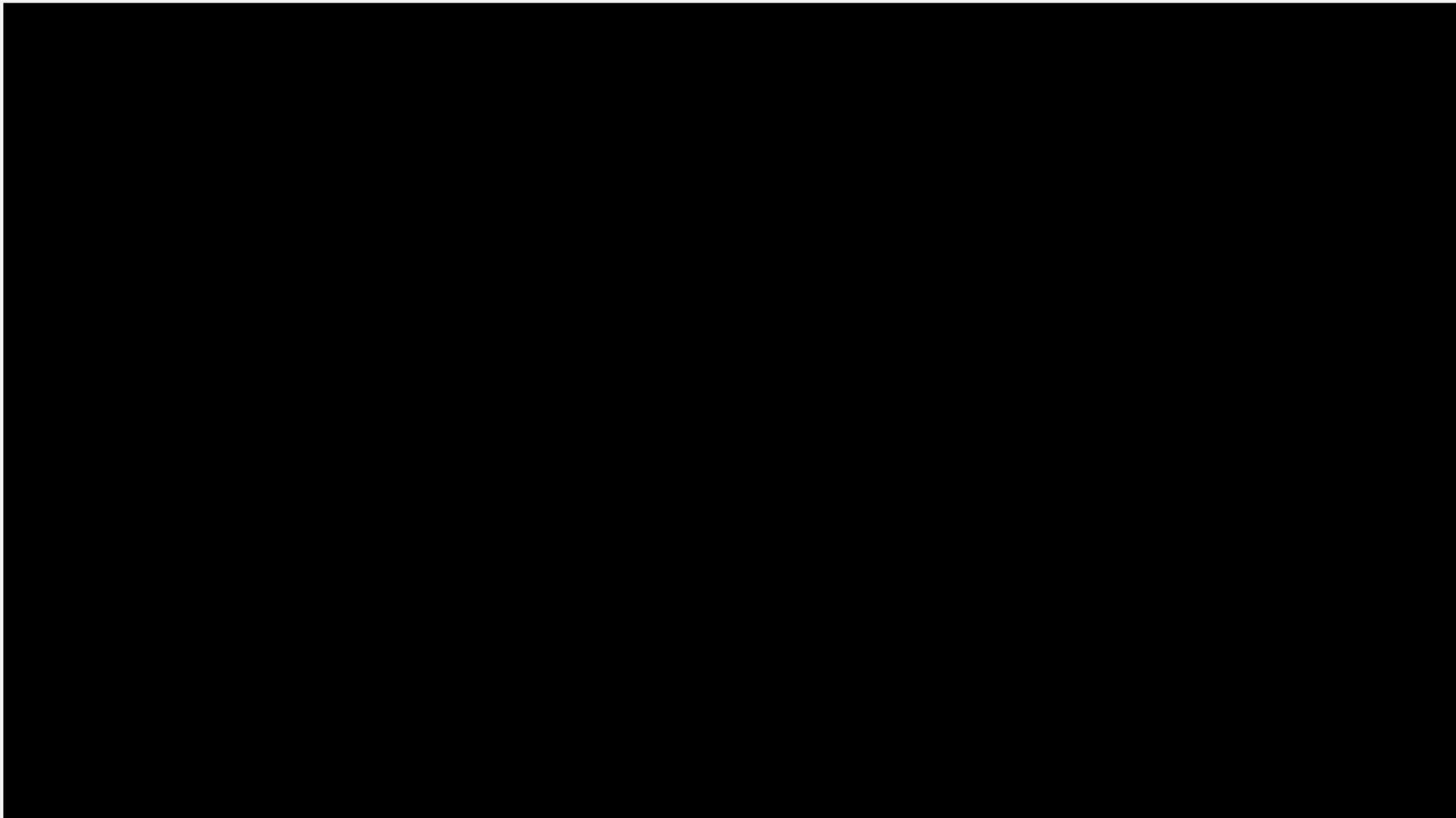
www.machinelearning.ai

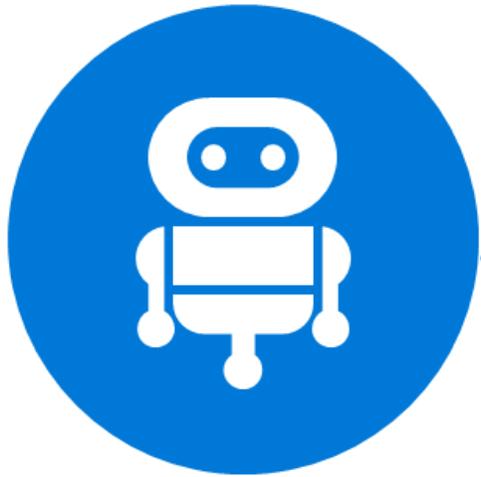
➤ Artificial Intelligence

➤ Cognitive Services



Artificial Intelligence



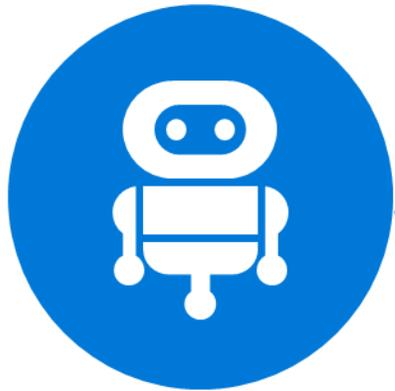


Make your own Chatbot!

<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

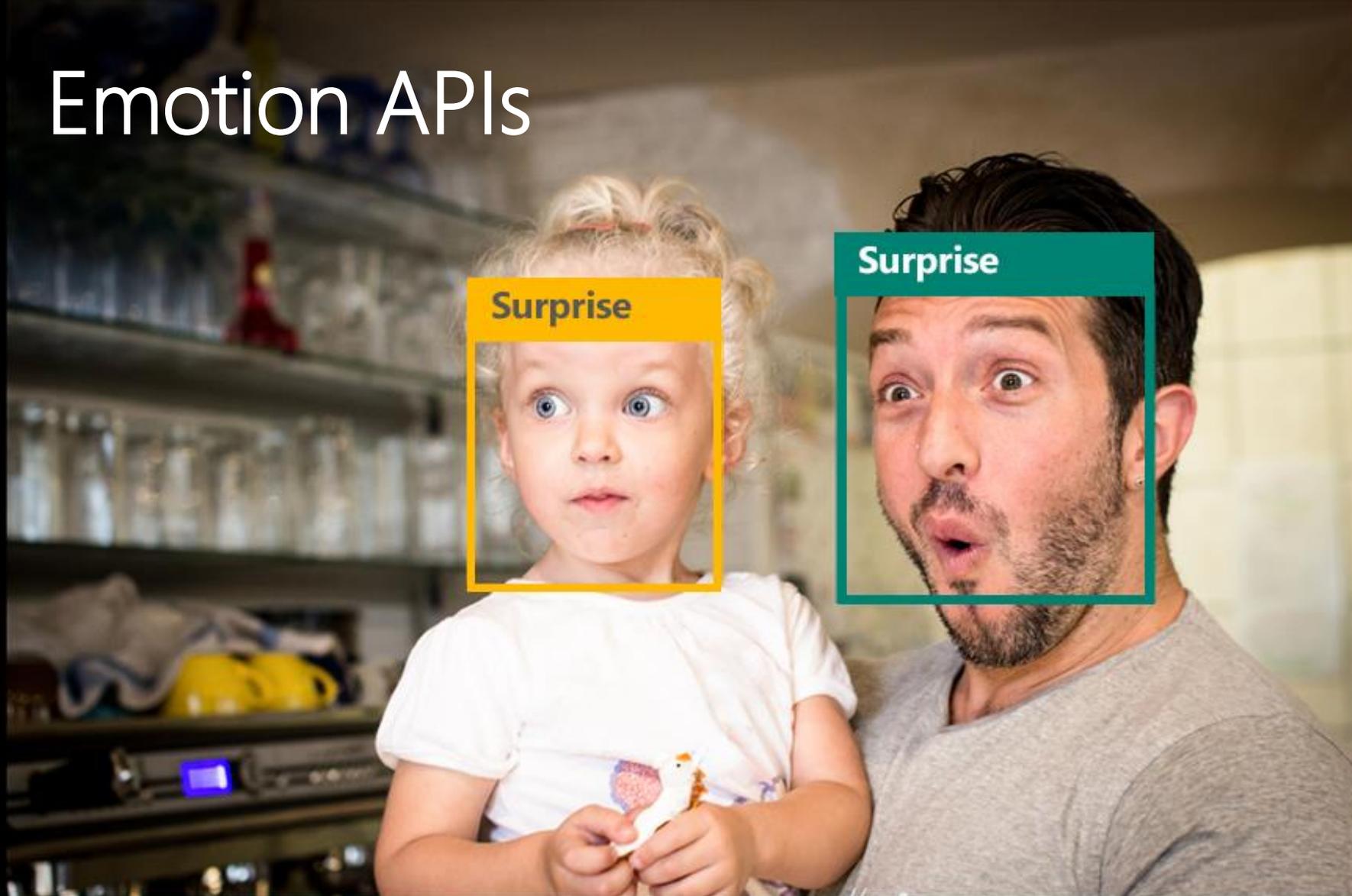
Tap into rich knowledge amassed from the web, academia, or your own data



