

Teaching AI for K-12

ReadyAI's Workshop and WAICY as a Classroom Example

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Arlington, VA

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Who we are

Empowering **all**
students to **improve**
our world with **AI**.

“
What We've

Tried

”



AI-IN-A-BOX

2018

A bundled solution of robots,
accessories, and curricular
resources

3000+ students





WAICY

The World Artificial Intelligence
Competition for Youth

2018 & 2019

600+ Students

150+ Projects

8 Countries

- global competition
- students learn and use AI technology to solve real problems



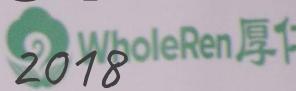
WAICY

2018



ReadyAI





WAICY

WAICY 2018

WAICY 2018



WholeRen 厚仁®

Ready

WholeRen 厚仁®

Ready

Evan
Zhao



WholeRen 厚仁®

Ready

Song Jia

Cyber chink



WAICY

2018





WAICY

2018



WAICY

2018



ReadyAI

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WAICY

2018





WAICY

2018













WAICY

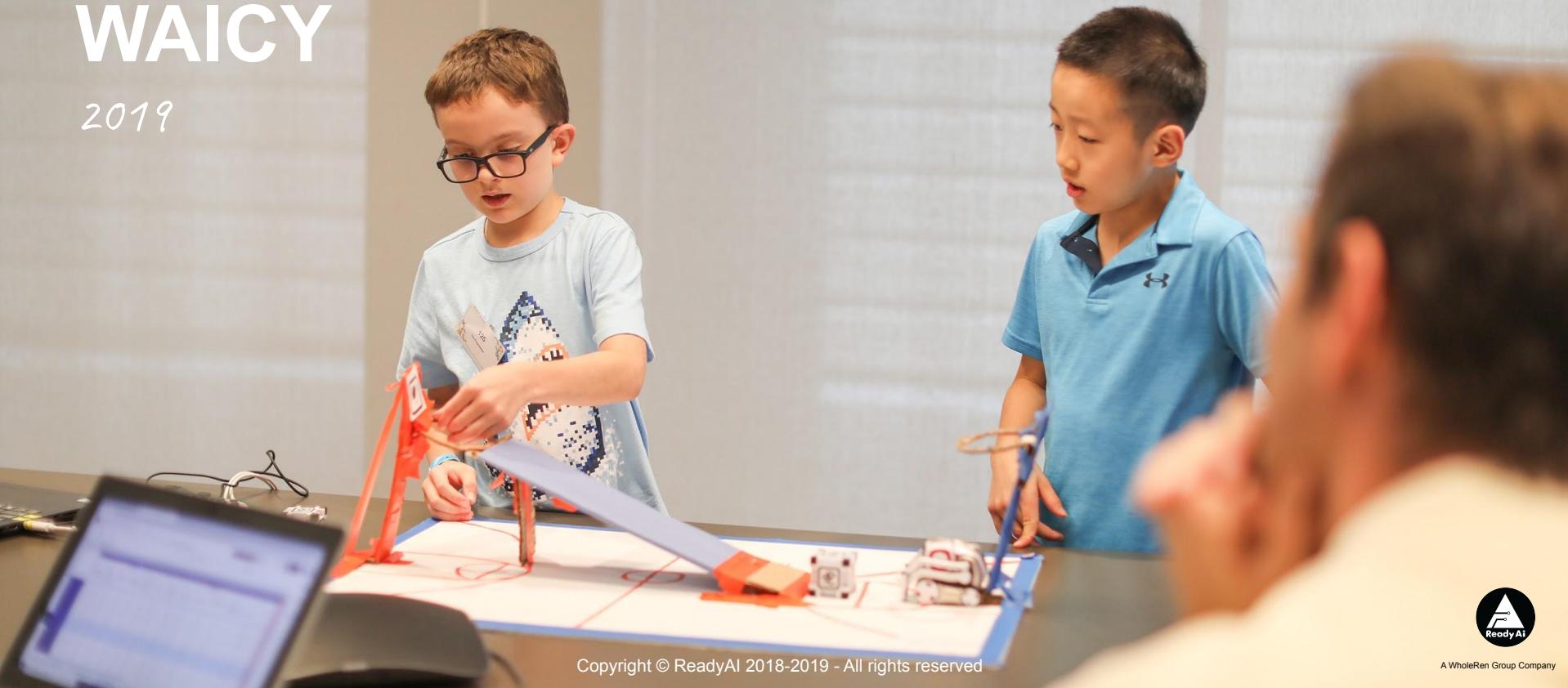
2019





WAICY

2019





WAICY

2019



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WAICY

2019



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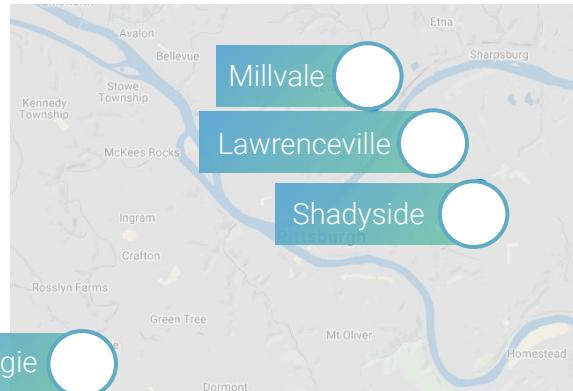
BOYS & GIRLS CLUB

2018



► BOYS & GIRLS CLUB 2018

Western
Pennsylvania



- 16-week programs
- Piloted in Fall 2018
- 4 locations
- 4 instructors
- ~120 total students

Nationwide



WE TEACH AI

- Community centers
- Libraries
- Schools
- 200+ students





TEACHER TRAINING

- AAAI, CSTA, ISTE
- Monthly local teacher training
- Online training course
- 100+ teachers



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City of Pittsburgh

AI Learning Day for Kids



Pittsburgh City Council proclaimed July 27th, 2019, the day of WAICY as AI Learning Day for Kids



AI Education Exchange

In China





ReadyAI Lab

July 2019



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READYAI LAB

July 2019





READYAI LAB

July 2019





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[ReadyAI](#)

