FOSTERING CREATIVITY THROUGH DESIGN AND TECHNOLOGY EDUCATION

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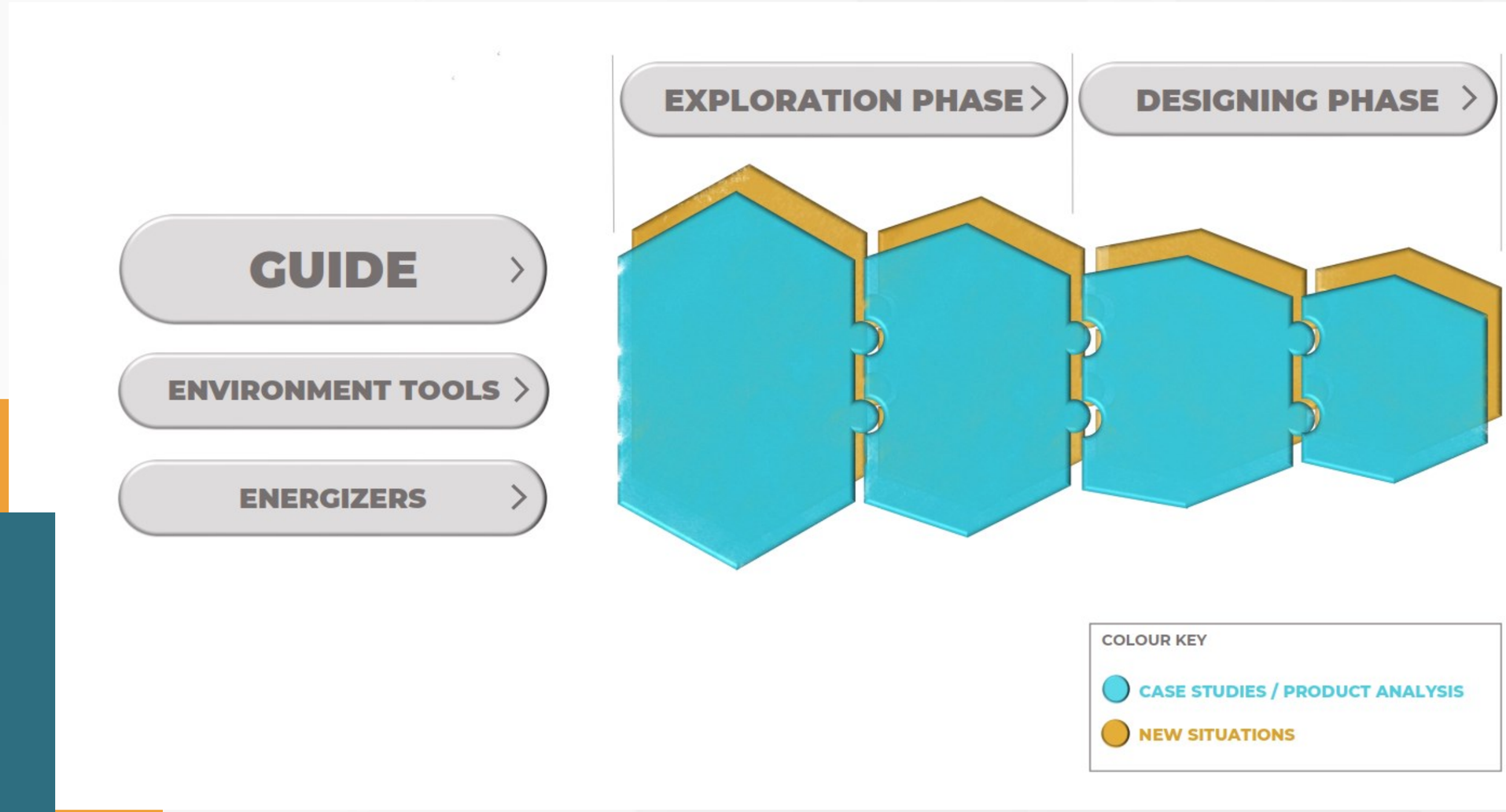
Fostering Creativity Through Design and Technology Education



Creativity?

Diverse Experiences of Design and Technology Education for a Contemporary and Pluralist Society

