Assessing projects in Physical Computing

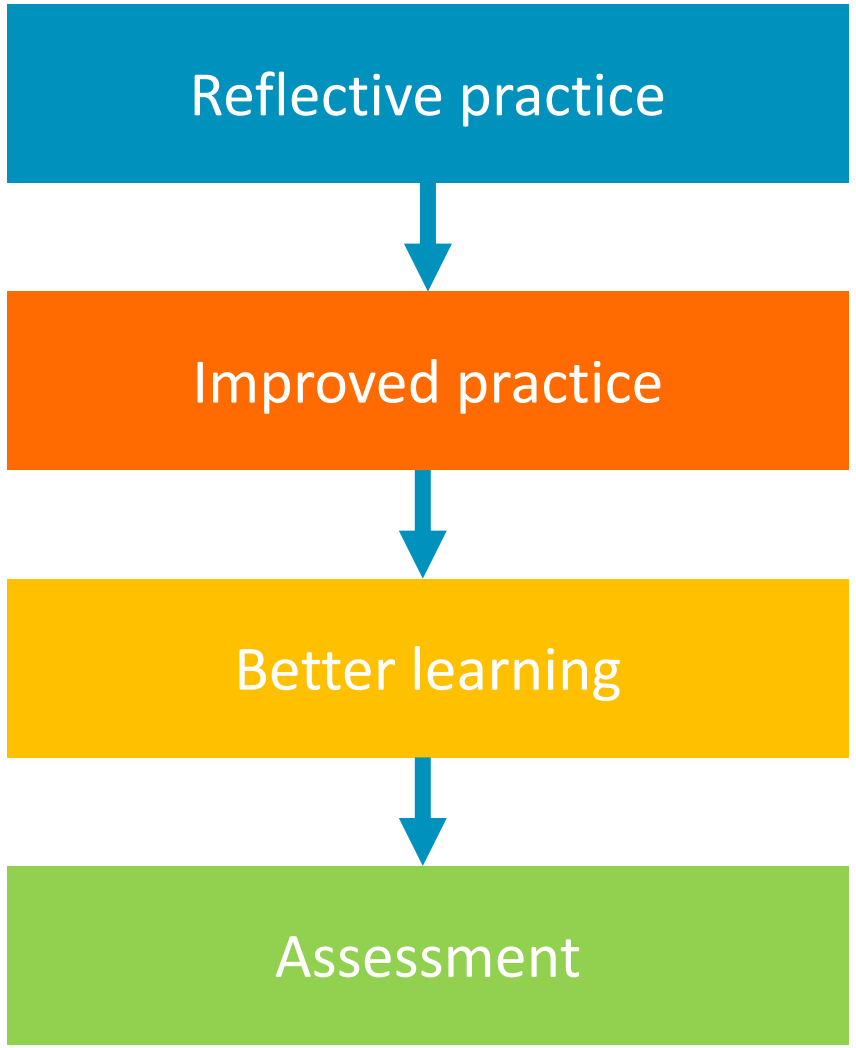
Arm School Program with support from CBSE