Completed

[ReadyAI Lab Kit - Beginner Course](#)

[by ReadyAI](#)

The ReadyAI Lab Kit includes all teaching resources... [See more](#)

[SEE MORE...](#)

7 Lessons

Completed

[AI+Me Unplugged Lesson Plans for 3-5](#)

[by ReadyAI](#)

[SEE MORE...](#)

7 Lessons

Completed

[AI-IN-A-BOX™ LESSON PLANS](#)

[AI-IN-A-BOX™ Lesson Plans - Elementary School](#)

[by ReadyAI](#)

These lesson plans require the AI-IN-A-BOX™. In t... [See more](#)

[SEE MORE...](#)

12 Lessons

Completed

[AI+Me Unplugged Lesson Plans for K-2](#)

[by ReadyAI](#)

These lesson plans center around the five big idea... [See more](#)

[SEE MORE...](#)

7 Lessons

Completed

[AI-IN-A-BOX™ LESSON PLANS](#)

[AI-IN-A-BOX™ Lesson Plans - Middle School](#)

[by ReadyAI](#)

These lesson plans require the AI-IN-A-BOX™. In t... [See more](#)

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8 Lessons

Completed

[AI Course with Cozmo and Calypso](#)

[by ReadyAI](#)

The first lesson of the course is open for preview... [See more](#)

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Completed

[Teacher Training Course - Cozmo and Calypso](#)

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This course serves as a guide to facilitating the ... [See more](#)

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[Teacher Training Course - Cozmo and Code Lab](#)

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[AI + ME](#)

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"AI+ME" is an online experience intended to provid... [See more](#)

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“ What We Learned ”

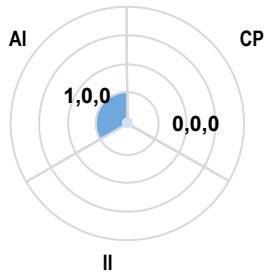


Curriculum Tested



AI+ME

45 mins





We will explore *5 Big Ideas* in AI

- AI perceives
- AI decides
- AI learns
- AI interacts with us
- AI impacts society in different ways

Topic Progress: ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

Topic: Perception

Can you *perceive* these emotions?

