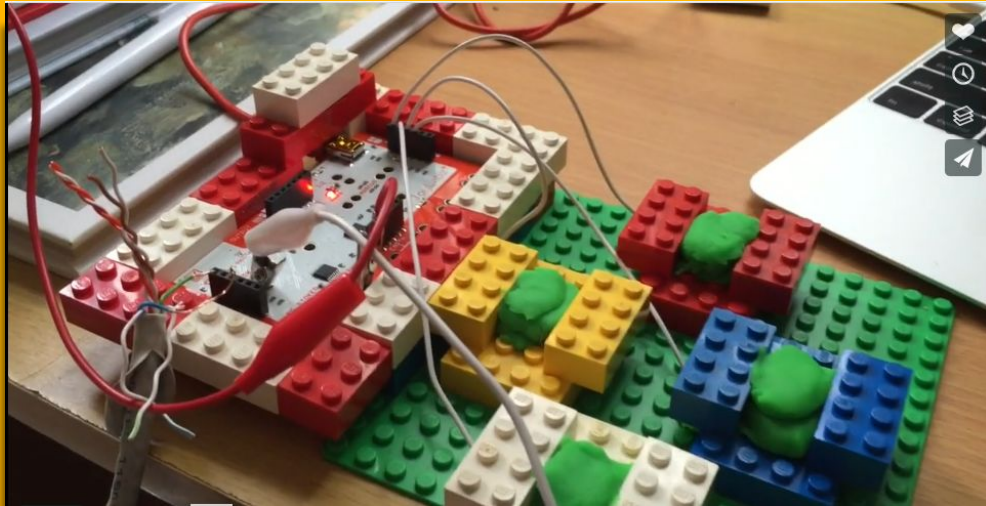# Retooling a makerspace for blended learning

Philip J. Standlee
**スタンドリー　フィリップ**

standlee-p@kanda.
kuis.ac.jp

Which skills do you want for your students? 👦👧👽

- ❖ Develop "I can do it" attitude
- ❖ Engage in the world and help create it
- ❖ Be willing to take risks and learn from failure
- ❖ Learn persistence and grit
- ❖ Be resourceful
- ❖ Share their knowledge and support
- ❖ Empathize & Equity [2, 3, 6, 5]

- ❖ Build technical skills related to STEAM
- ❖ Understand 21st century skills and tools [6]
- ❖ Learn scientific and design processes [1, 2, 5]
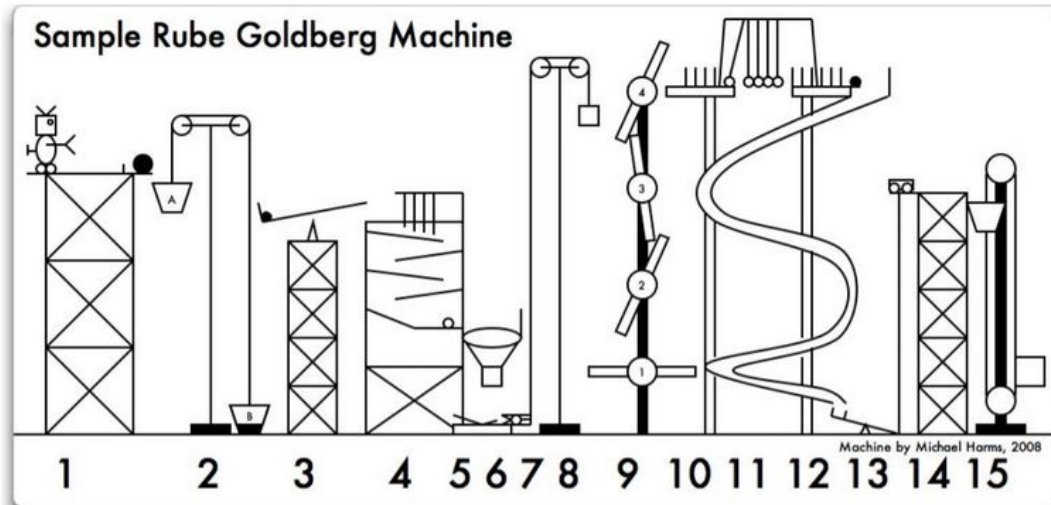- ❖ Develop the language so they can do these activities