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

COGNITIVE APIs

☰ DEMOS ⚙️ ⋮

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



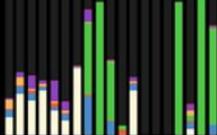
What Dog



Emotion Match



What If



Realtime Crowd Insights



Bing Autosuggest



Bing Images



Bing News



Bot Framework

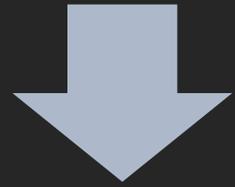
<https://www.microsoft.com/cognitive-services/>

➤ Analytics Technology



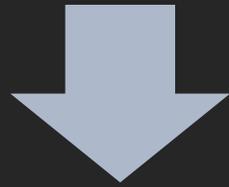
Power BI

TEACHER-LED
CLASSROOMS



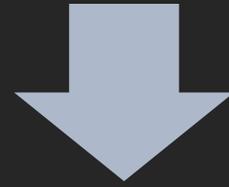
PROJECT-BASED
LEARNING

TRADITIONAL
CLASSROOMS



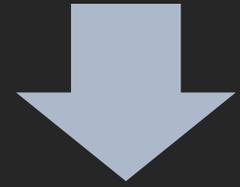
FLIPPED
CLASSROOMS

INDEPENDENT
LEARNING



COLLABORATIVE
LEARNING

LOCK STEP
LEARNING



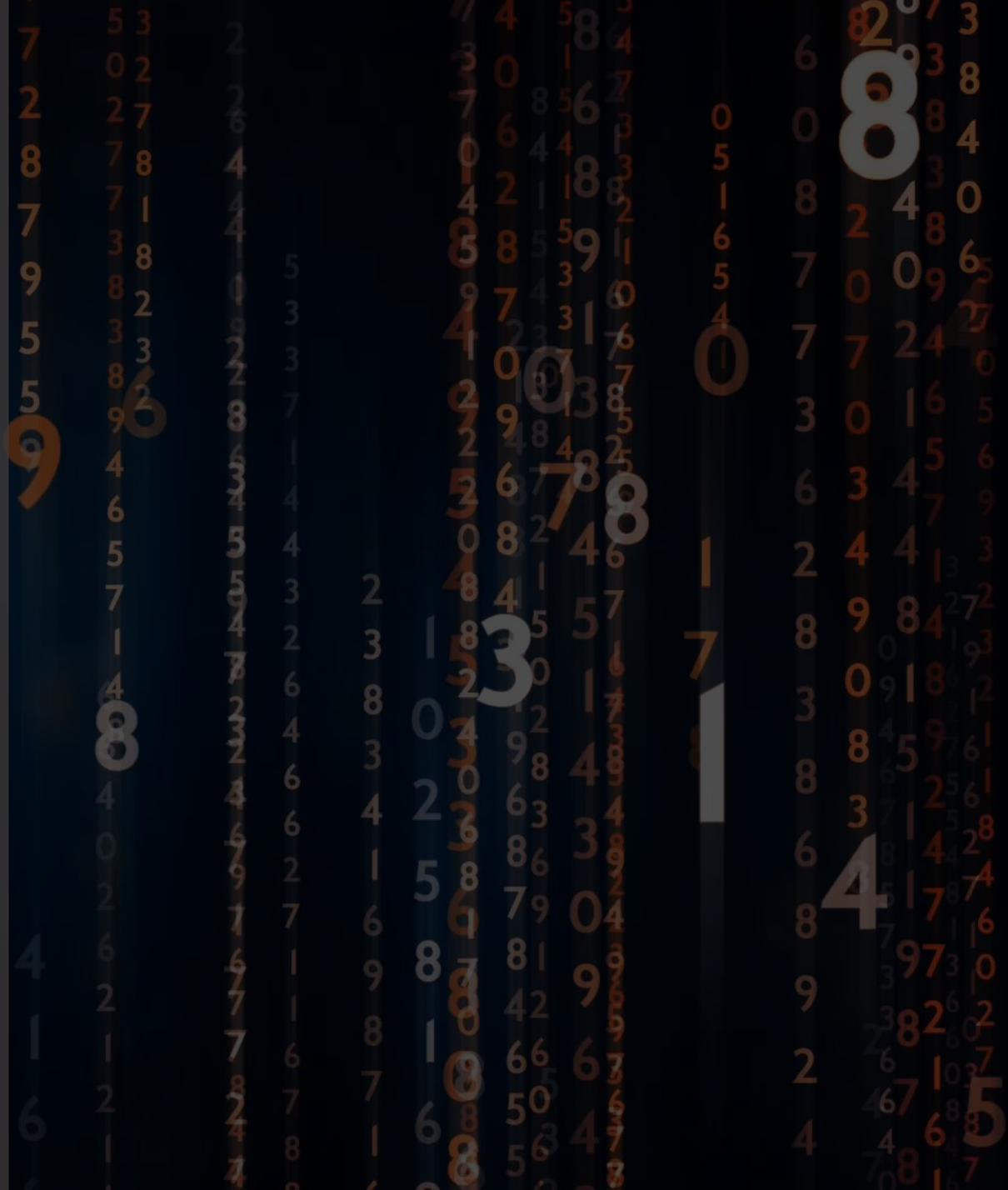
PERSONALIZED
LEARNING

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).

