



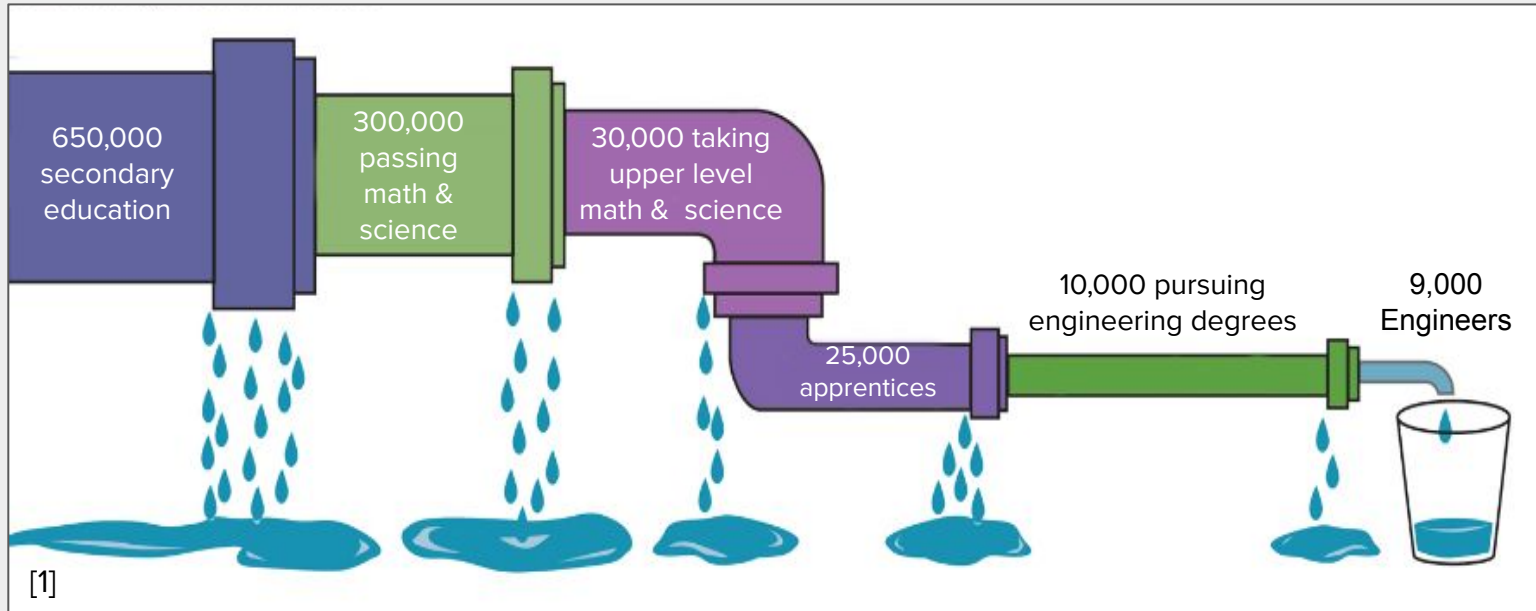
WPI

the
DESIGN
MUSEUM

STEAM Workshop Development

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The Leaking STEAM Pipeline



STEAM Education

The Arts

Improve student

- ❖ Inquiry and Design
- ❖ Collaboration
- ❖ Creative thinking



STEM

VS.

STEAM

[2]

DOES THE "A" Matter?

The Design Museum

Serves 60,000 learners per year

- ❖ Digital Design Workshops
 - Graphic Design
 - App Design
 - 3D Printing



[3]

Our Goal



To aid the Design Museum in its efforts to motivate student engagement in STEAM fields by updating current digital design workshops and developing a lesson plan for a new coding workshop.



Objectives

1. **Develop an evaluation framework** for workshop effectiveness according to stakeholder views.
2. **Assess the effectiveness** of the Design Museum's current workshops.
3. **Recommend changes** to lesson plans and create **pre- and post-visit** modules for the Design Museum's current workshops.
4. **Create a proposal for a new workshop** according to the evaluation framework.
5. **Pilot and assess** our new workshop based on the evaluation framework.