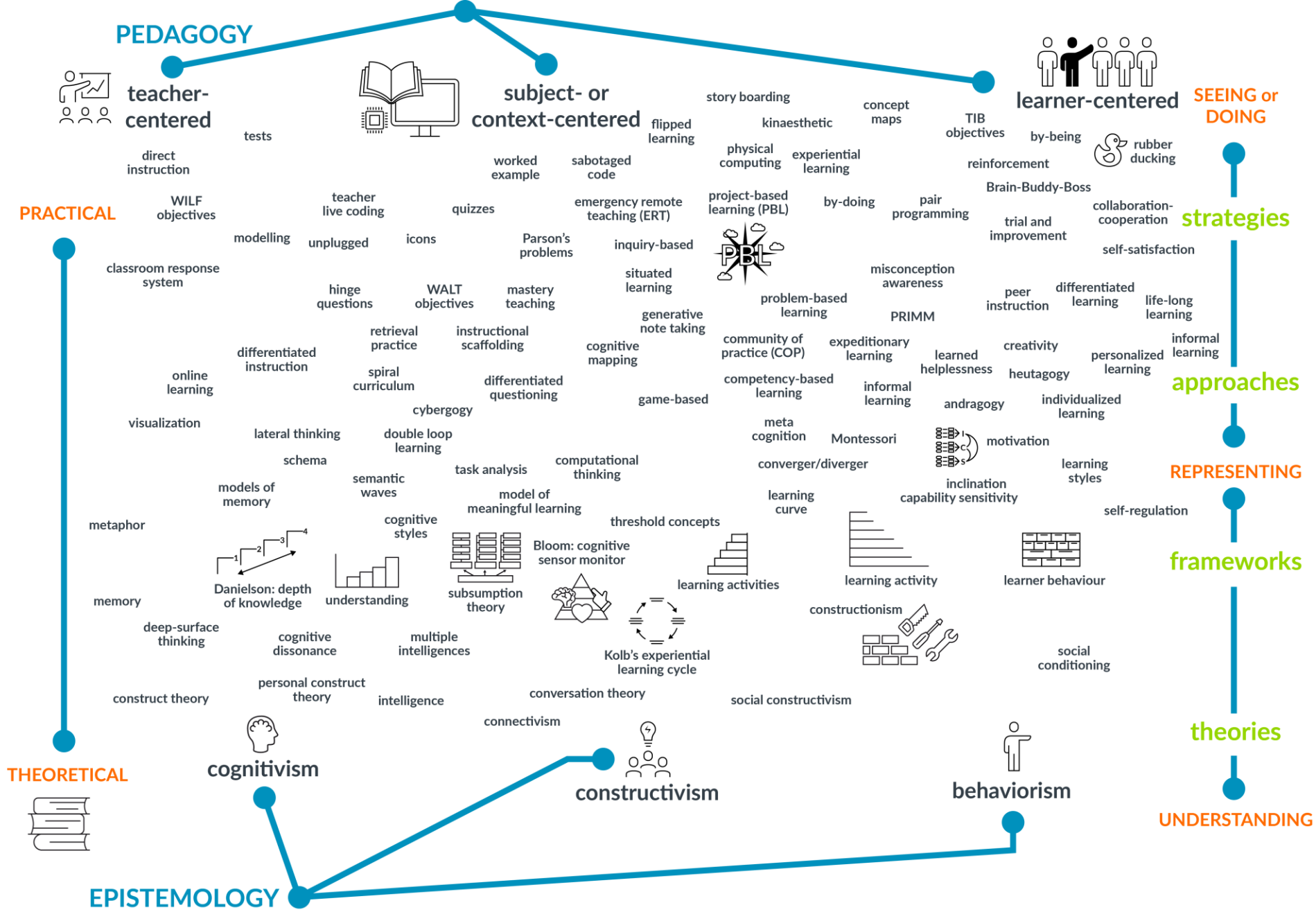
22nd February, 2023

Why do we assess?

Why do we assess?

- Are our learners learning?
- Are they progressing?
- What impact are we having?
- Is our practice effective?
- What can we improve?
- How can we measure success?





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Assessment in PBL is a two-way dialogue, with the teacher observing and listening.