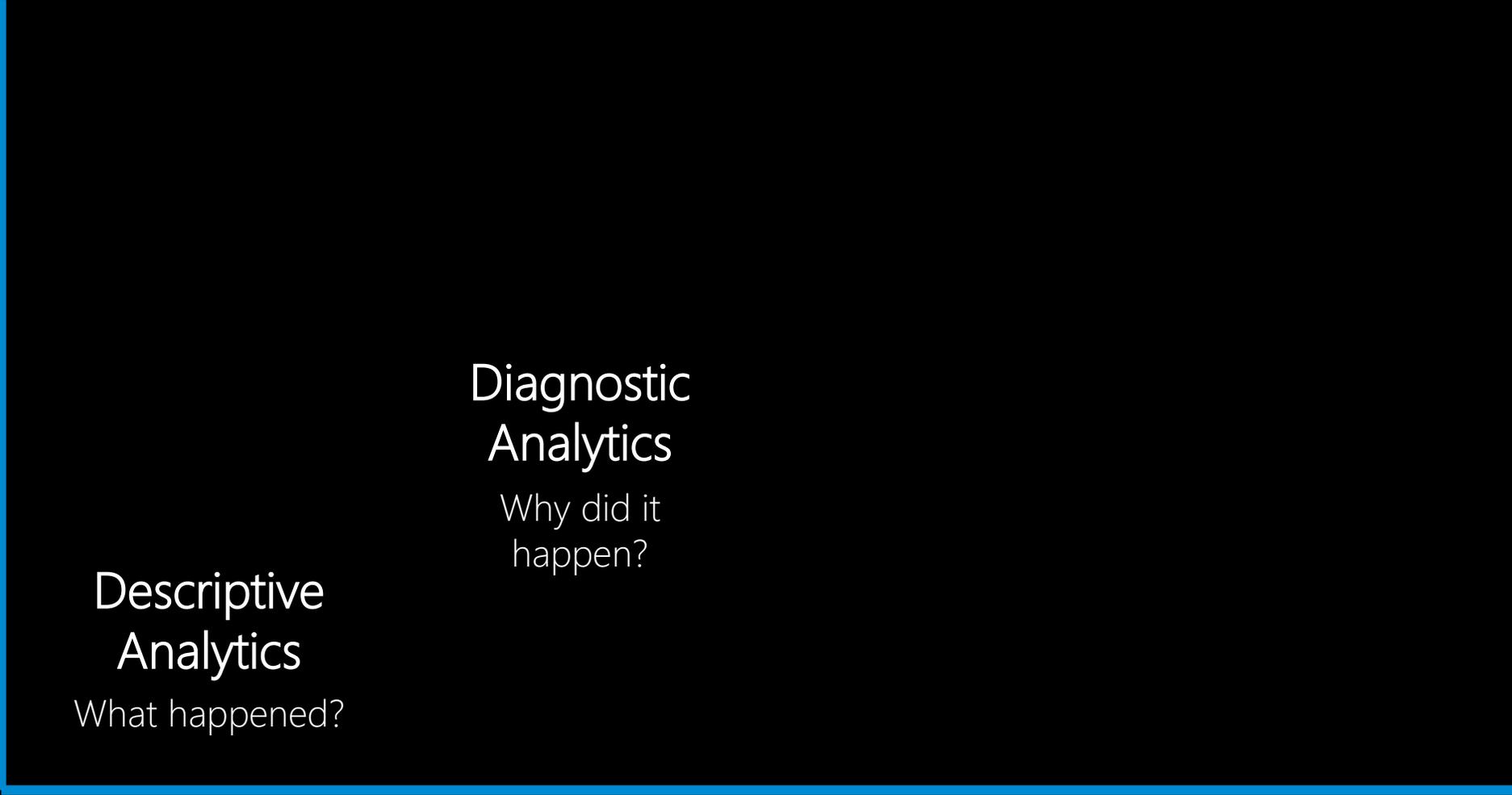
What should I teach today?...and how?

A JOURNEY
POWERED BY
DATA



Advanced Analytics

according to Gartner, INC.