Drag the feeling to the right faces

Scared	Surprise
Neutral	Sad
Angry	Happy
Disgusted	Bored

Check

3 / 11

Topic Progress: ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

- Welcome to AI + Me!
- Perception
- Representation and Reasoning
- Machine Learning
- Human-AI Interaction
- Societal Impact
- Notes

Return to [AI + ME](#)

My AI Journey



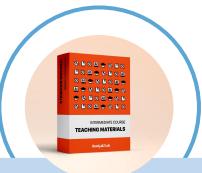
Curriculum Tested



AI+ME



Beginner
Course

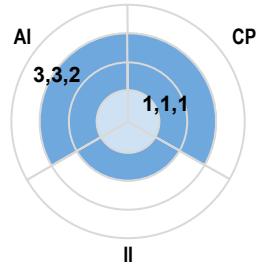
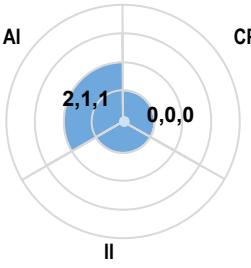
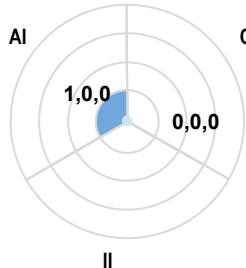


Intermediate
Course

45 mins

90 mins * 4 sessions

90 mins * 4 sessions





Beginner Course

CLASSROOM SET-UP & LOGISTICS

Please use the following list as you set up your classroom and prepare supplies for students. All printable materials (including posters) are linked to their respective pdfs so you can print and use directly.



Lesson Plans

Lesson 3: Object Manipulation

Summary of Lesson

Applying the principles of **object identification**, students will assist their AI units to identify the objects around it and create a world view map of their environment. Applying the principle of landmark-based navigation, students will learn how their AI unit can navigate around objects and manipulate the objects. Students will also be introduced to the limitations of AI manipulation not only with their own units but also in general.

Agenda

- Warm-up (10 minutes)
- Guided lesson (35 minutes)
- Break (10 minutes)
- Teacher Presentation (15 minutes)
- Student Production (15 minutes)
- Closure (5 minutes)

Assessment

- Can students:
- program Cozmo to navigate to any cube?
 - program Cozmo to navigate to a specific cube?
 - evaluate uses for the AI principle of landmark-based navigation?
 - identify what Cozmo can and cannot manipulate?
 - program Cozmo to manipulate his cubes?
 - create uses for the AI manipulation in a variety of fields?

Essential Question:
How does AI navigate?
Why does AI need to be able to manipulate objects?

Objectives

- Students will be able to
- explain how landmark-based navigation works and where it is applied in our lives
 - read and write multiple lines of rules that involve landmark-based navigation
 - be aware of what their AI unit can do with objects it can manipulate
 - describe what their AI unit can and cannot manipulate and why

Tools and Materials

- AI-IN-A-BOX™ (1 per 2-5 students)
- Large sheets of paper or similar for carousal activity
- PowerPoint 3
- Teacher Resources 3.1 - 3.2

Connecting to Prior Knowledge
Who and what can AI recognize?

Support
If you have any questions about the lesson plan, please contact info@ReadyAI.org



Email Template

What we learned
Hi Parents,

We had a wonderful second class -- students learned about object and facial recognition!

1. Computer vision works by detecting edges, lines, and patterns
2. Cozmo can differentiate his three cubes by recognizing their unique markers
3. Facial detection involves extracting facial landmarks such as eyes and nose

What we accomplished
Students coded a short demo that simulates how AI can promote manufacturing safety. They programmed Cozmo to notify humans when he detects someone was entering a hypothetically dangerous setting.