The Flipped Challenge
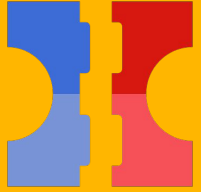
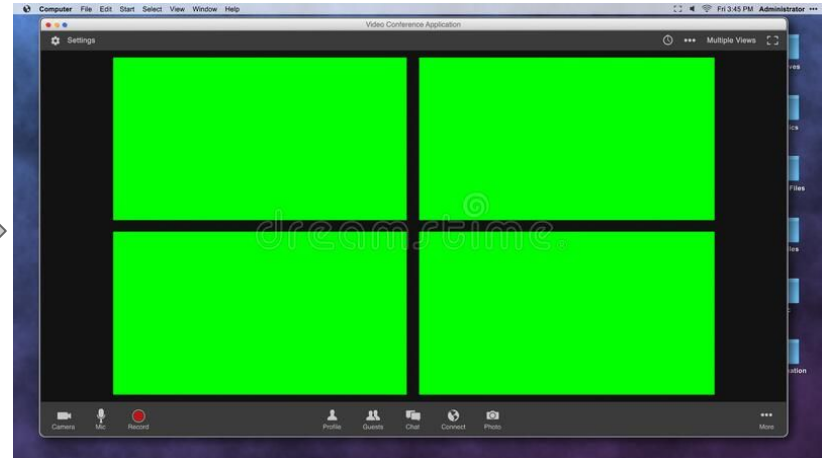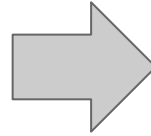# Lesson Design Challenge

Build a lesson(s) where students must make a Rube Goldberg Machine in small groups....

Sample Rube Goldberg Machine

Machine by Michael Harms, 2008

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

...but it must be done online!

What to think about

What materials, will students need?
Materials
Directions

What language tasks will students need?
Vocabulary
Language resources
Online tools

How will you foster collaboration and engagement?
Warm-up activities
Collaborating Tools
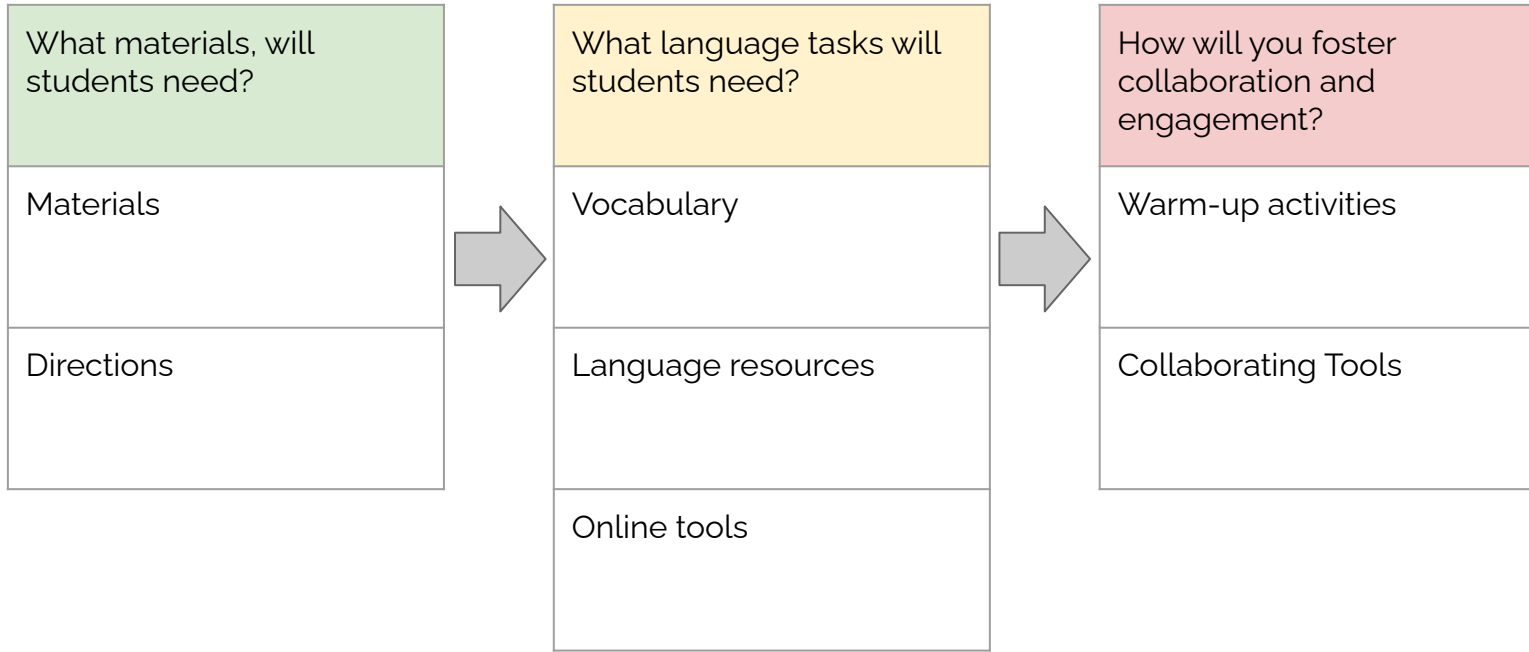
Planning for Interaction