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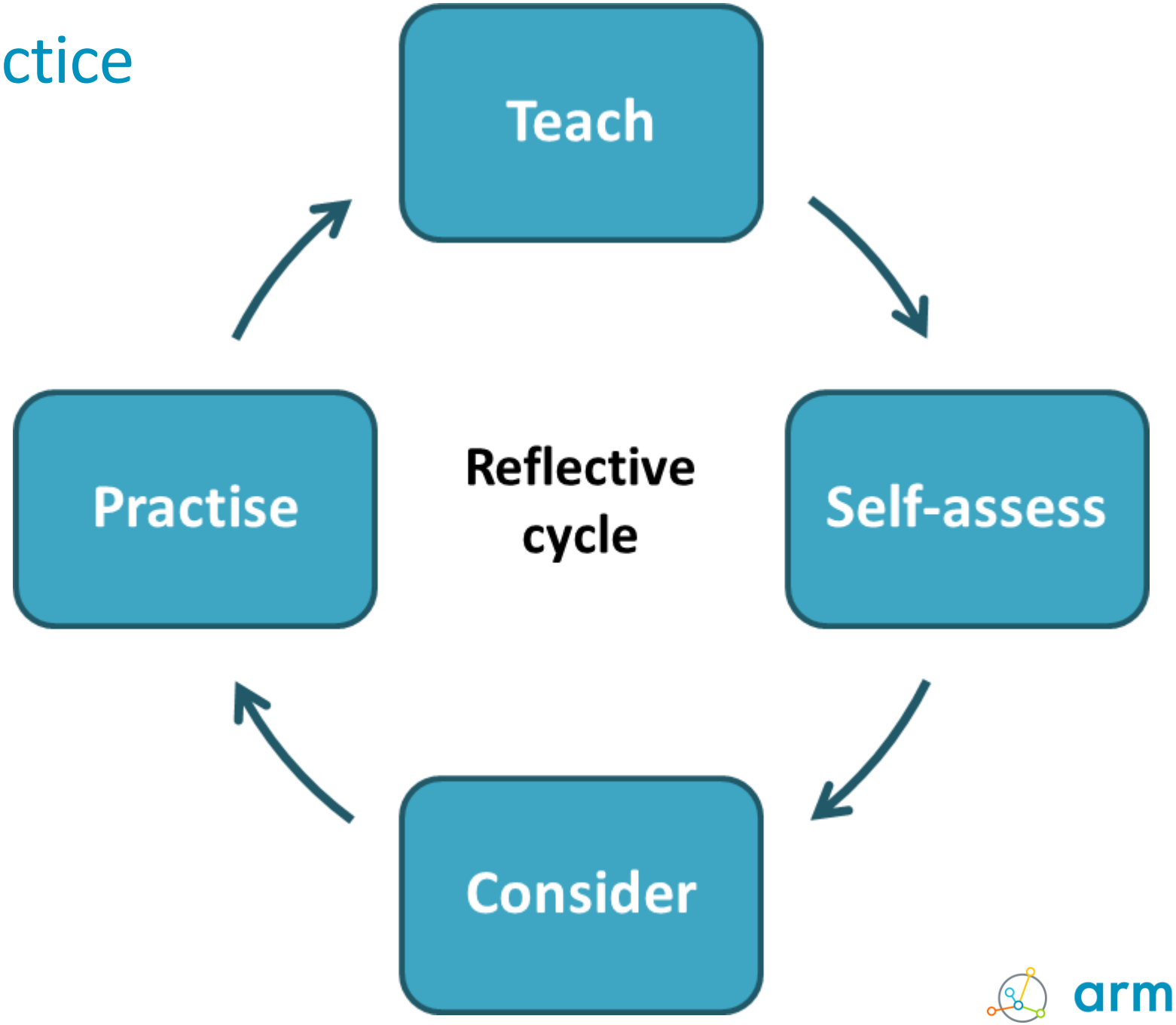
The big picture of assessment

- assessment **for** learning – informs the learner about their own learning
- assessment **of** learning – a judgement of what has been learnt
- assessment **for** teaching – informs the teacher of the impact of teaching
- assessment **of** teaching – a judgement of the teachers teaching

Summative assessment

Formative assessment

Reflective practice



Summative assessment

- ***Mark***—a numeric value given to a question.
- ***Score***—often a numeric value calculated by summation of marks and adjusted by weighting across papers or other assessments.
- ***Grade***—a qualitative statement reflecting the outcome of an assessment which can be a word, letter, or number, for example, distinction/merit/pass/fail A*/A/B/C… 9/8/7/6… very good/good/satisfactory/poor

- **Assessment of learning**

Formative assessment

Peer assessment

- It is usually guided by criteria or heuristics also called rubrics (Cornel University, 2021).
- Criteria relate to the specific requirements of a task (specifications).
- Heuristics relate to the general rules about structure and presentation.
- Feedback might be guided by rules of conduct—perhaps two stars and a wish.
- The process improves learners' understanding of subject content and raises levels of engagement.