Additionally, students learned about how facial recognition works at the basic level -- computer software detects facial features, such as eyebrows and eyes, which are interpreted as a face altogether.

What's Next
In the next lesson, students will learn about object manipulation. By the end of the next session, students will be able to program Cozmo to pick up his cube. They will also learn about indentation, an important logical concept that some programming languages such as Python rely on to distinguish structure. It allows students to code even more complex programs!



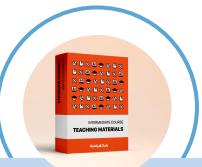
Curriculum Tested



AI+ME



Beginner Course



Intermediate Course



Intermediate Project



Summer Camp 4+1

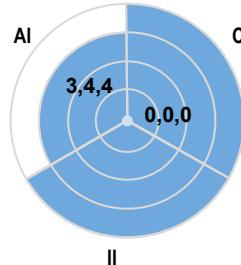
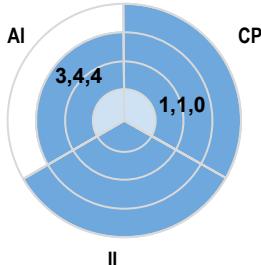
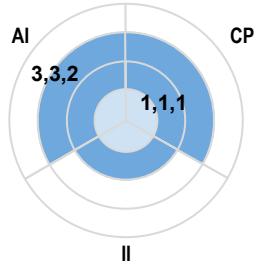
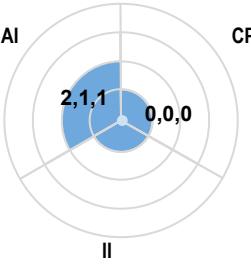
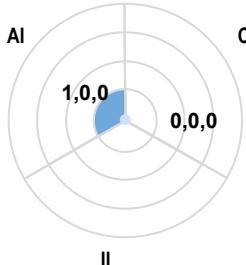
45 mins