Contemporary Societies

Change

MOSTLY DRIVEN BY TECHNOLOGICAL ADVANCEMENTS

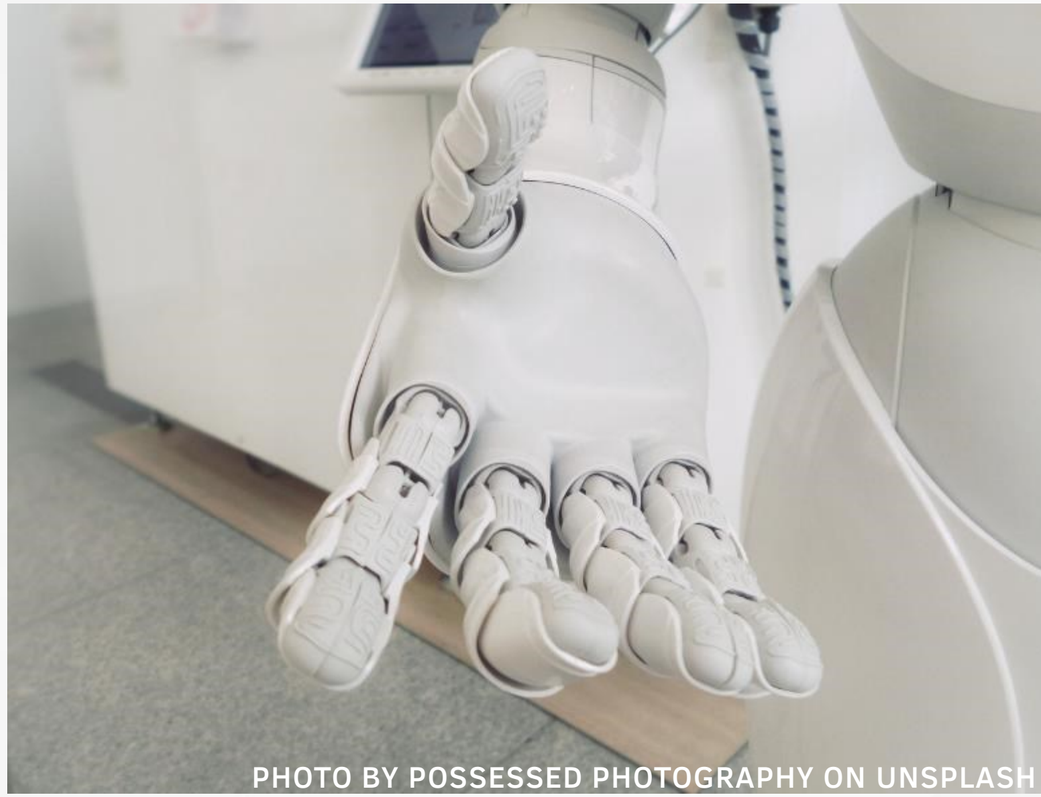


PHOTO BY POSSESSED PHOTOGRAPHY ON UNSPLASH

Contemporary Societies

PHOTO BY KELLY SIKKEMA ON UNSPLASH

Challenges

RECURRING FROM THE PAST

Creativity

Active citizens who understand that diversity of ideas is not a threat but an opportunity

Pro-actively manage and direct change to address the challenges

Toolkit?

Toolkit?

TRADITIONAL SCHOOLING

“Problem-posing education bases itself on creativity and stimulates true reflaction and action upon reality” (Friere,1993)

“I believe this passionately, that we don't grow into creativity, we grow out of it. Or rather, we get educated out of it.” (Robinson, 2006)

Toolkit?

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TEACHERS’ DILEMMA

“With the current emphasis on accountability, educators simply do not have the time to invest in curriculum that may not pay off.” (Runco, 2014)

Objectives

01 Define the Scope that Can and Should be covered by a Toolkit

02 Identify Factors that help or hinder Creativity in the Design and Technology Classroom

03 Develop a solution that addresses the main research question:

How can Design and Technology Teachers make their lessons more conducive to creativity?

Methodology

Phase 01:

Exploratory Research

Literature Review

D&T Teacher Interviews (n= 4)

Toolkit Development

Phase 02:

Toolkit Evaluation

D&T Teacher Interviews (n = 3)

Feedback

Defining Creativity & its Links to D&T

- **It has an ‘elusive definition’**

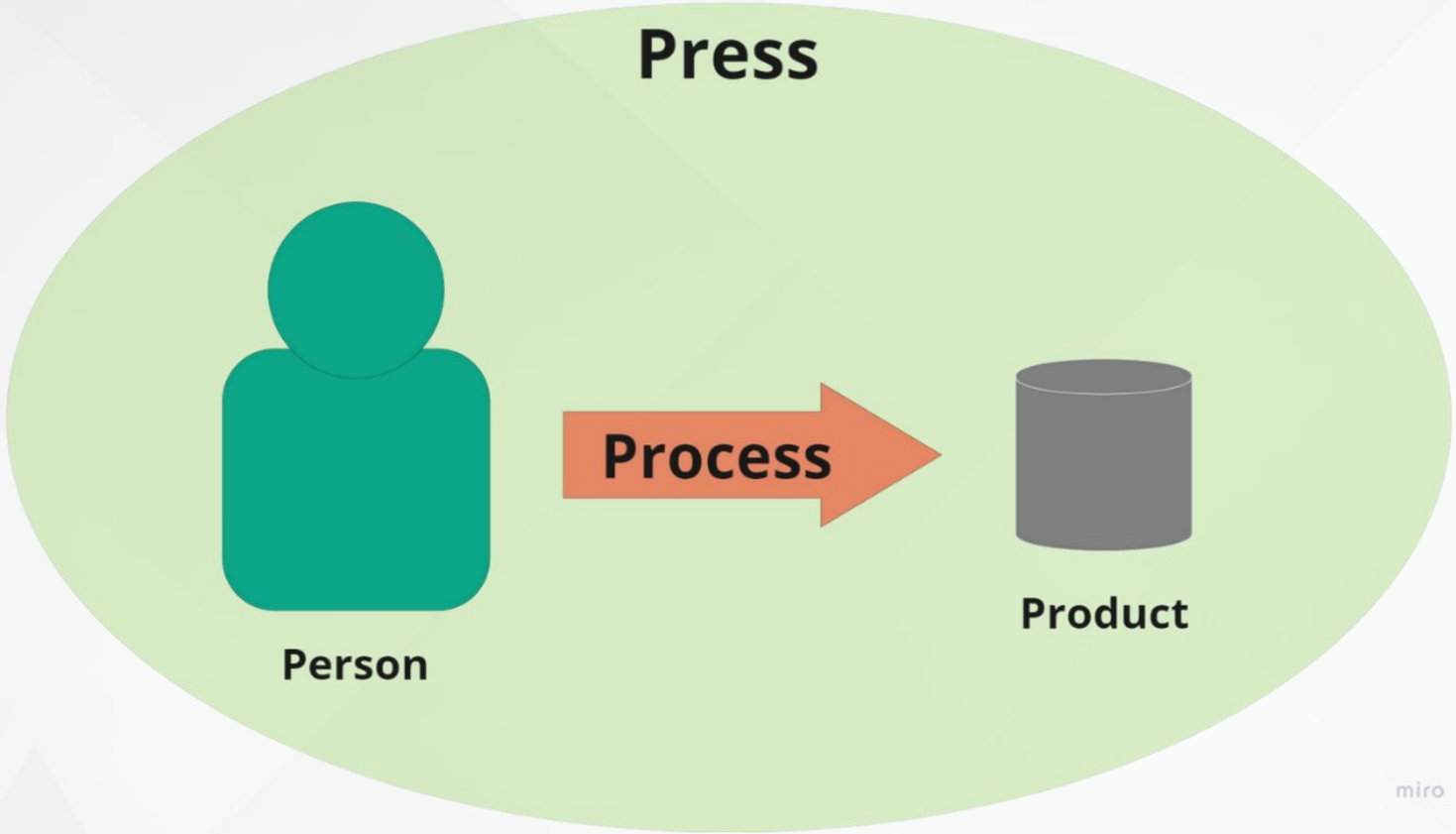
  (NACCCE, 1999)