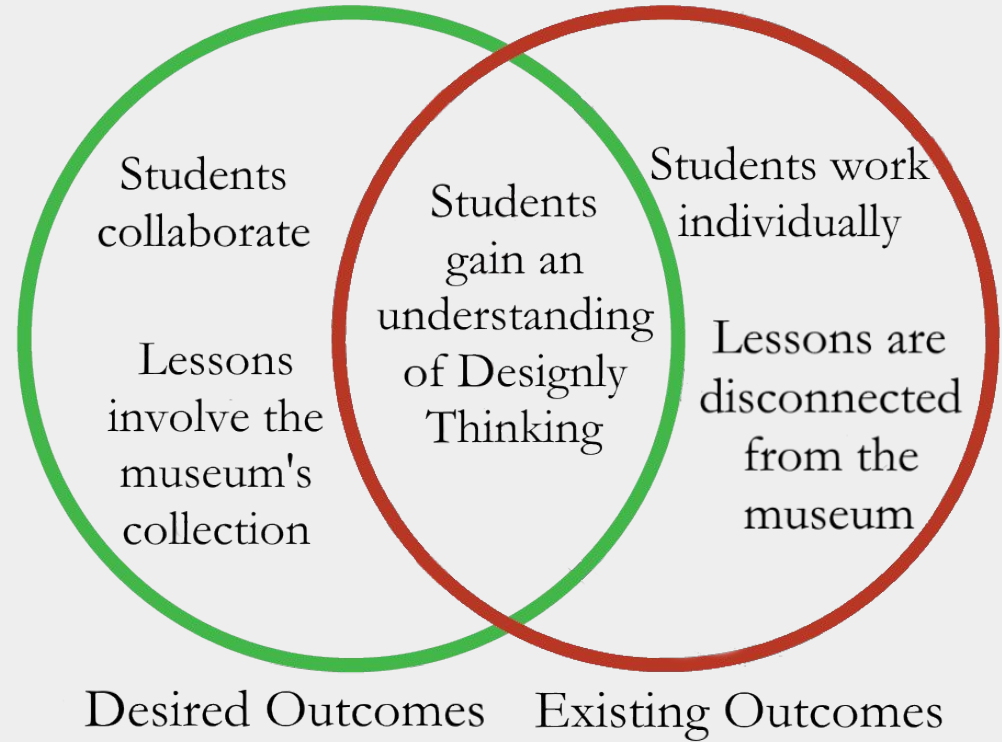
Evaluation of Effective Lessons

Expero Framework:

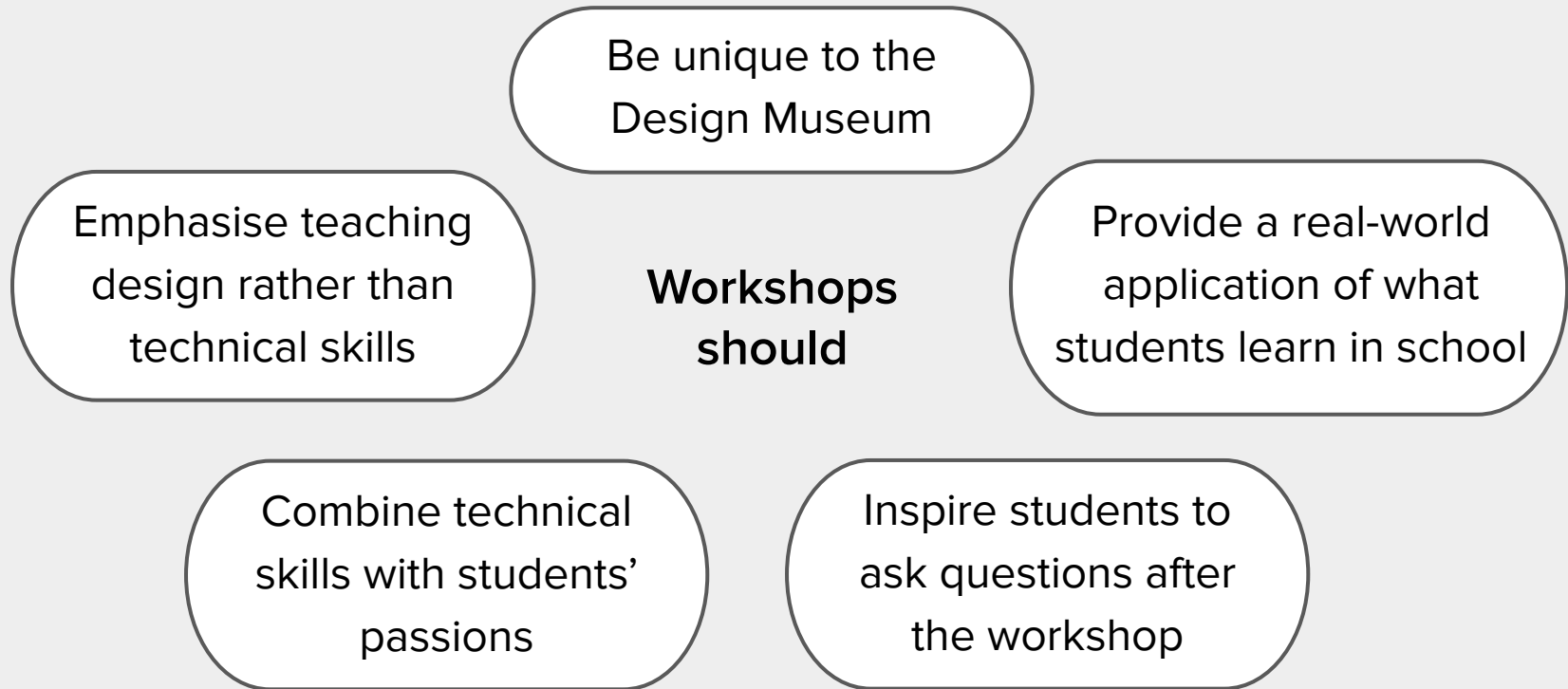
Desired Outcomes

vs.

Existing Outcomes



Findings - Desired Outcomes





Graphic Design Workshop

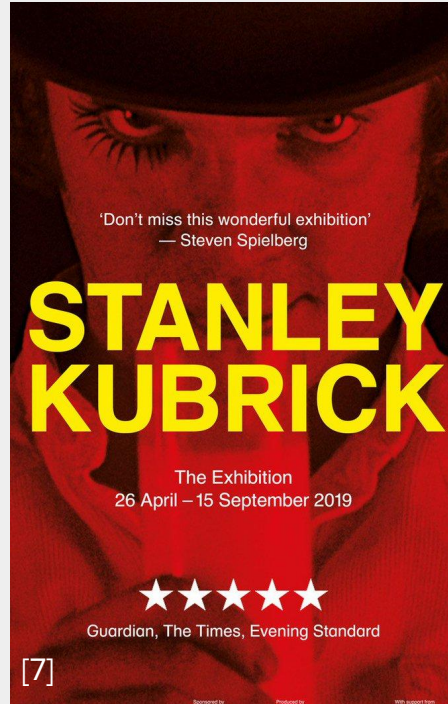
- ❖ Students examine different examples of graphic design
- ❖ Students consider a widespread issue they are passionate about
- ❖ Students design a poster that expresses their views

Findings - Graphic Design Workshop

- ❖ Workshop is not unique to the Design Museum
- ❖ Workshop does not inspire students to ask questions about design



Recommendations - Graphic Design Workshop



1. Include additional posters from the Design Museum's collection
2. Provide students with questions prompting them to consider the design process

App Design Workshop

- ❖ Students examine different apps and UI elements
- ❖ Students create an app that responds to a user



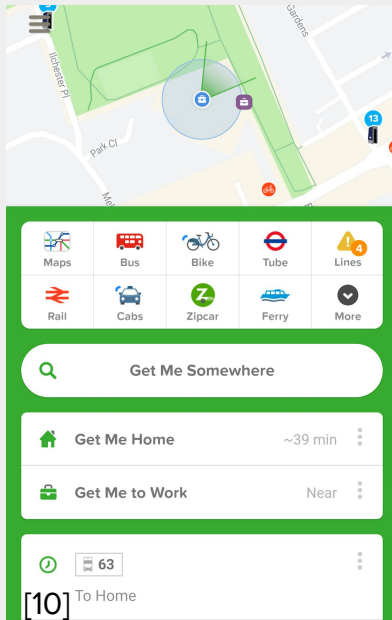
[8]