Sync formats

Async formats

🙂 **Microbit coding**

YouTube

Zoom

Quizlet

Padlet

Google Jamboard

Tinkercad (drafting tool) 🙂

Google Documents

Line

Scratch (coding) 🙂

Google Classroom (LMS)

Group Work

Individual Work

🙂 **Makerspace focused**

Example R.G. Goldberg Machine

Maker Challenge

	Content	Speaking & Listening	Reading	Writing	Engagement
Project/Task					
End Product					

For more on sync vs async blended learning please visit "curatorofcurisity.com" (3)

What is Maker Education?

Setting the terms

Maker - "A maker is *not* a special title…[it] is someone -- anyone -- who makes things. By understanding maker in this way, the maker community can be viewed as being inclusive, embracing, and welcoming to all those who make."

Making - "…is about the active role construction plays in learning. The maker has a product in mind when working with tools and materials.

Makerspaces - "…are physical spaces containing a variety of tools and materials for the creation and sharing of hands-on projects."

(2, 5)

(Martinez & Stager, 2019)
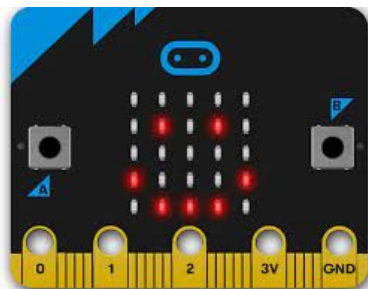
https://bit.ly/3He28hw

https://bit.ly/39Fs33j

High tech tools

Microcontrollers

Microbit

3D Printers

Laser Cutters

Low Tech Materials

- ❖ Scissors
- ❖ Paper
- ❖ Glue of all kinds
- ❖ LEDs
- ❖ Batteries
- ❖ Wire
- ❖ Conductive Tape
- ❖ Electrical Tape
- ❖ Conductive Thread
- ❖ Cutting boards
- ❖ String

Blended Learning

Blended learning is an approach to online and face-to-face learning that focuses on community building, students social and emotional needs, and communication.

For example: building student and teacher relationships, creating rituals and routines, and thinking about instructional design for equity.

https://sites.google.com/view/curatorofcreativity/blended-learning

(3)

Blended learning guidelines

Community Building

- ❖ First 2 weeks community building
- ❖ Build student and teacher relationships
- ❖ Create rituals and routines
- ❖ Adapt and use warm-ups, get to know you, and team building activities.

Communication

- ❖ Establish LMS and consistent lessons and activities
- ❖ Use multi-modes of communication: written and oral directions, videos
- ❖ Consistent due dates, longer working time, more feedback (less assignments)

(3)

Activities: Light it Up

Opening - LED Puzzle

Demo - Microbit

Take it further - Microbit Coding Challenge

Showcase - Project with Directions

Introduce the idea and model it to the students. Let students work together to complete a more context task.

Activities: Light it Up

Opening - LED Puzzle	Vocabulary Games Dual Entry Journal
Demo - Microbit	Order text activity & Model Directions
Take it further - Microbit Coding Challenge	Jigsaw Reading & Share
Showcase - Project with Directions	Multiple Modals: written or video was ok.

Focus on the point of the project. Deeper learning of the language and content.

Activities: Light it Up

Opening - LED Puzzle	Vo... Du...	Tour around our building/home
Demo - Paper Circuit	Or... M...	Brainstorm in our Journals
Take it further - Parallel Circuit with switch	Jigsaw Reading & Share	Looked at online and student examples
Showcase - Project with Directions	Multiple Modals: written or video was ok.	Jigsaws & small groups

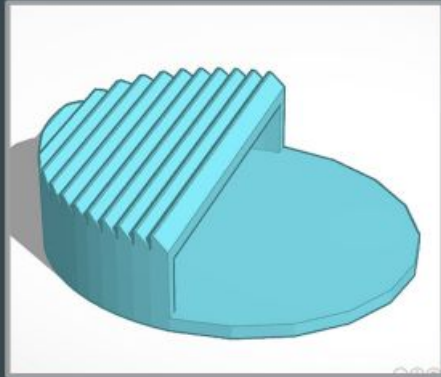Focus on the students and get out of the way.

Language Learning?