Self assessment

- Self-assessment is a process where a learner is given time and a requirement to assess their work.
- It is usually guided by criteria or heuristics also called rubrics (Cornel University, 2021).
- Criteria relate to the specific requirements of a task (specifications).
- There must be some form of teacher intervention otherwise misconceptions can be compounded.
- The process improves learners' understanding of subject content and raises levels of engagement

Assessments in PBL

Formative

- Iterative assessment points
- Success criteria checks by teacher
- Code interrogations
- Open questions
- Project manager role in group

Summative

- MCQ quiz
- Long answer question on the extent to which the artefact met the success criteria
- Assessment/review of artefact against success criteria
- Assessment of elevator pitch
- Plan against artefact assessment
- Code review

Learning outcomes (success criteria)

- Sets expectations
- Provides a transparent framework for assessment
- Measurable
- Consistent
- Self assessment is baked into the learning journey
- Reflection on the learning is a key part of the learning
- Stretch tasks

Setting the context and problem set

Setting the scene

Loneliness and isolation are a real problem for children and the elderly staying in hospitals for long periods of time, especially in rural areas.

You have been tasked with creating a digital pet that can be played with and that can keep people company whilst they stay in hospital.

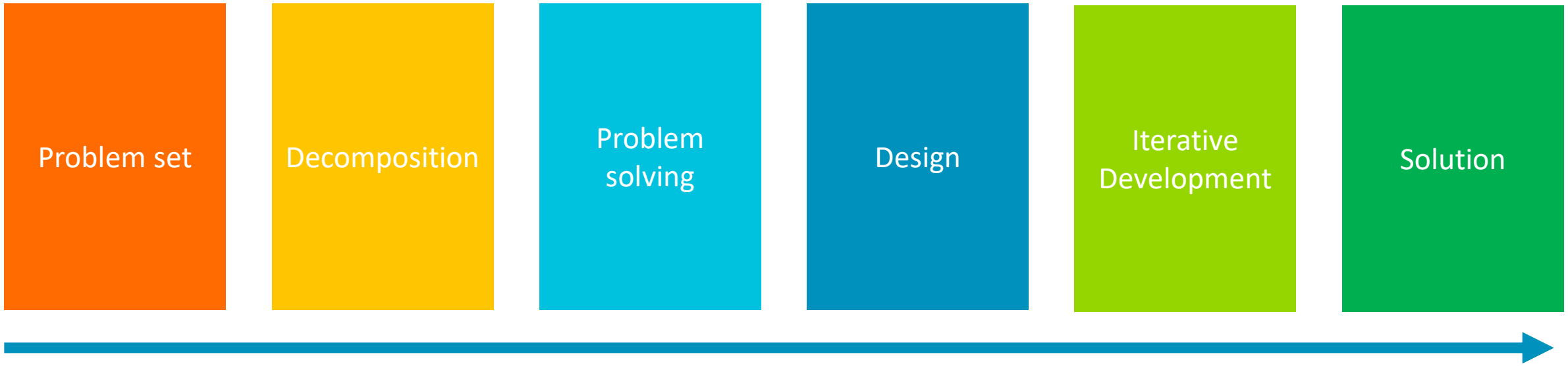
The pet must be interactive.