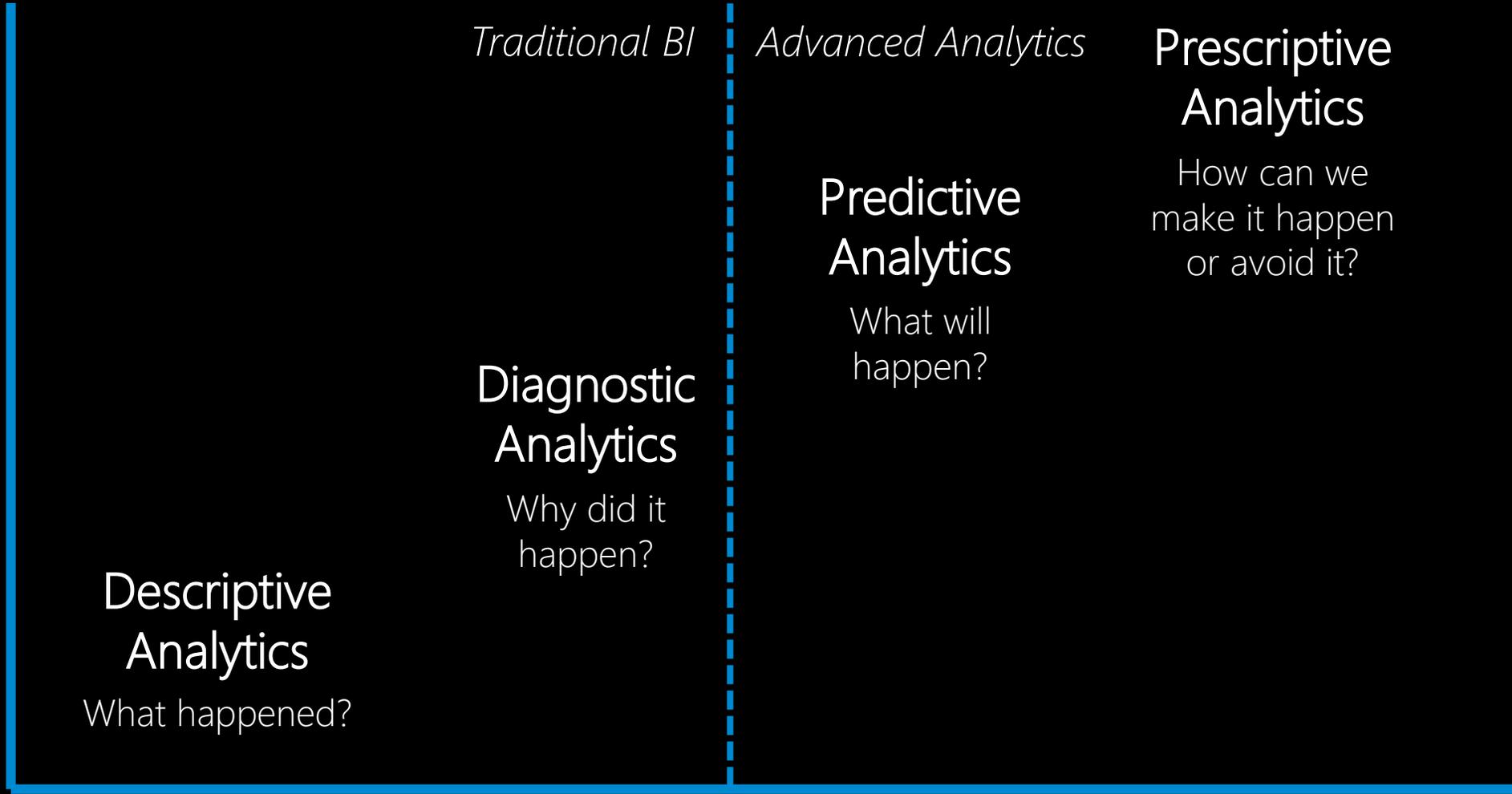


**Descriptive
Analytics**
What happened?

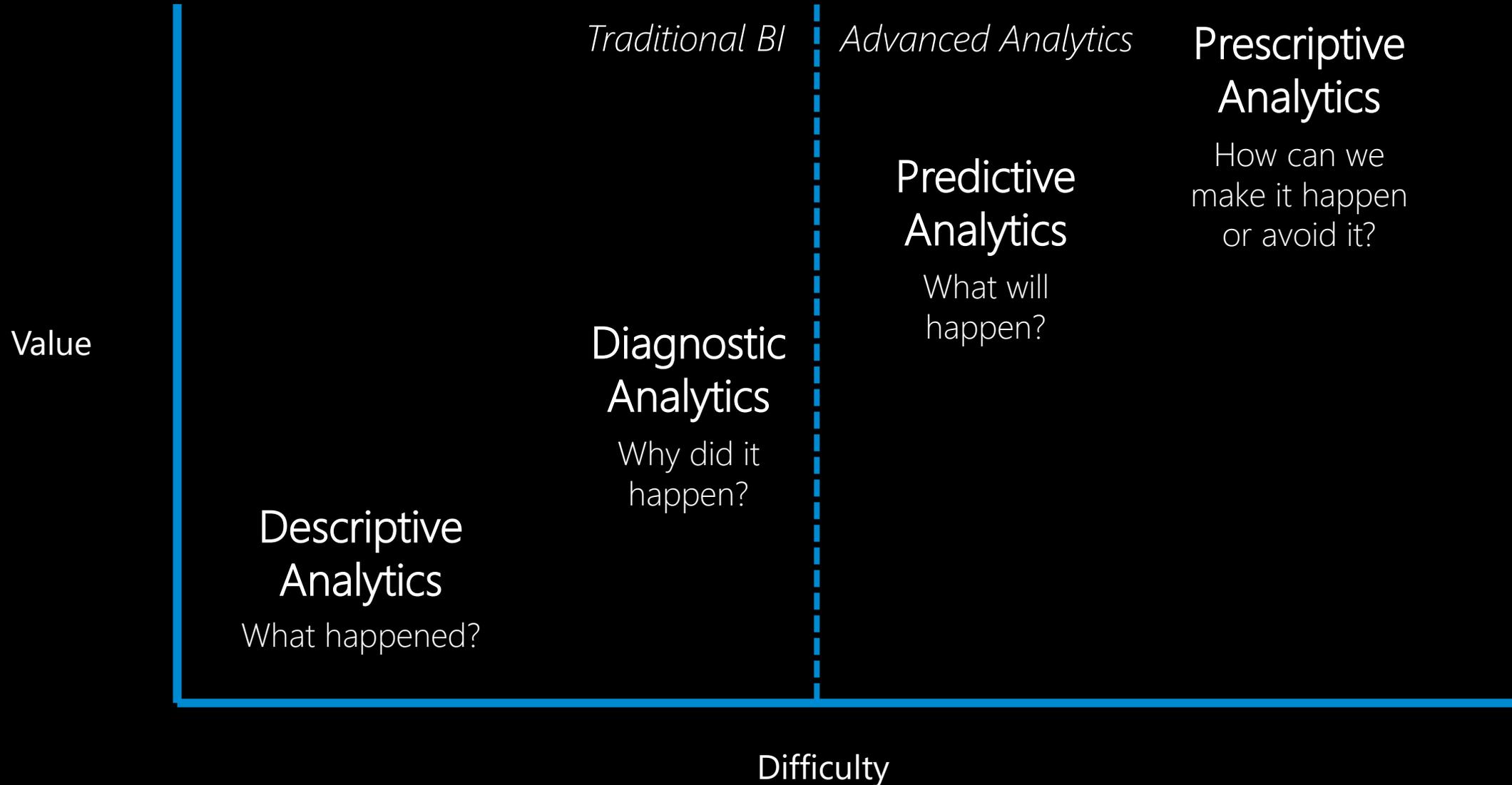
**Diagnostic
Analytics**
Why did it
happen?

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



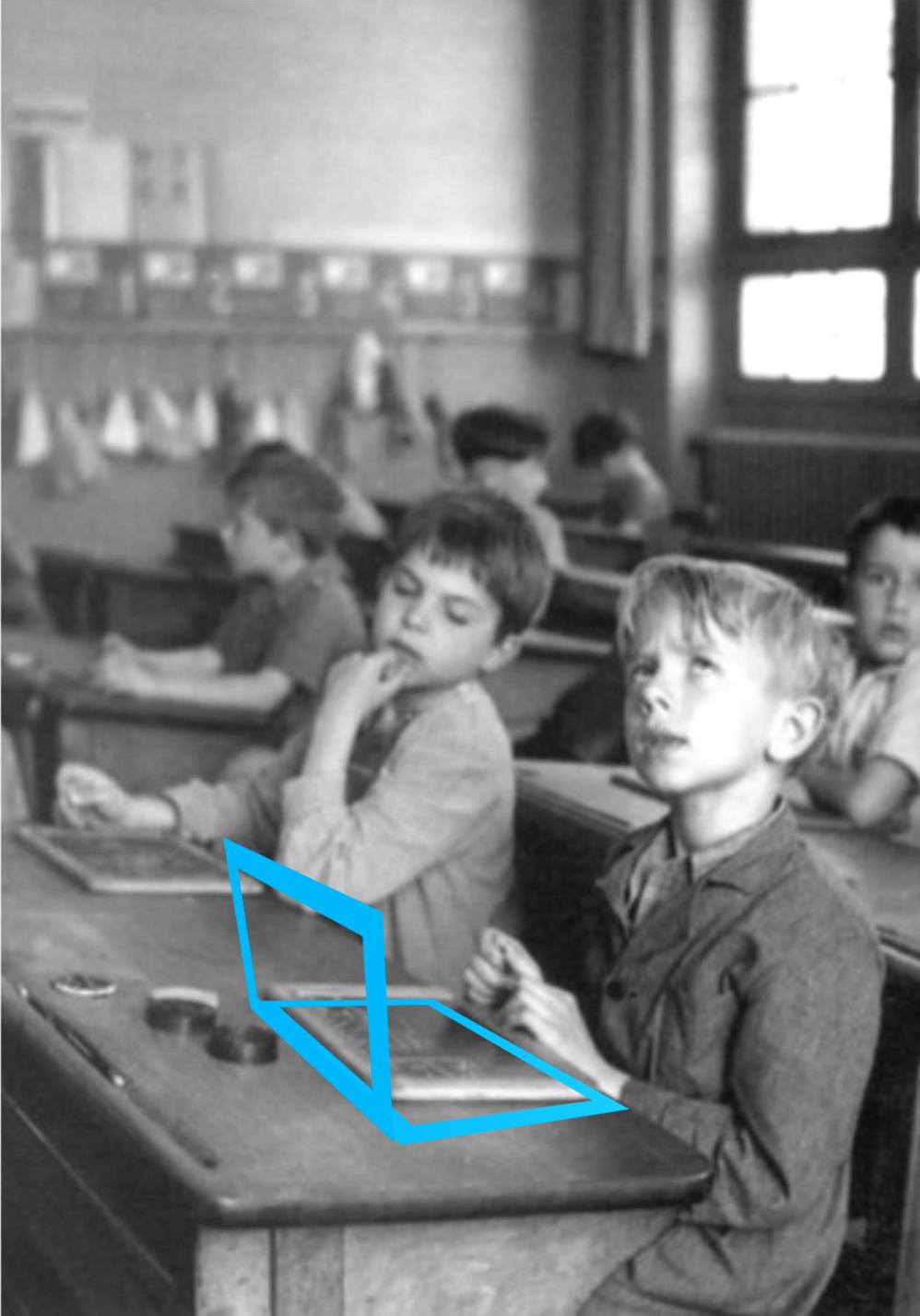


“Innovation” hubs
are popping up



Tinker Toys

“Which ones should we buy?”