❖ Sharing ideas
❖ Negotiating ideas
❖ Reading texts
❖ Discussing meaning of texts
❖ Textual and grammar features
❖ Reflections
❖ Lexical uptake

Microbit Example Projects

Microbit Example Projects

5W1H)
What: the WATCH to help your rest
Who: workers and students who watch the
      screen for a long time
Why:
①function →want them to take a better rest with caring about the time without the internet
②design→everyone has the different favorite colors and styles so they can make the original one
When: when they take a rest
Where: wherever
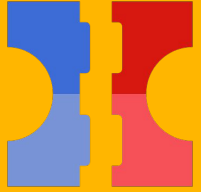How: confirm the time

4) Complete

Past Student Projects

- ❖ A copper flower with LED
- ❖ A Microbit fitbit watch
- ❖ A Microbit theremin
- ❖ A Captain America silhouette for our movie section
- ❖ A cup of noodles stopper
- ❖ A gender neutral bathroom sign

23

A pilot study

Pilot Study: Fall 2020 Students

Fall 2020

5 Students

4 female / 1 male

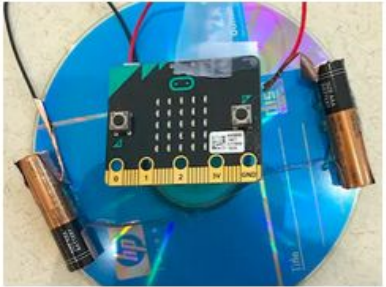Multilingual double majors

TOEIC Range: 470-725 (guessing)

Some making experience

Creative Group

Reflection Journals

Journal #3 Prompts	Microbit Design Challenge		
In this journal, you will write a plan on how you will design your Microbit project. Then read one another classmate's journal and respond to them. You	**Choice 1** Describe how you brainstormed or came up with ideas on how to use your microbit. What activities, discussions, or lesson helped you the most when thinking about your project? What strategies did you use	**Choice 2** Describe how you made your prototype project using your microbit. What materials did you decide to use? Where did you find them? What online resources helped you make your prototype? What did you	**Choice 3** Evaluate your microbit challenge from the eyes of a younger student. How would you teach this project to them so they could learn about electricity, coding, the microprocessor, and how it works
may need to get their email address so you can share your journals.	to think about empathize or ideate phases of your project? What was the most challenging part? 	notice when making it? How could you improve your prototype in the future? 	with different materials. What would they need to know how to do? What activities could you make to help them?

Student Reflections and Language Resources

"Finally, I believe I can be improve my presentation skills. Especially in this case, I made the code that include lots of blocks so it wasn't enough to explain my code and I guess my classmates couldn't understand my code. I would like them to make to understand clearly more. Anyway, I did good works as a whole more than I could imagine."

Self-Efficacy: In the journals, some students speak about "break through" moments where they realize they "can do it." Usually, it comes after a long process of trial and error.

Workshop Feedback

Thanks!

Any questions?

You can find me email me at
standlee-p@kanda.kuis.ac.jp

References

[1]Alley, W. (2018). Making English Speakers: Makerspaces as constructivist learning environments. MEXTESOL Journal, *42*(4). Retrieved from: https://scripta.up.edu.mx/bitstream/handle/20.500.12552/4904/Making%20English%20Speakers.pdf?sequence=1

[2]Clapp, E. P., Ross, J., Ryan, J. O., & Tishman, S. (2016). Maker-centered learning: Empowering young people to shape their worlds. John Wiley & Sons.

[3]Kitchen, M. (2021). *Blended and remote learning*. Creative Curiosity. https://sites.google.com/view/curatorofcreativity/blended-learning

[4]Martin, D., Panjwani, A., & Rusk, N. (2016). *Start Making!: A Guide to Engaging Young People in Maker Activities*. Maker Media, Inc.

[5]Martinez, S. L., & Stager, G. (2019). *Invent to learn: Making, Tinkering, and Engineering in the Classroom* (2nd ed.). Torrance, Canada: Constructing Modern Knowledge.

[6]Partnership for 21st Century Skills. (2009). Assessment: A 21st century skills implementation guide. Retrieved from: http://www.p21.org/index.php?option=com_content&task=view&id=504&Itemid=185#maps

References

[7]Van Lier, L., & Walqui, A. (2012, January). How teachers and educators can most usefully and deliberately consider language. In *Understanding Language Conference, Stanford, CA*.

[8] Van Lier, L., & Walqui, A. (2012). Language and the common core state standards. Understanding Language: Commissioned Papers on Language and Literacy Issues in the Common Core State Standards and Next Generation Science Standards.
https://ell.stanford.edu/sites/default/files/pdf/academic-papers/04-Van%20Lier%20Walqui%20Language%20and%20CCSS%20FINAL.pdf