Success criteria

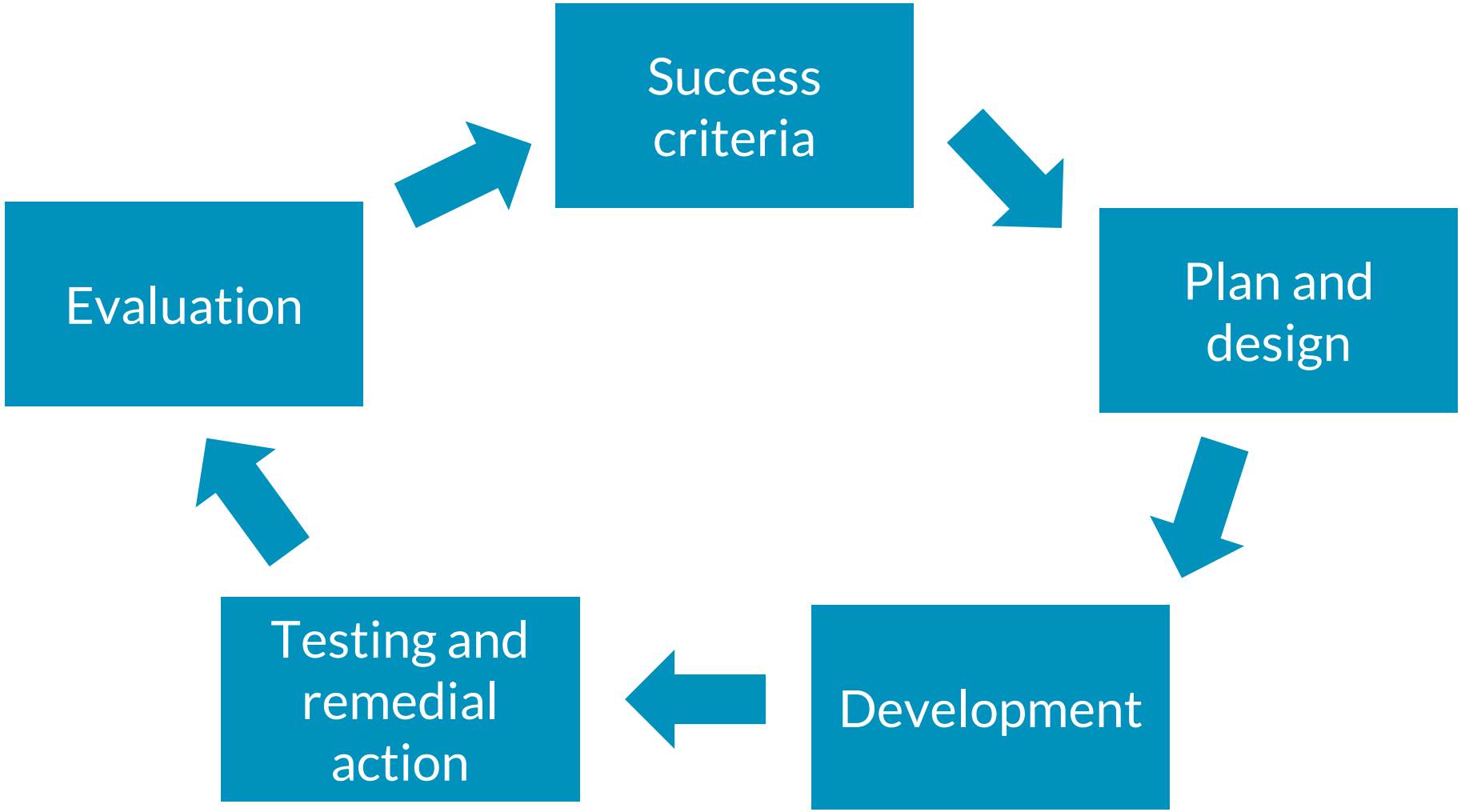
- The product must be suitable for one of the users listed below and the pet must:
- Look like a friendly pet (be creative)
- Be robust enough to be played with
- Contain a micro:bit that users can interact with
- Have a face to express emotions when interacted with
- Have one or more interactions programmed so it behaves like a pet to keep the user company

Decomposition

- Decomposition involves breaking down the overall task into a series of smaller problems