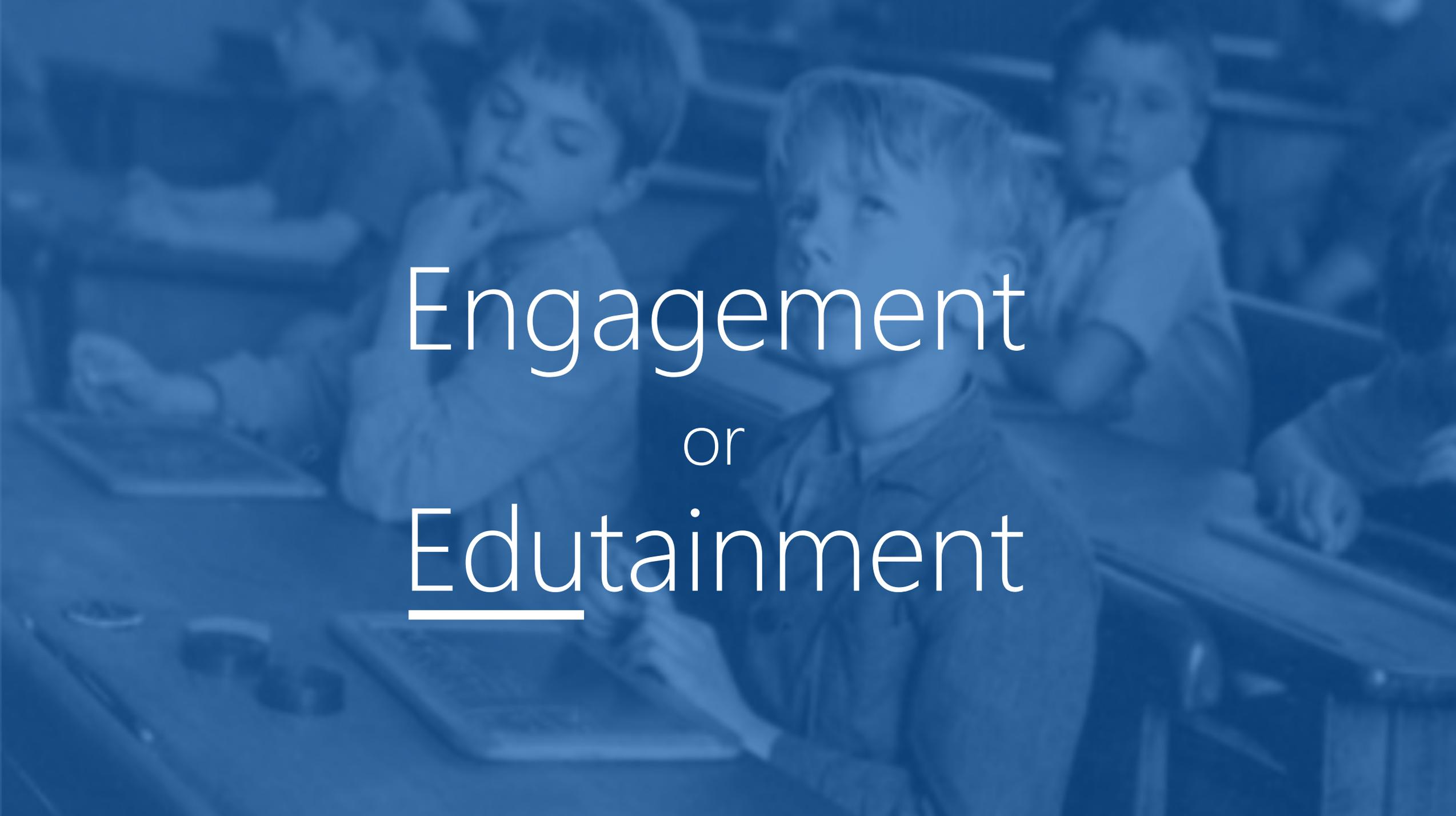
Does putting a **device** in the hands of a student automatically mean they are engaged in **deep** learning?



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



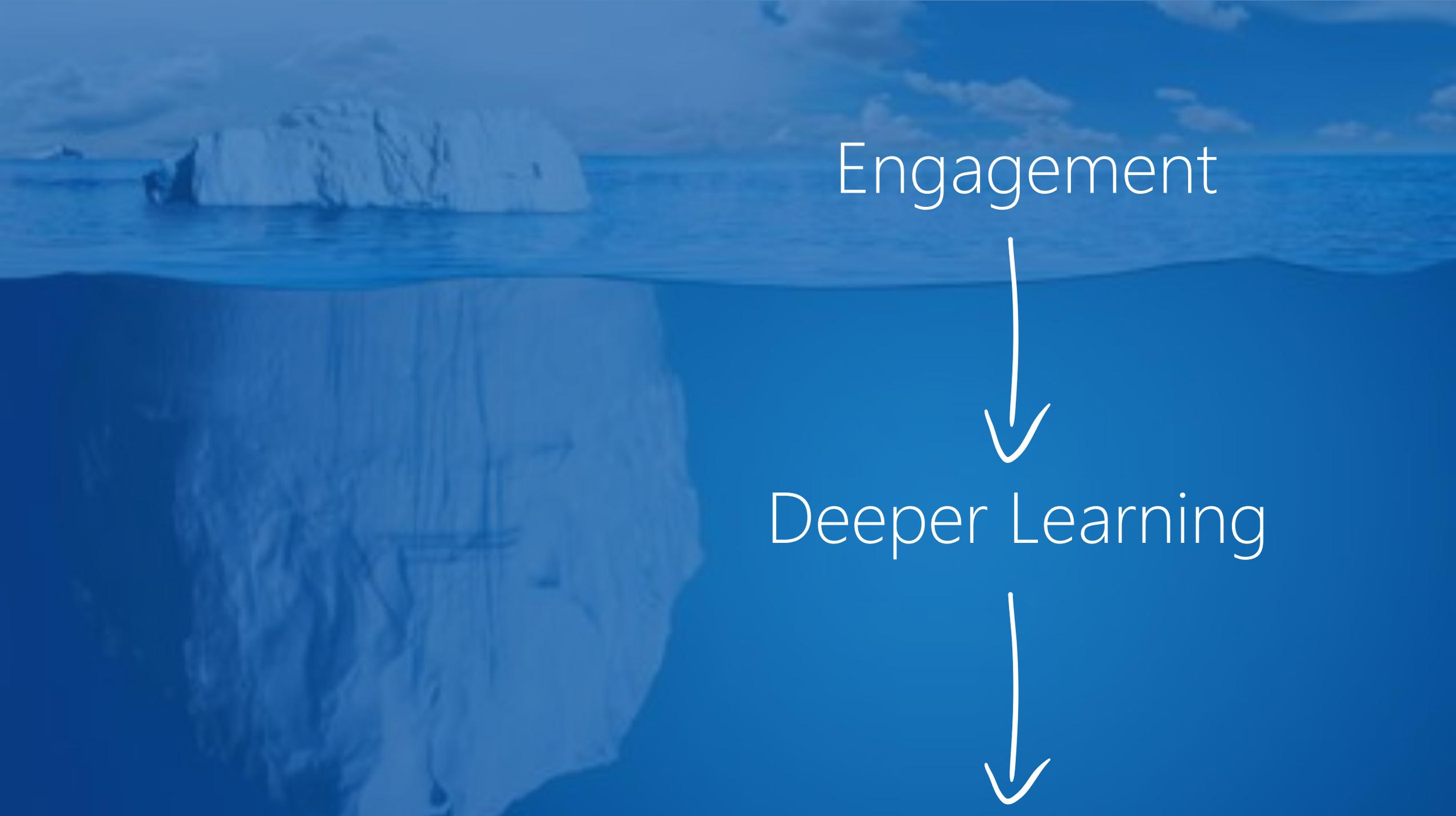
Does putting a **headset** on the face of a student automatically mean they are engaged in **deep** learning?



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 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