- **“...fuzzy at the edges..”**

  (Fisher, 2004))

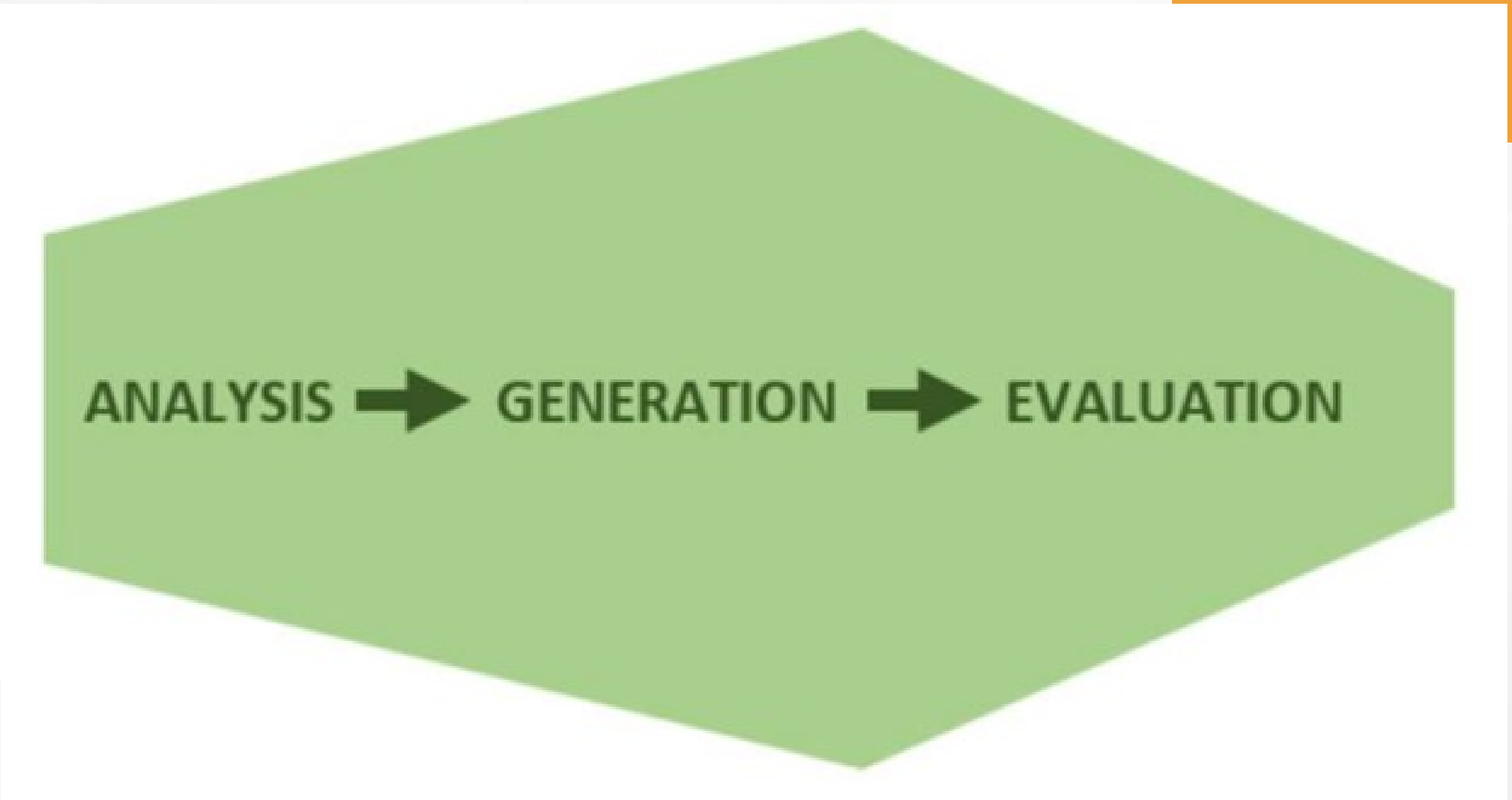
The Four P’s of Creativity

(Rhodes, 1961)



(Adapted from Hyun-Kyung & Soojin, 2015, Figure 1)