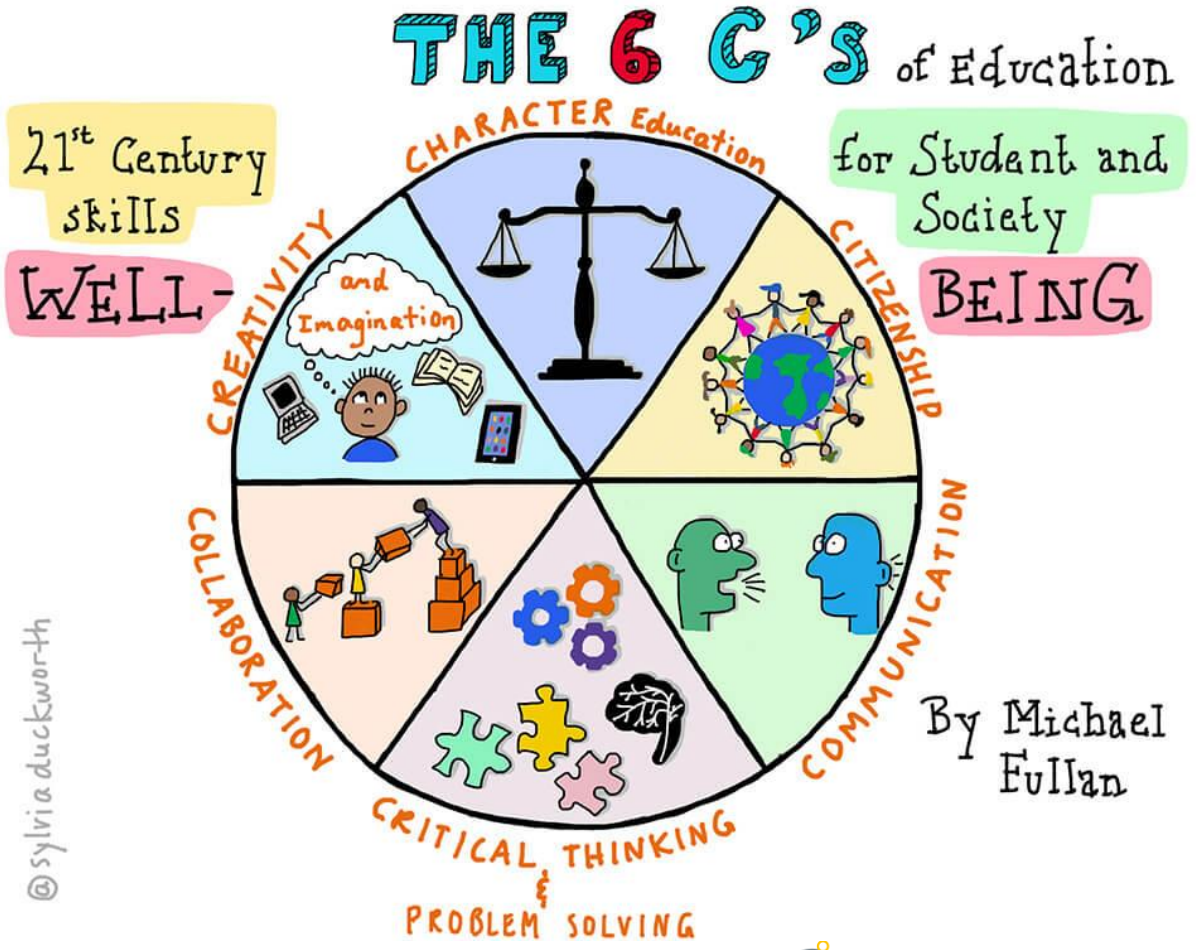
Iterative development cycle



Assessing soft skills

Soft skills (6Cs)

- Teamwork
- Collaboration
- Creative ideation
- Applied Computational thinking
- Communication
- Planning
- Iterative development
- Problem solving



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Open questioning

- Questions that can’t be answered with a ‘yes’ or ‘no’
- Great for informal formative assessment
- Can be used to determine reasoning and application of design thinking

Issues when assessing group work

- ‘driver’ students carrying the group
- Some learners disengaging
- Some learners only working on one specific area
- Summative assessment difficult to make valid
- Formative assessment much better suited
- Assessment by outcome can lose the learning journeys impact
- Some learners are poor at self reflection