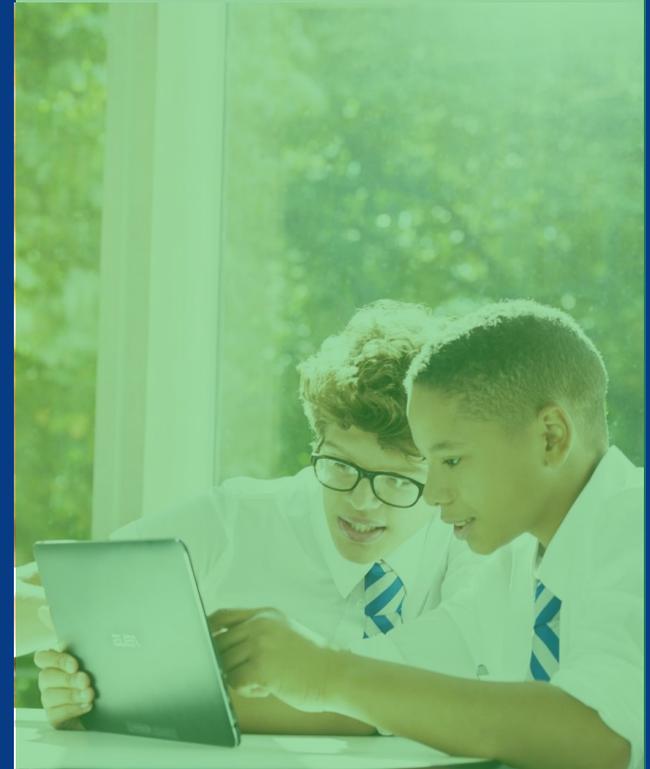
PEDAGOGY



PROFESSIONAL LEARNING



PLATFORMS



Purposeful Engagement

PEDAGOGY



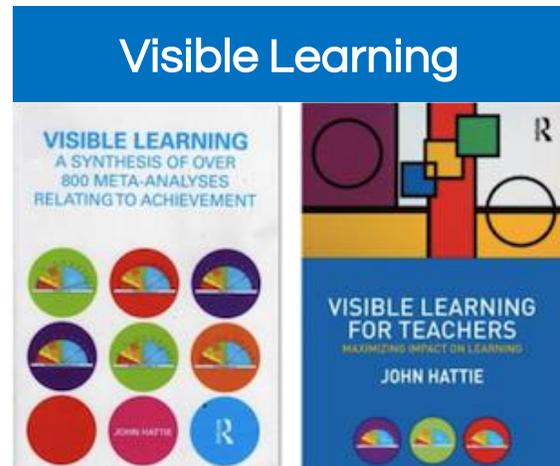
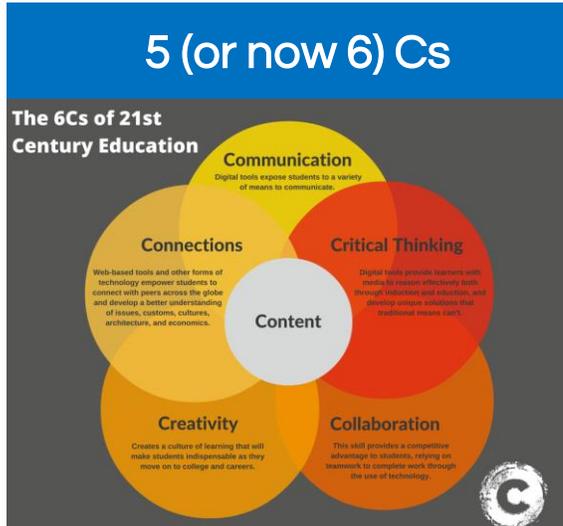
PROFESSIONAL LEARNING



PLATFORMS

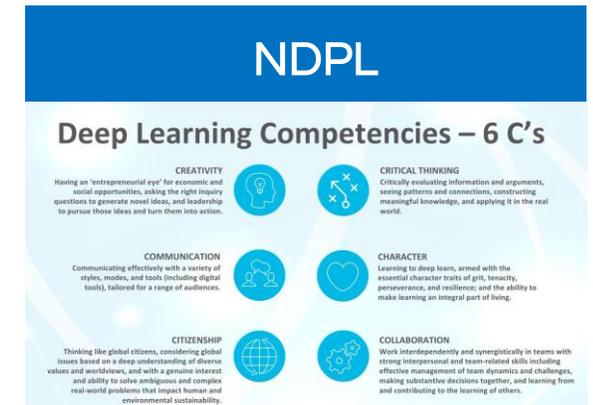
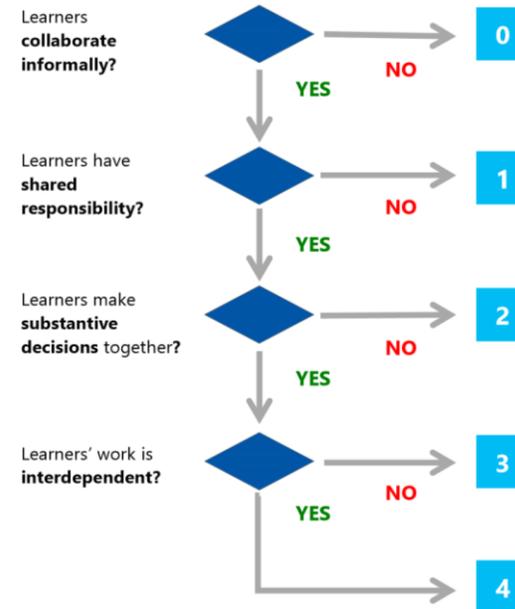


PEDAGOGY



21CLD Framework

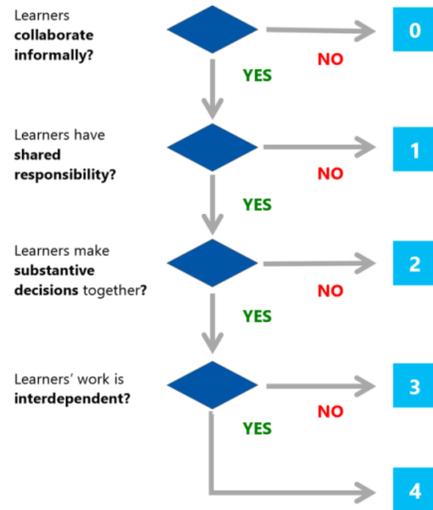
Collaboration: Decision Steps



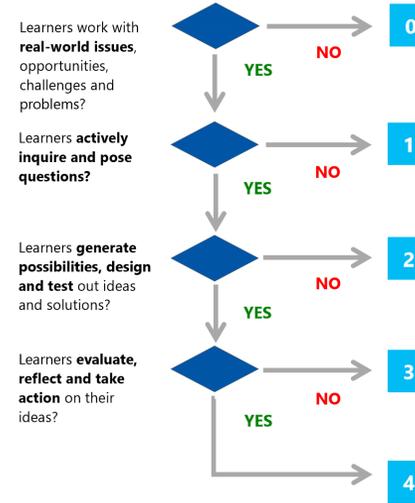
LEARNING DESIGN FRAMEWORKS

21CLD Framework

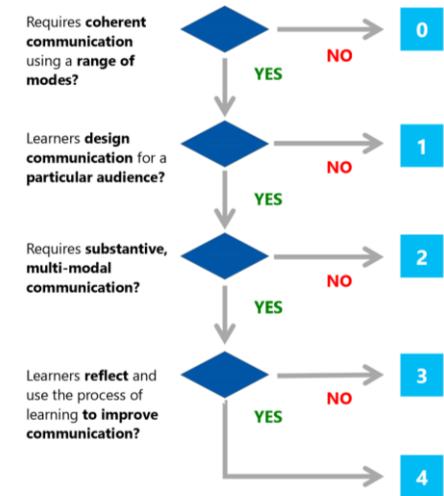
Collaboration: Decision Steps



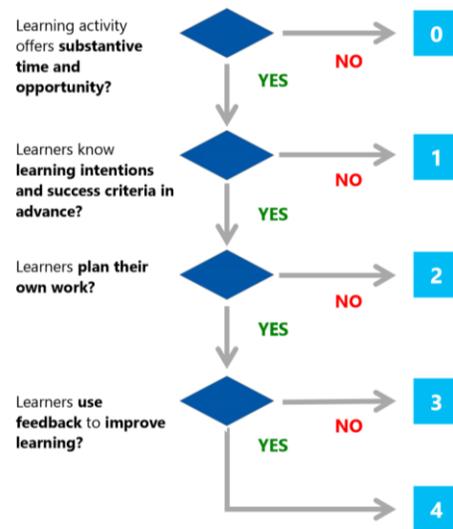
Real-World Innovation and Problem-Solving: Decision Steps