Process



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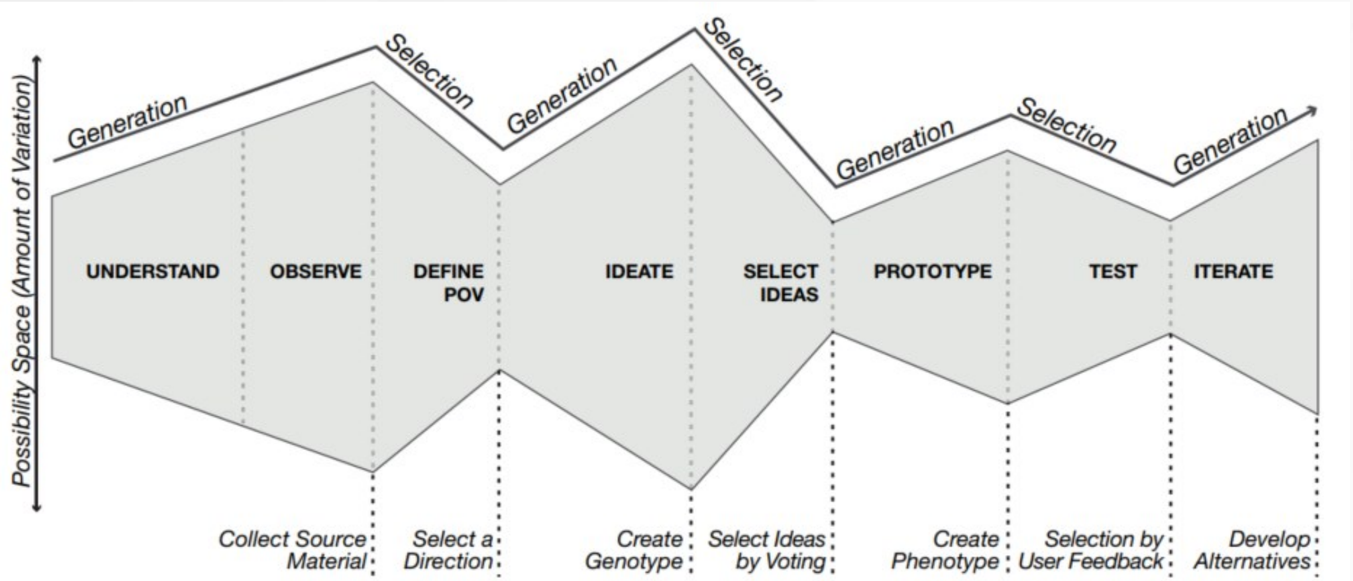
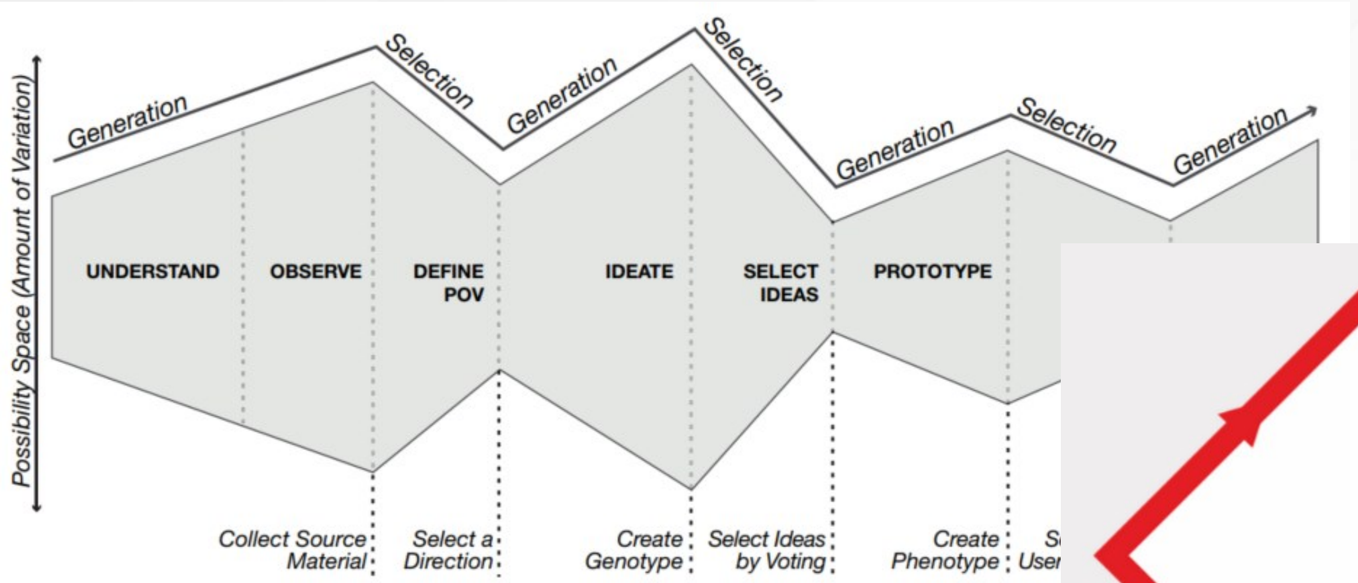


Figure 5: Alternation of generating and selecting in the design thinking process.

Process



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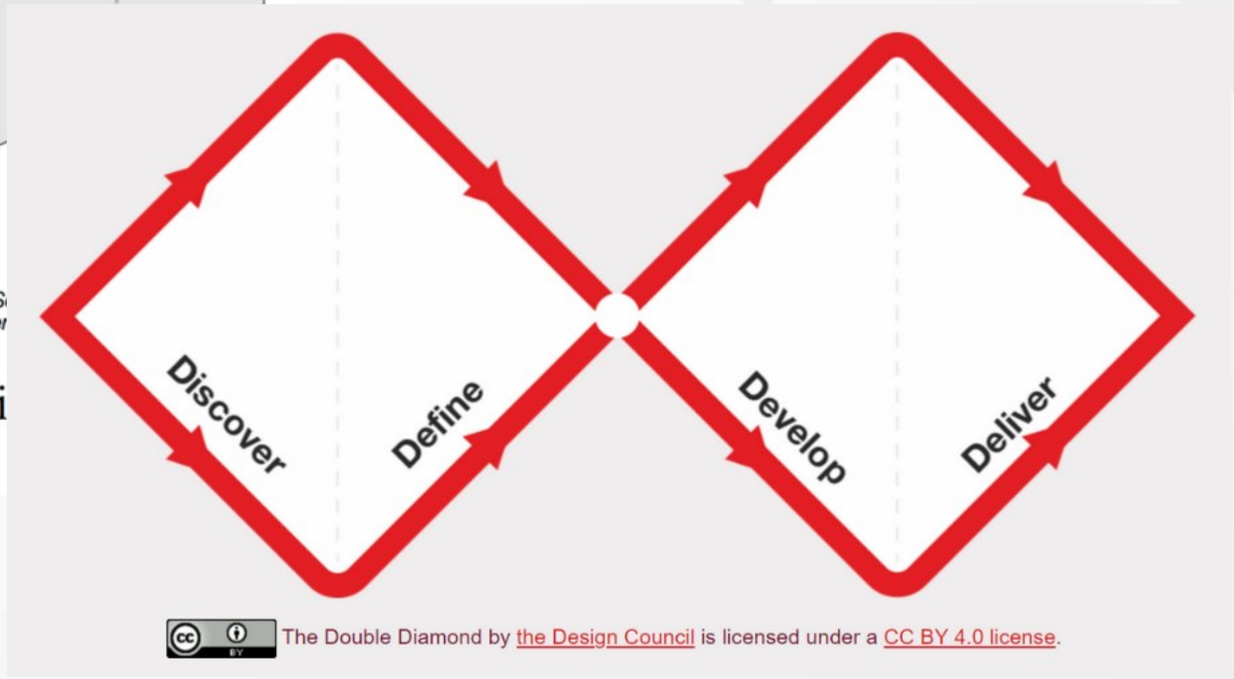