Findings - App Design Workshop

- ❖ Workshop is not unique to the Design Museum
 - Does not involve the museum's collection
 - Just as effective if taught elsewhere



Recommendations - App Design Workshop



- ❖ Provide students with an example of a user interface related to the museum
 - Website
 - City mapper (app displayed in DMU)

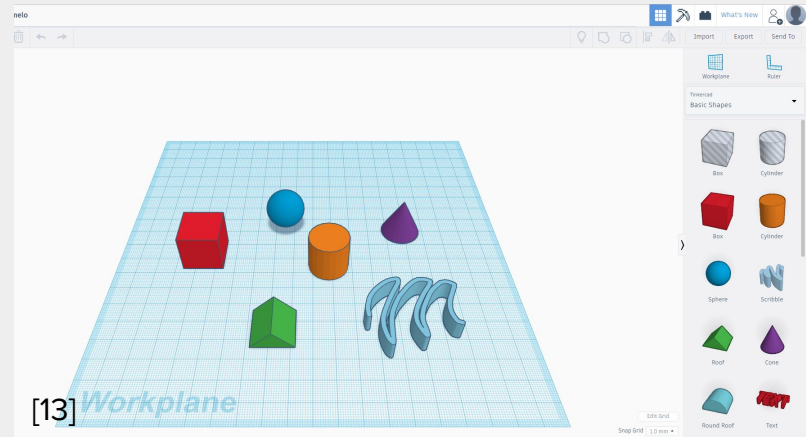


3D Printing Workshop

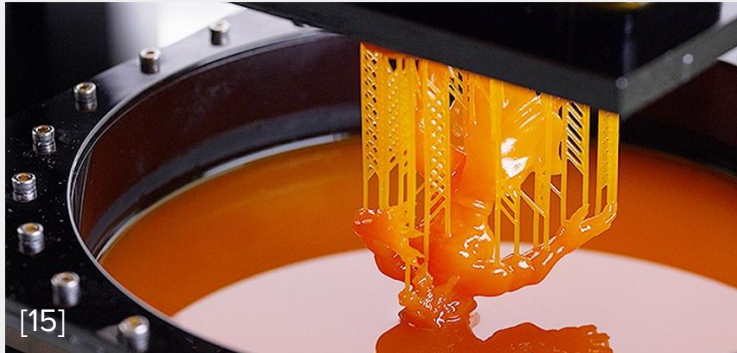
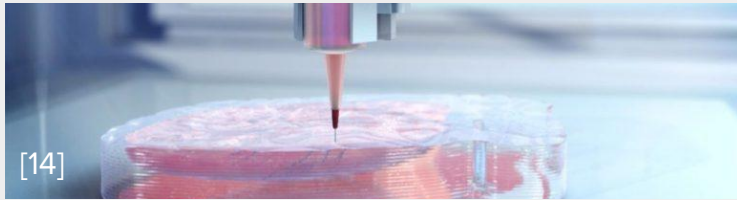
- ❖ Students examine objects in the museum's collection
- ❖ Students consider problems based on potential users
- ❖ Students improve the design of an existing product

Findings - 3D Printing Workshop

- ❖ Workshop fails to combine technical skills with students' passions
 - Lecture is very technical
 - Prompt for hands-on learning is restrictive



Recommendations - 3D Printing Workshop



1. Revise the lecture section
2. Prompt students to think about which material would be best to use for their product
3. Incorporate additional handling objects from DMU exhibit
4. Additional prompt for more advanced students