90 mins * 4 sessions

90 mins * 4 sessions

90 mins * 4 sessions

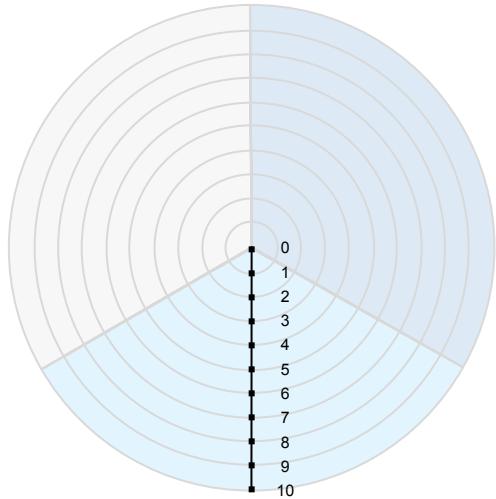
4 half days + demo day





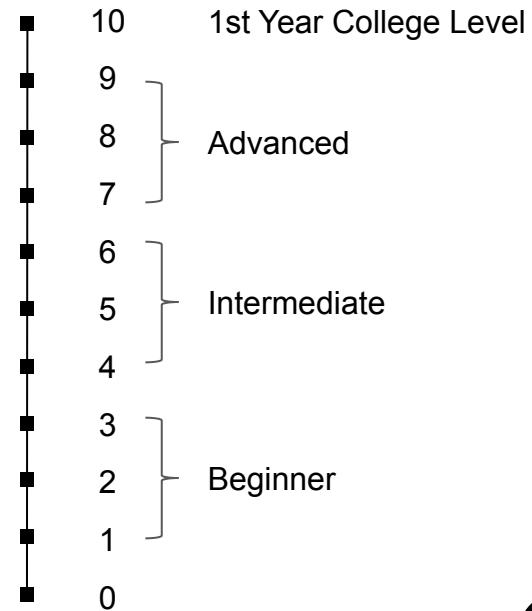
AI Competency Framework

AI
Artificial
Intelligence



II
Innovation & Impact

CP
Computational
Thinking &
Programming





Course Assessment



Quiz questions



Applying AI



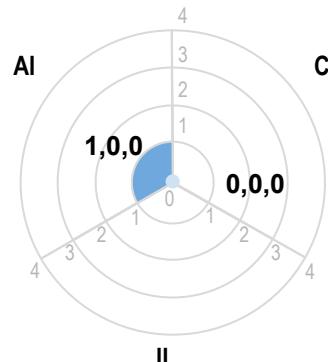
Applying AI +
Programming



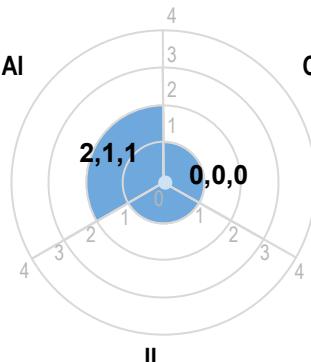
Applying AI +
Programming



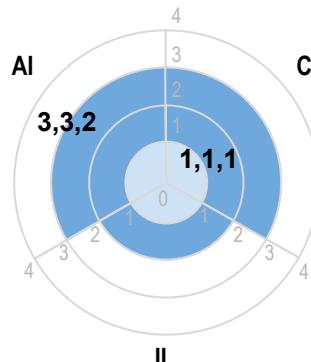
WAICY Rubric



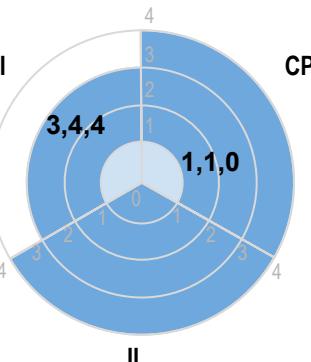
3000+ students



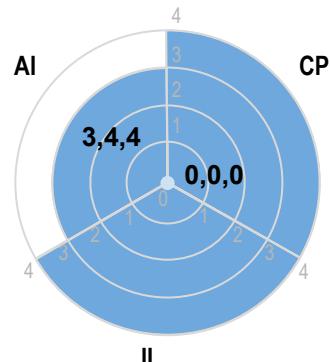
450 students



450 students



450 students



600+ students



Student Personas



Sadie



Kevin



Anthony



Luke

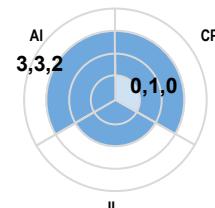
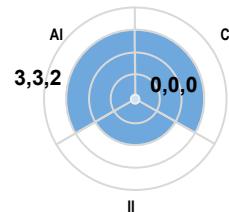