Process

A relation has been found between general process knowledge and creativity

(Christiaans & Venselaar, 2005)

Product

Product

Diverse, Unique

and

Appropriate, Relevant, of Value

(Amabile, 1983; Cropley, D. & Cropley, 2010; Denson et al., 2015; Robinson, 2017)

Press

society

culture

history

Press

The instrument of children’s creativity in design & technology is the designing and making assignment (DMA)

(Barlex, 2004)

Person

Personal Attributes

and

Qualities

Person

Tolerance to:
Risk
Mistakes
Ambiguity

Creative confidence

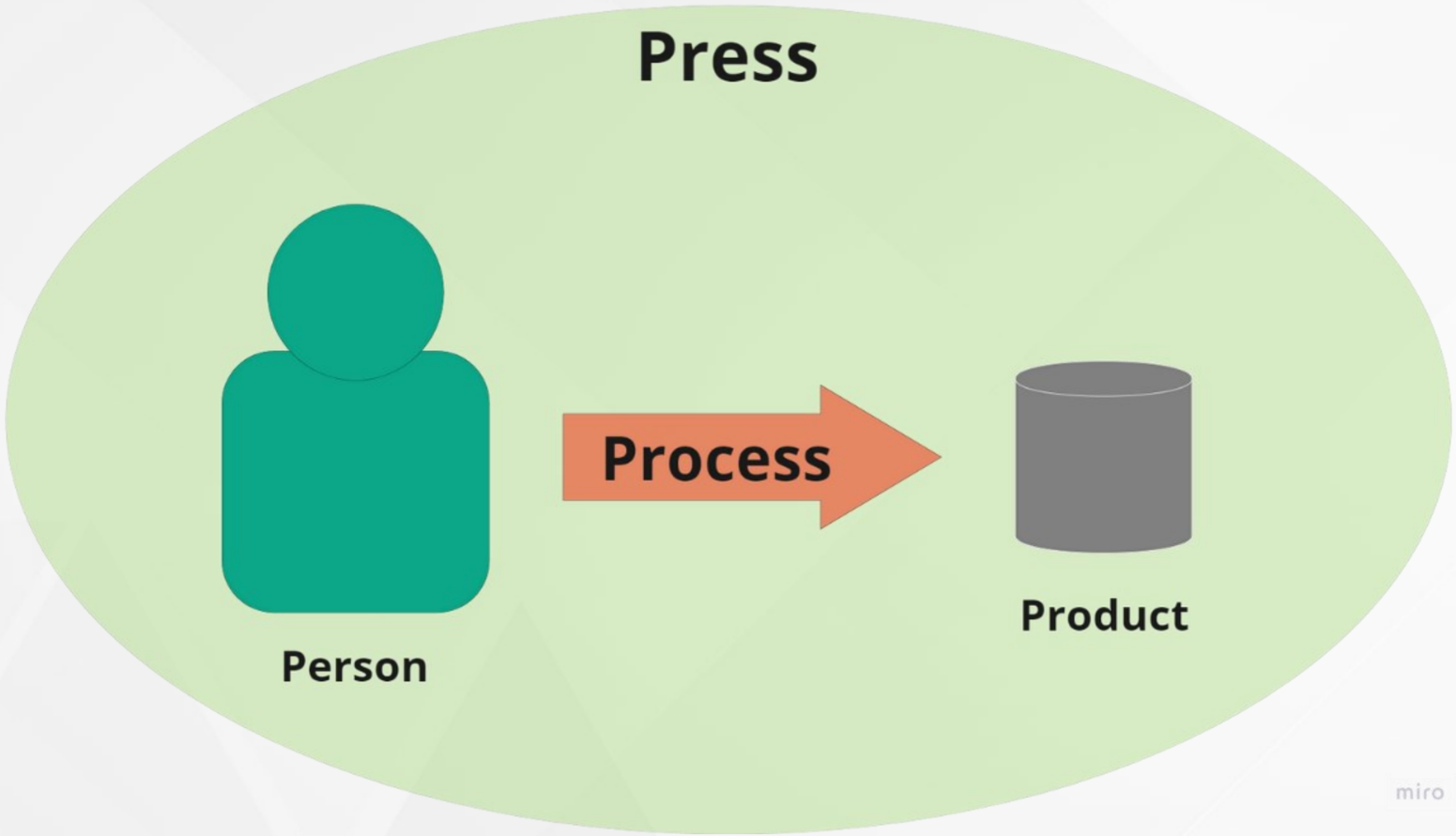
PHOTO BY SAMMIE CHAFFIN ON UNSLPASH

Links to the Findings

Focus on the Product

Links between Creativity & D&T not explicit

Underlying Philosphy



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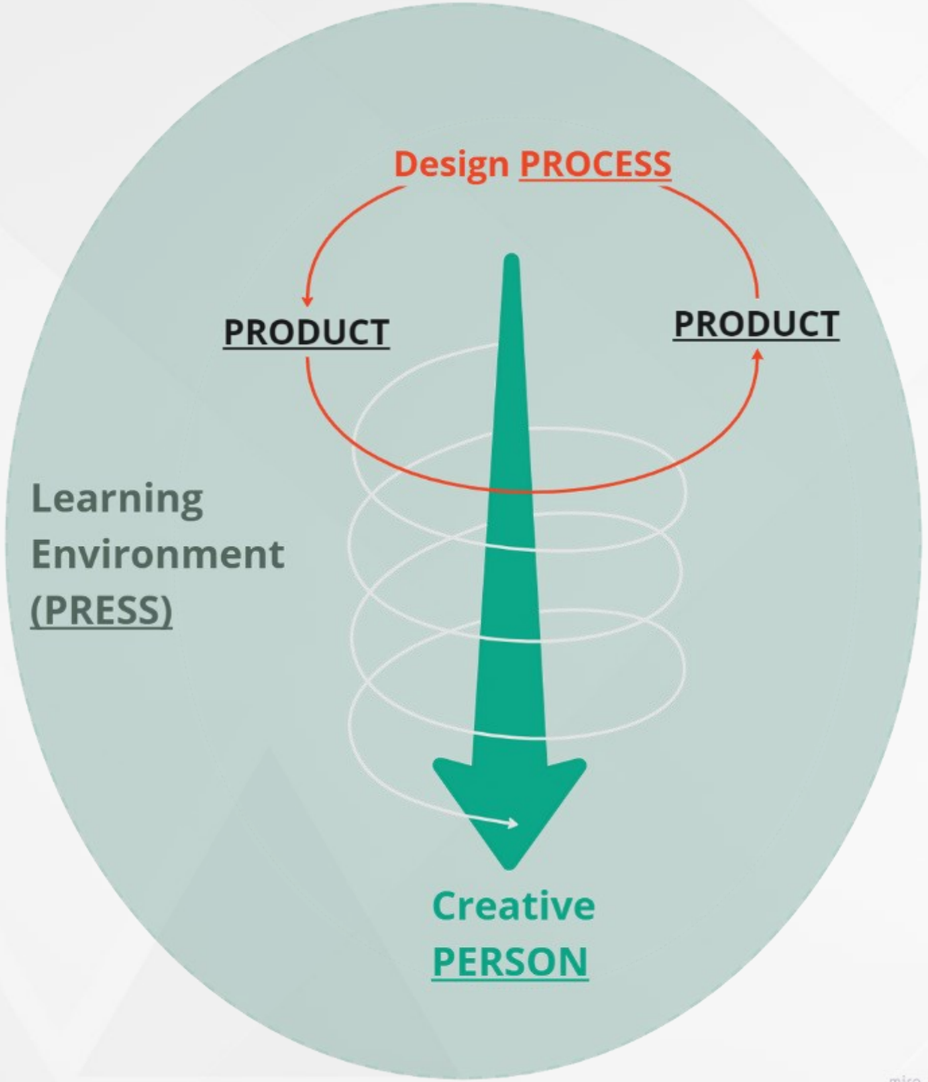

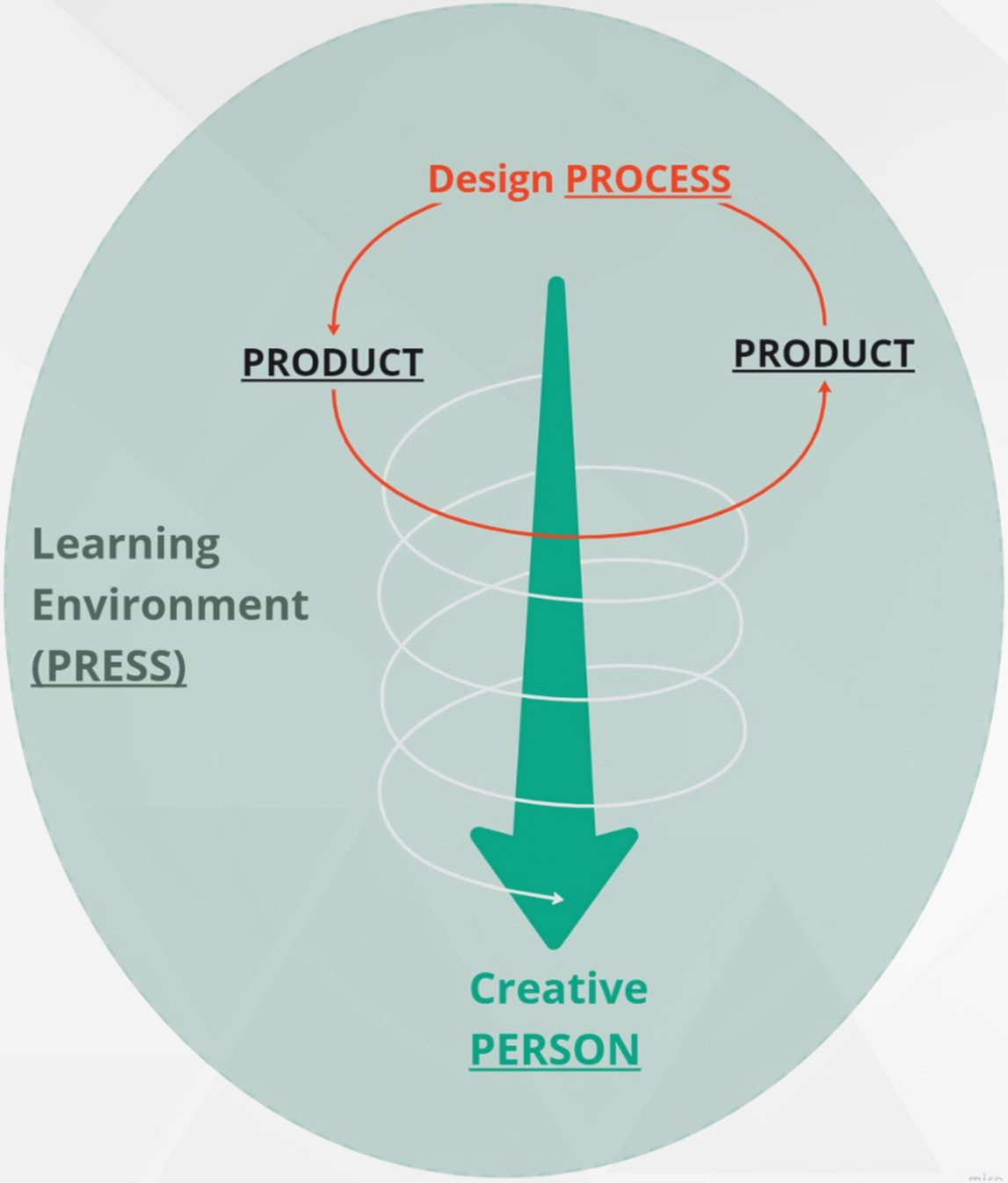

Underlying Philosphy

01 **The Design Process at the Backbone**

02 **Frequent practice through the use of the Spiral Curriculum concept**

03 **Each iteration produces creative products, the long term aim is the fostering of Creative Persons**

Factors Affecting Creativity

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Barrier

Inability or Lack of Confidence for students to express themselves

Related to findings discussed by Barlex (2007)

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Creativity Fixation / Design Fixation

A factor highlighted by Barlex (2004) and Cross (2006)

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Facilitator

An opportunity of Sensory interaction with their ideas - (eg: 3D imaging / simulators)

Mirrors benefits of modelling and prototyping (Pahl et al, 2007)

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Facilitator

A learning environment and Classroom Climate that promote:
Freedom, enthusiasm, fun, and where students feel safe and confident to express ideas.