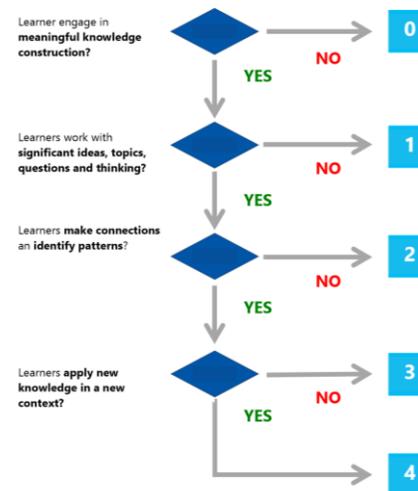
Skilful Communication: Decision Steps



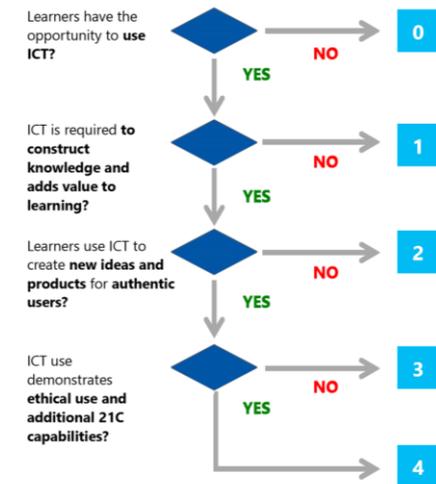
Self-Regulation: Decision Steps

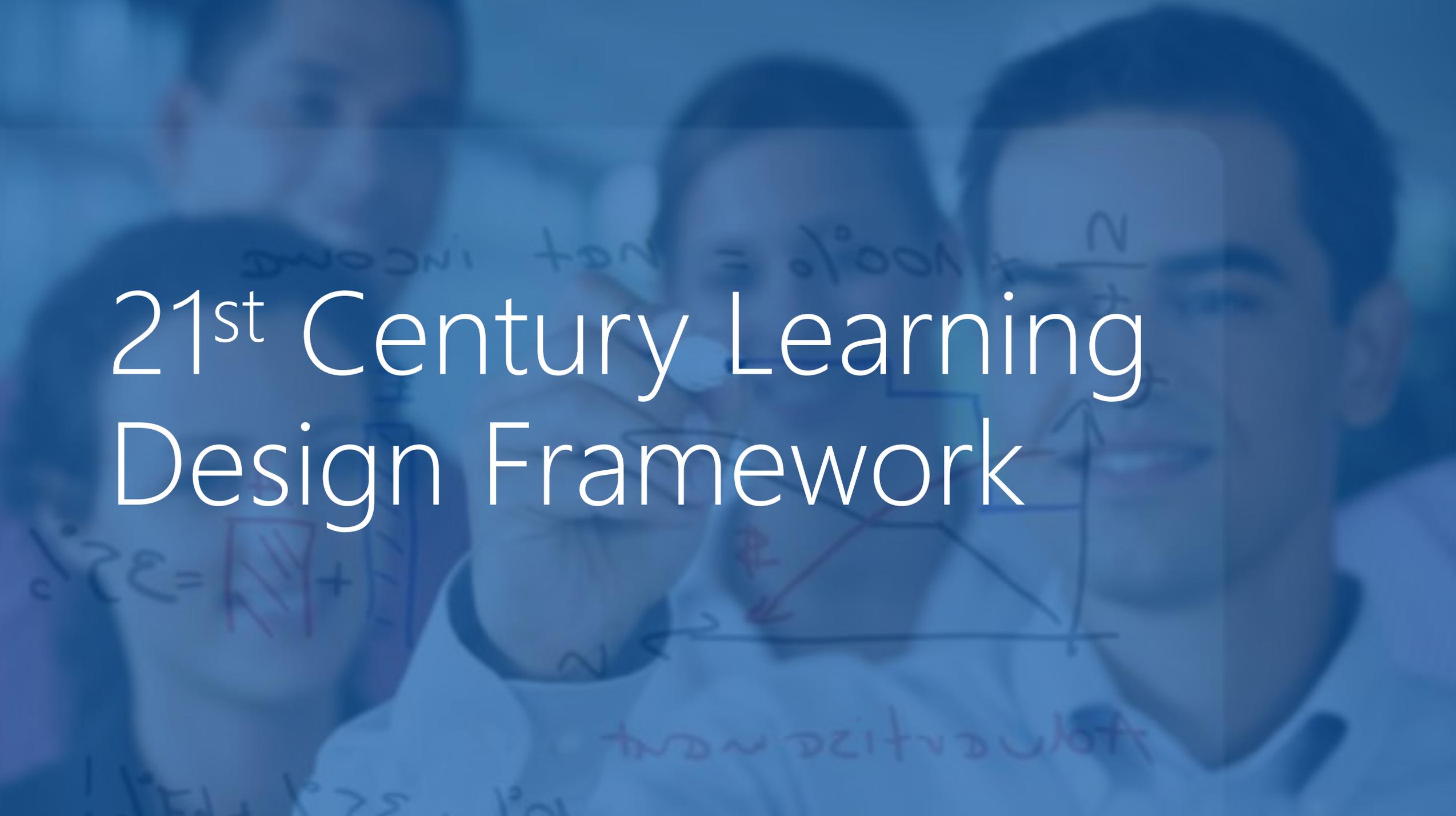


Knowledge Construction: Decision Steps



ICT for learning: Decision Steps





21st 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

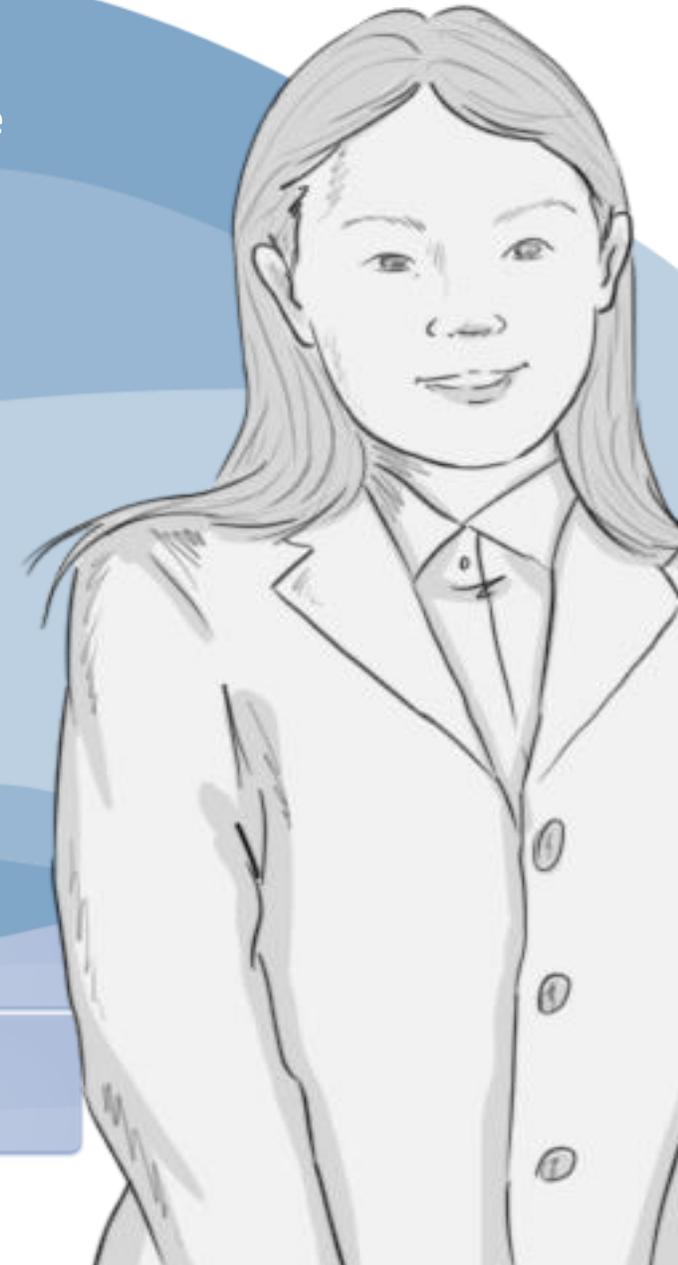
Student Focus
Groups

33 focus groups

Education
System Change

School
Leadership
and Culture

Innovative
Teaching
Practices



21CLD Research & Resources



Search “**Microsoft ITL Research**”