Sophia



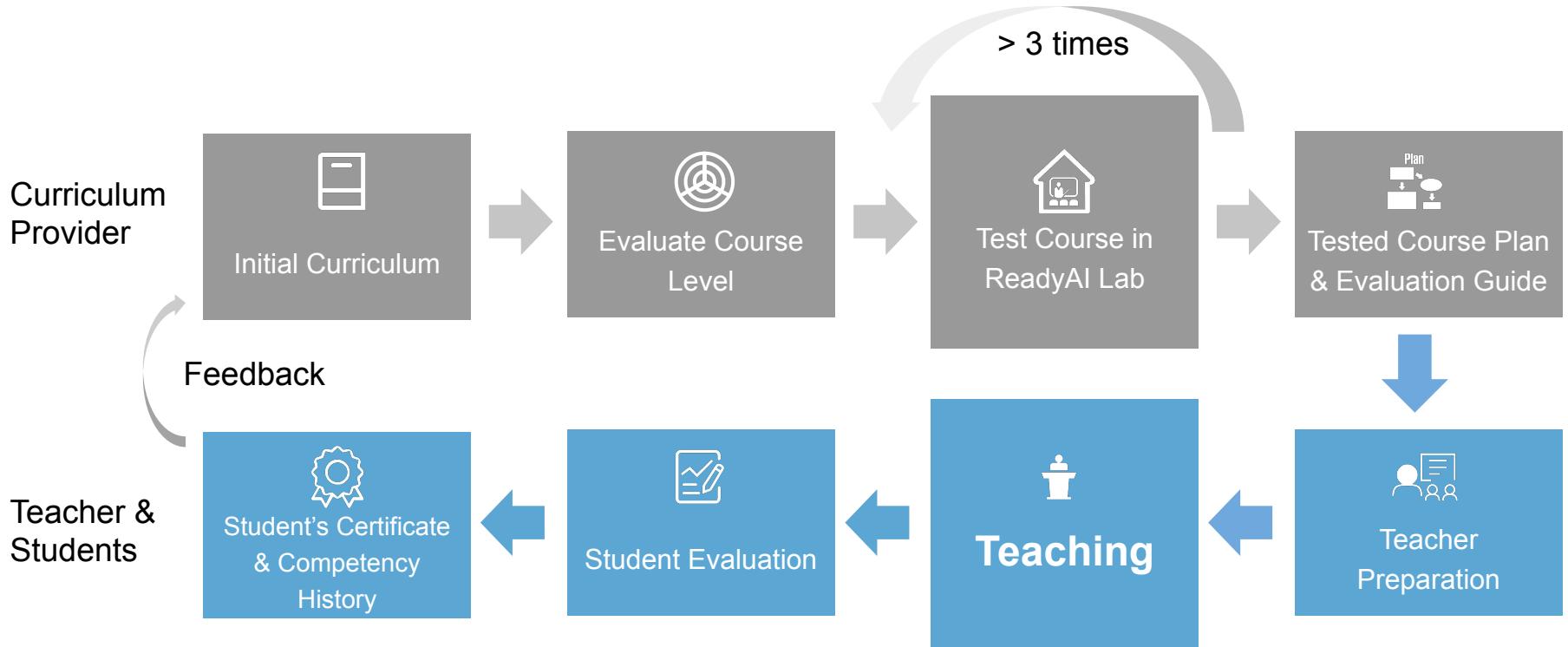
Emily

Grade	K	K	6	6	5	6
Prior coding/robotics?	✗	✗	✗	✓	✗	✓
Course taken	Beginner course	AI+Me	Beginner course	Intermediate, Project	Advanced	Summer camp
Before	0, 0, 0	0, 0, 0	0, 0, 0	0, 1, 0	0, 0, 0	0, 1, 0
After	3, 3, 2	1, 0, 0	2, 2, 2	3, 4, 4	2, 2, 3	3, 3, 2





How we can work together



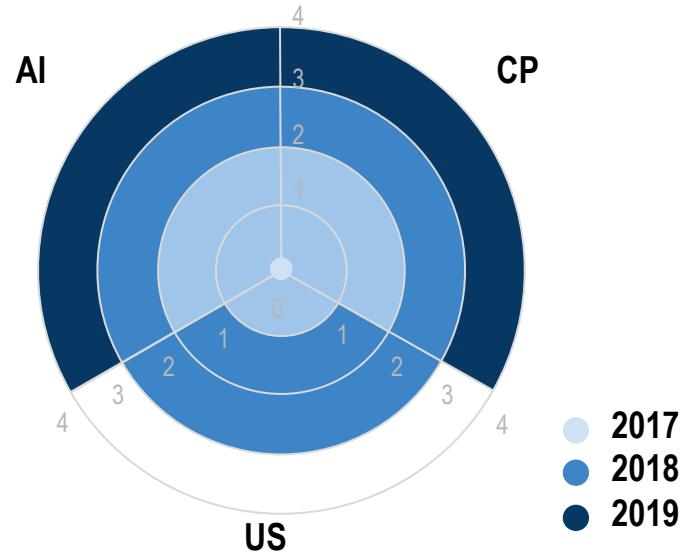


How we can work together

Certificate



Competency History



- 2017
- 2018
- 2019



Key Takeaways

- Curriculum
- Measurement
- Student Engagement

“Let's talk! ”

Yang Cheng Shanshan Jin

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