How do these reflect in the design of the Toolkit?

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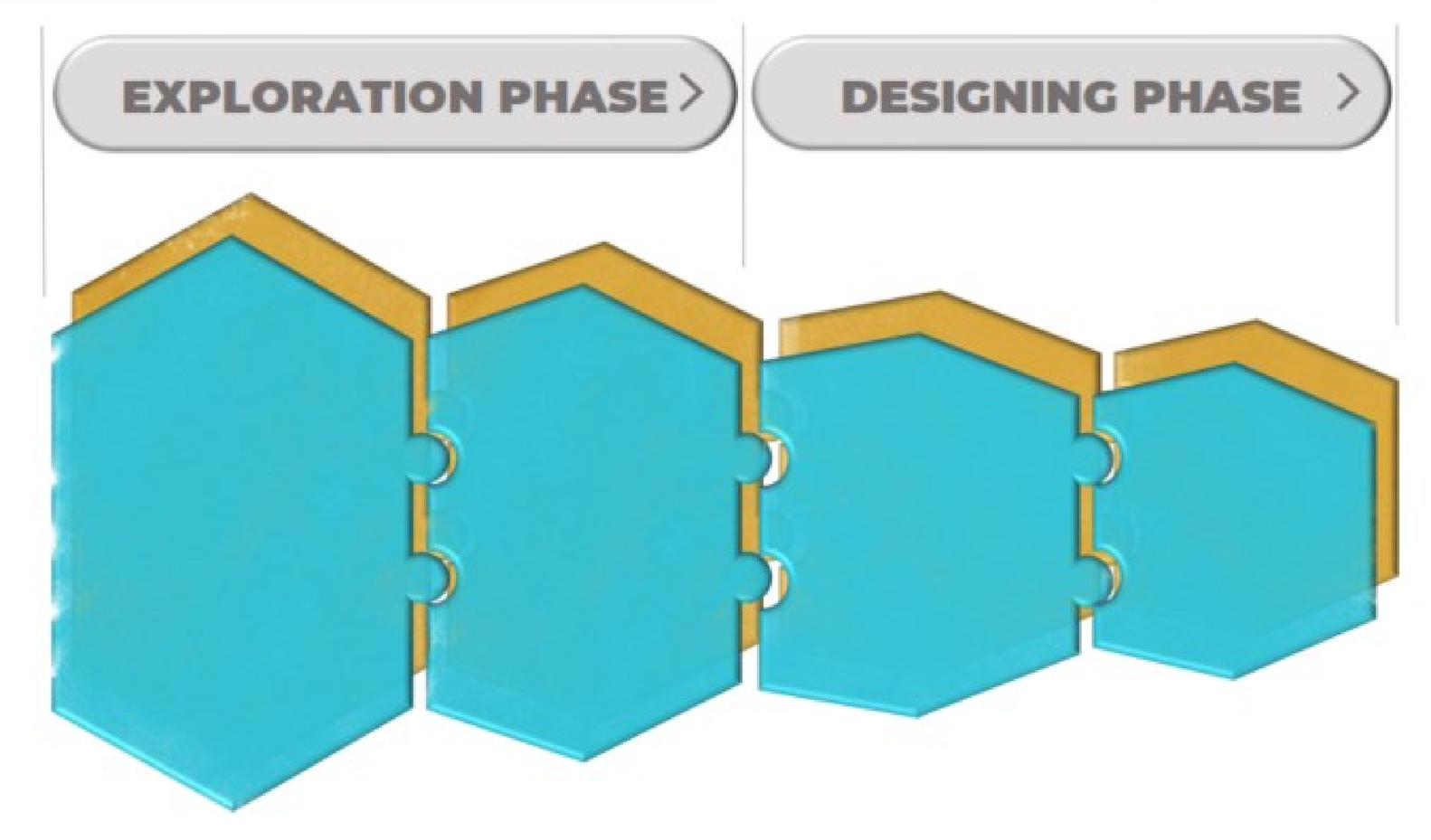
Design Process