MCQs

What does IDE stand for? ← Stem

a) Independent Design Exercise ← Distractor

b) Integrated Development Environment ← Answer

c) Instrumental Digital Element ← Distractor

Issues with MCQs

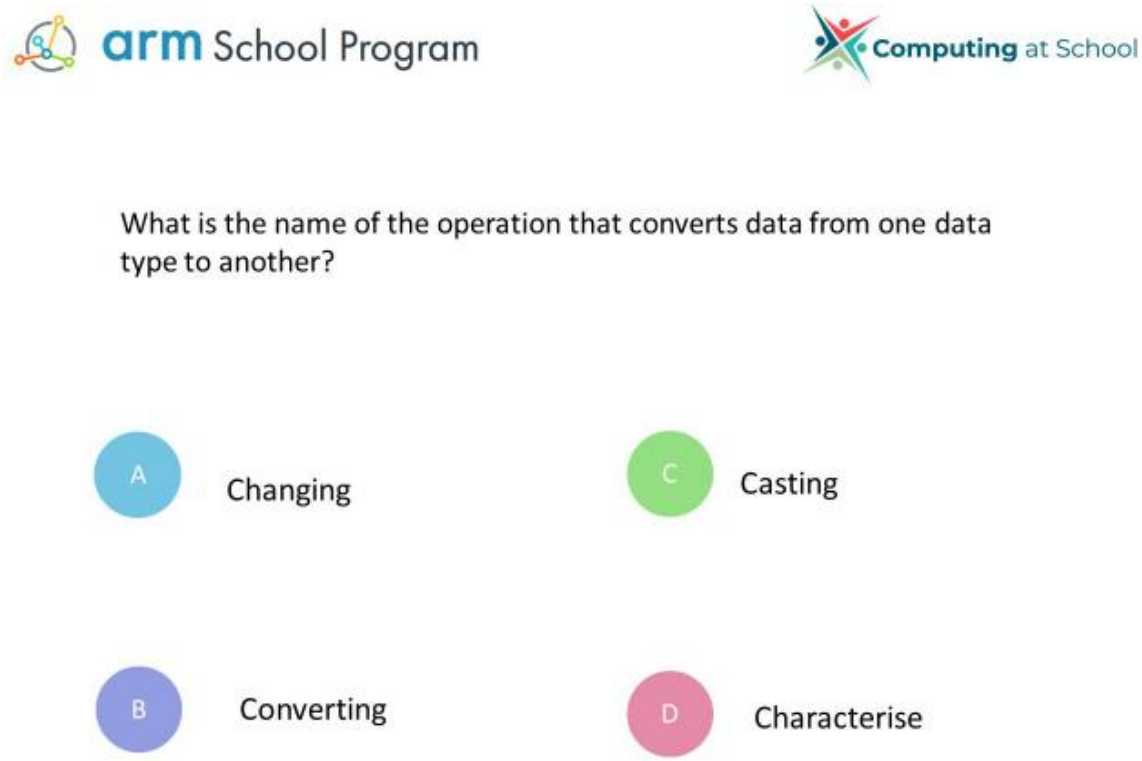
- Distractors are hard to write, can give the answer away

How to write better MCQs:

- Ensure all answers are similar length and are formatted the same
- No obviously wrong answers
- Ensure all distractors are reasonably believable
- Don’t use negative stems ‘Which is not correct’
- Ensure the stem is concise and makes sense, simpler the better

Diagnostic assessment

- https://diagnosticquestions.com/
- Assess misconceptions
- The results
  are **consistent** and **comparable** between learners and can also be used to assess learner progress over time.



Authentication

- Does it match the learner's usual performance?
- Is it within the learner's general performance?
- Is the style similar to the learner's usual style?
- Is the submission within the expected time scale?

- A different topic might reflect a specific talent or aptitude of a learner and so be above the general performance of the learner.
- Style can improve; a learner's work might be much better than expected.
- Style can change if the learner has a particular motivation for the topic.

- Newton, P. & Shaw, S. (2014) *Validity in Educational and Psychological Assessment* (1st ed.). SAGE Publications Ltd.

Monitoring progression over time

- Use a consistent rubric for observational assessment
- Assess the same things over time
- Record assessment data in a consistent and comparable format
- Align assessment to internal or formal structures if necessary

Providing feedback

- Feedback is essential in learners reflecting on their progress and improving over time
- Feedback should be categorised into what you are assessing for
- Use of ‘comment banks’ should be avoided
- Feedback should answer:
  - What can the student do?
  - What can’t the student do?
  - How does the student’s work compare with that of others?
  - How can the student do better?
- Feedback should be:
  - Educative in nature
  - Given in a timely manner
  - Sensitive to the individuals needs

Q & A

Nick Sample, Senior Manager, Arm School Program

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Thank You
Danke
Gracias
Grazie
谢谢
ありがとう
Asante
Merci
감사합니다
धन्यवाद
Kiitos
شكرًا
ধন্যবাদ
תודה