Deliverable - Coding Workshop

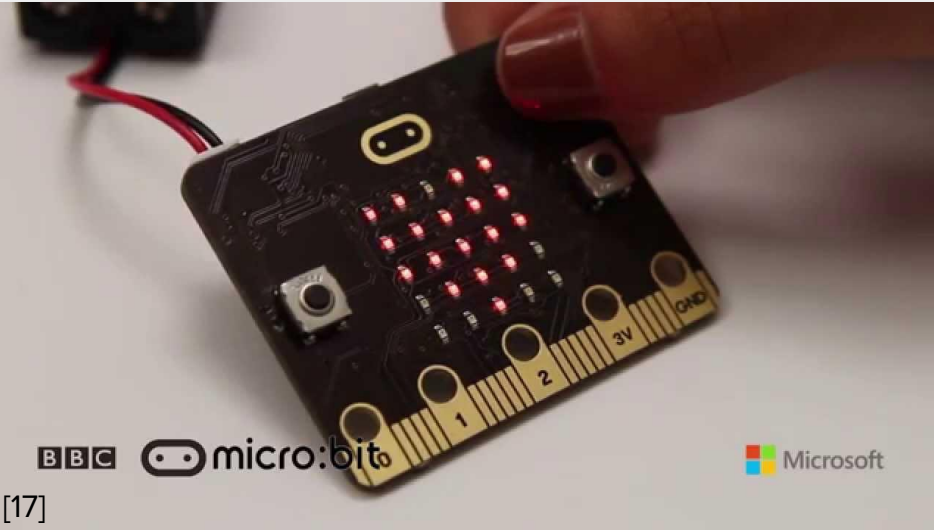
- ❖ Teaches how designers create user interactions within the digital world through coding
- ❖ Students utilise sensors on a Micro:bit to create an Internet of Things device



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Deliverable - Coding Workshop

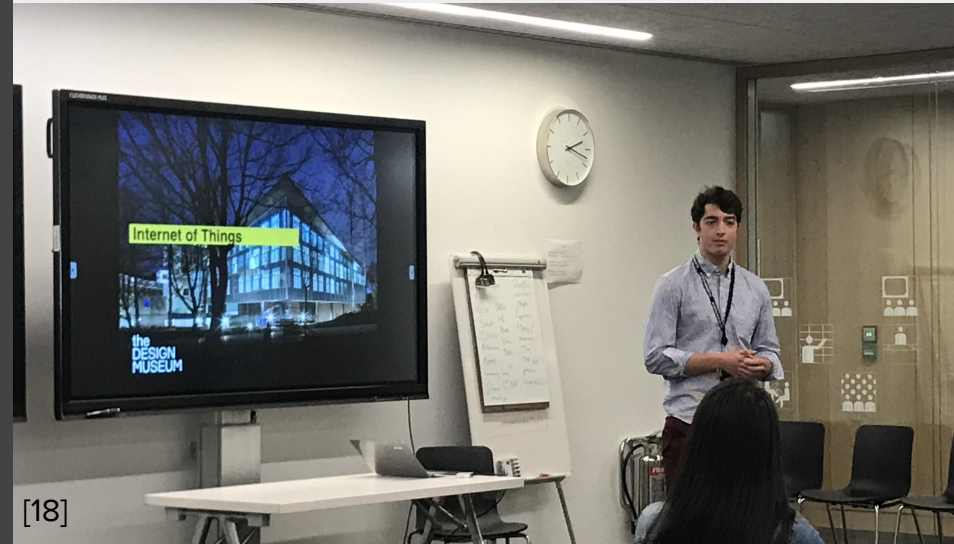
- ❖ **Micro:bit**
 - Microcontroller with sensors
- ❖ **MakeCode**
 - Block coding environment

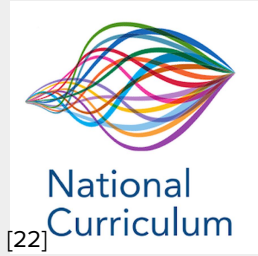


[17]

Deliverable - Coding Workshop

- ❖ Piloted hands on portion
 - Advanced students
 - Beginner students





Deliverable - Modules

Pre-Visit Modules

- ❖ Review knowledge
- ❖ Introduce workshop

Post-Visit Modules

- ❖ Refresh knowledge
- ❖ Enhance skills learned

Social Outcomes

Individual Effects

- ❖ Interesting and engaging workshops
- ❖ Unique approach to STEAM education
- ❖ Motivate engagement in STEAM fields

Local Effects

- ❖ Increase in museum and workshop interest

Global Effects

- ❖ Increase in qualified STEAM workforce

Acknowledgements

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