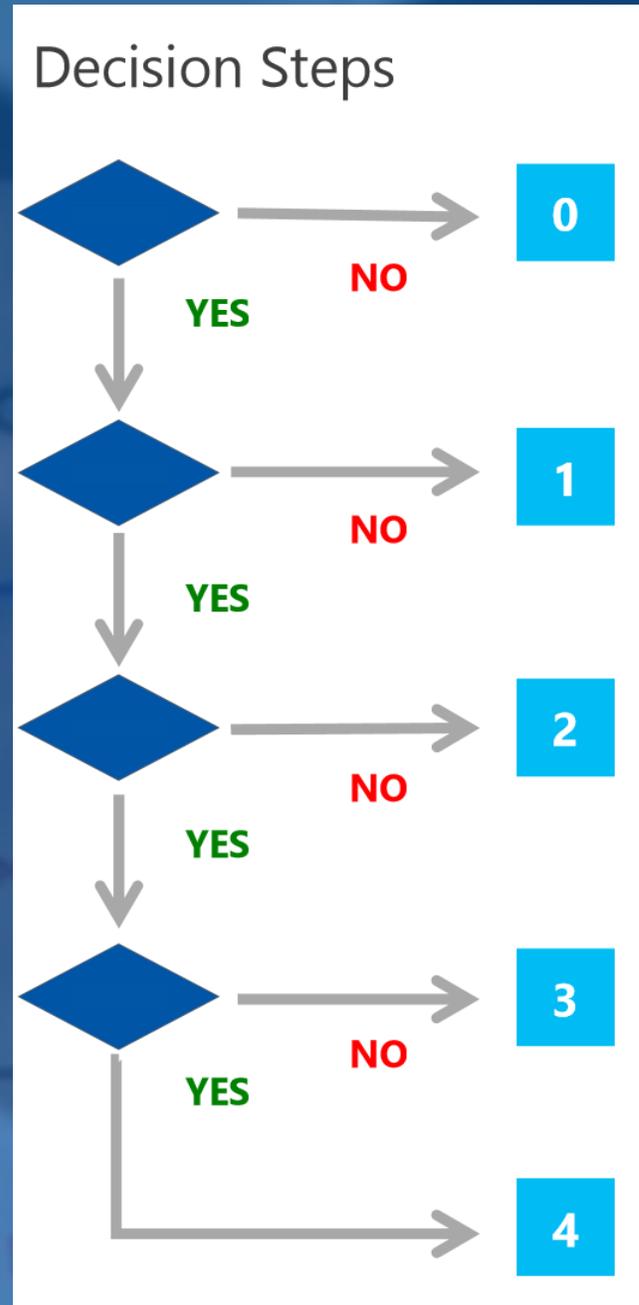
<https://education.microsoft.com/GetTrained/ITL-Research>

21CLD

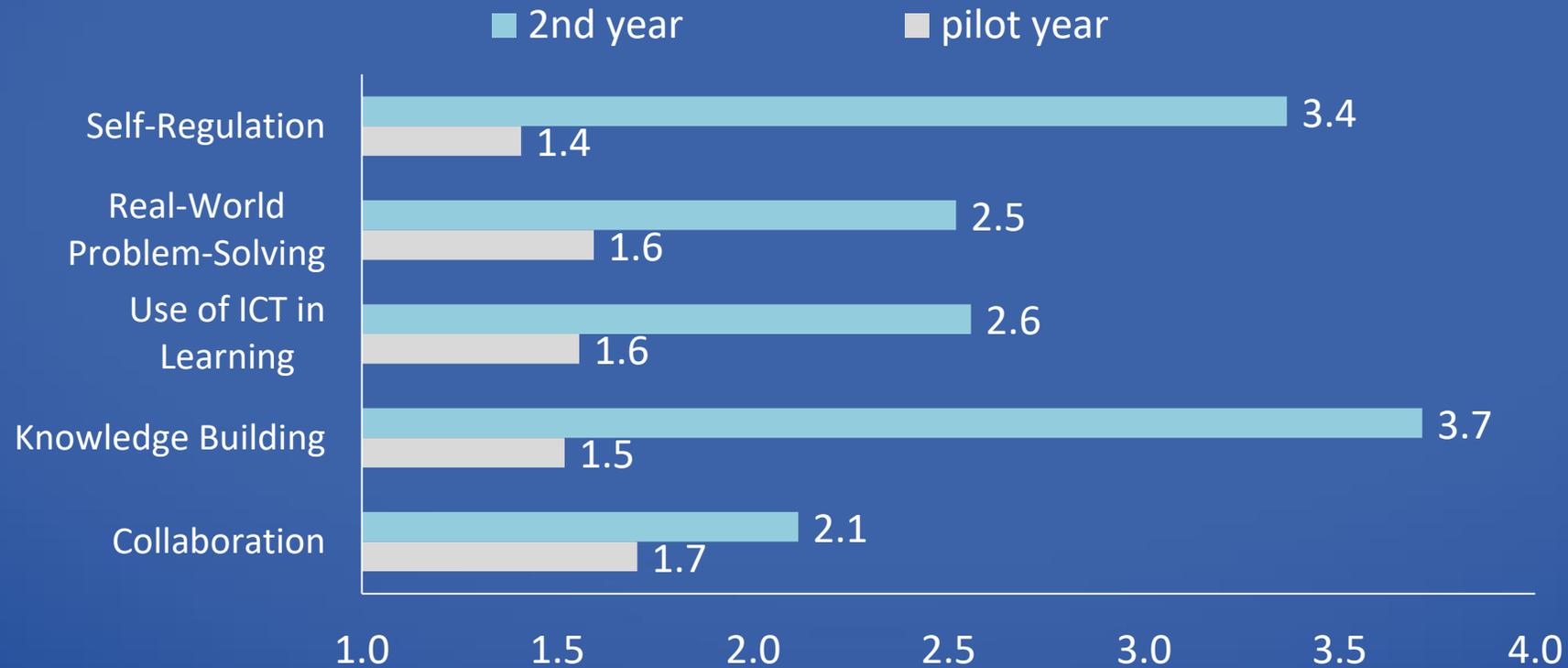


How do we design learning to develop these skills?

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 21st 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.

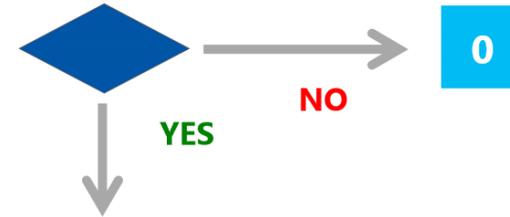
21CLD

Real World Problem Solving



Real-World Innovation and Problem-Solving: Decision Steps

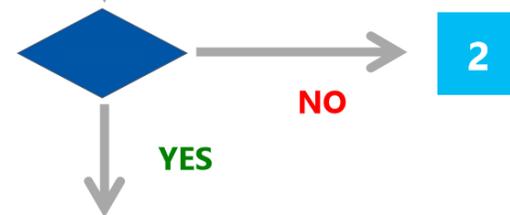
Learners work with **real-world issues**, opportunities, challenges and problems?



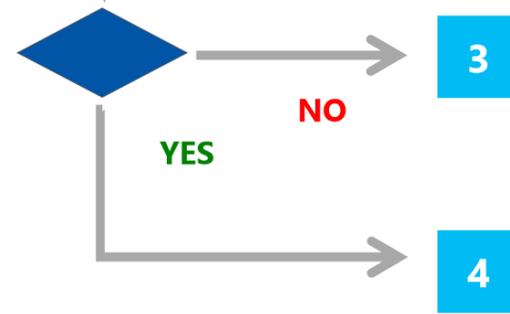
Learners **actively inquire and pose questions**?



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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