Exploring

Designing

Making

Evaluating



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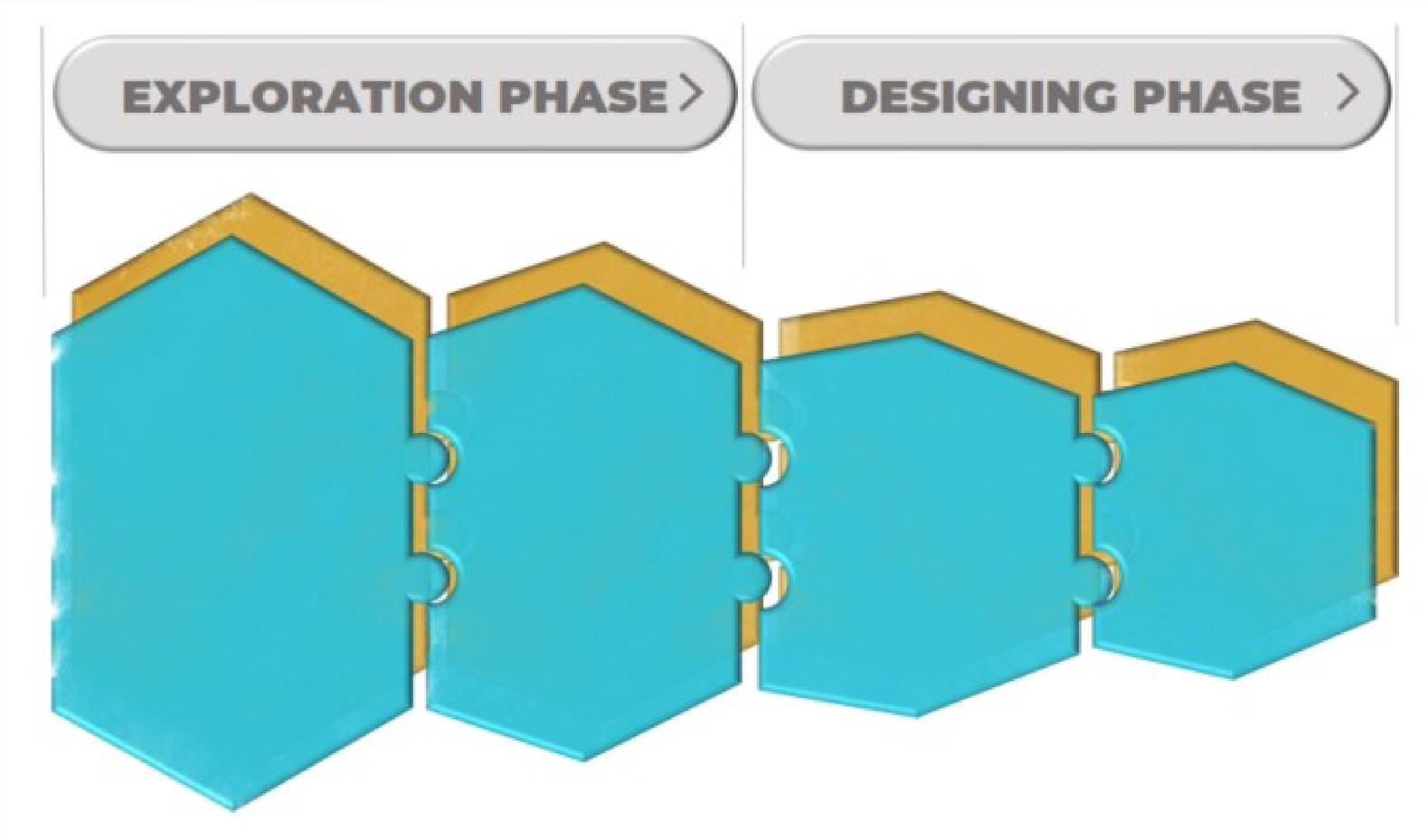
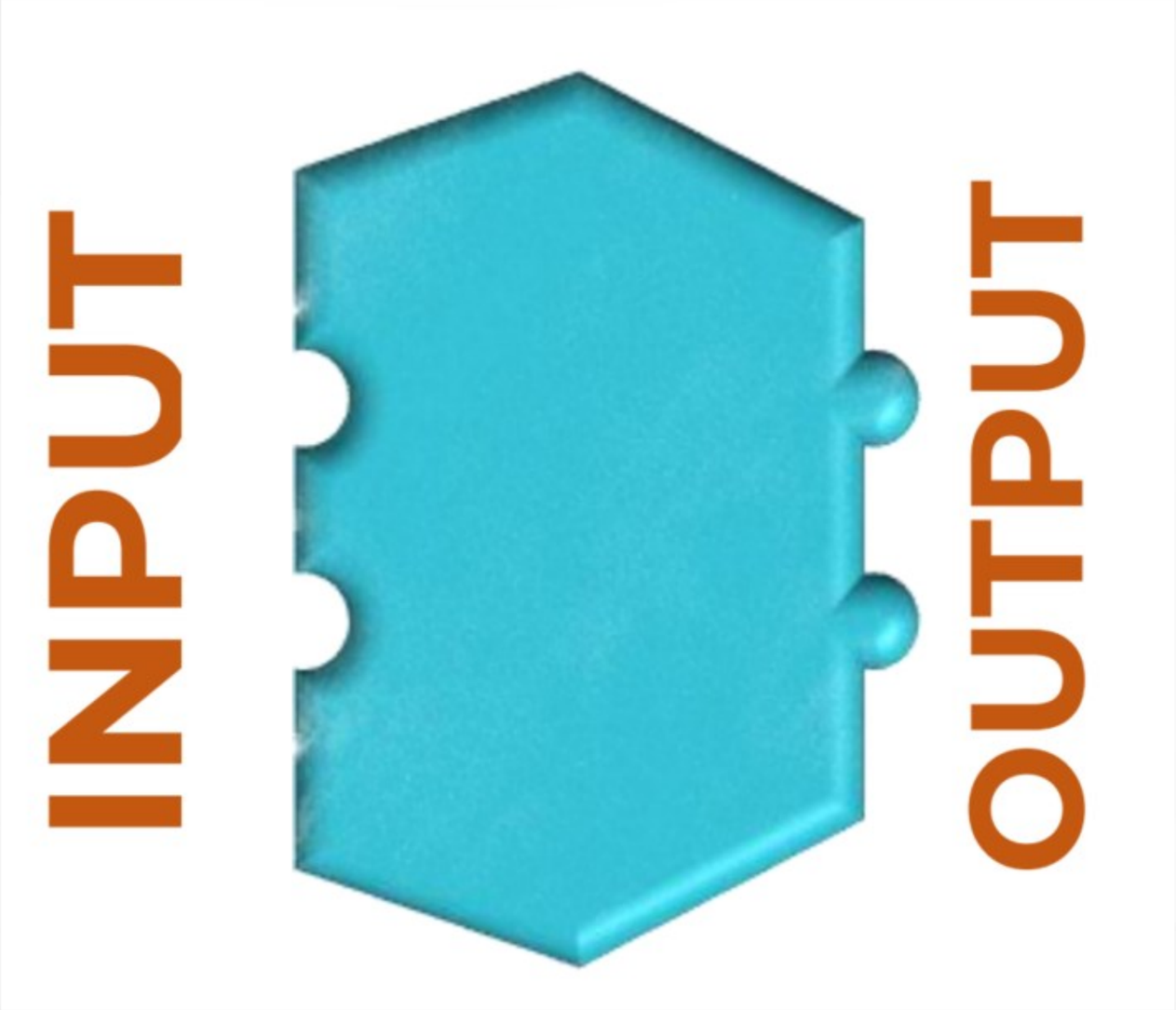


Plug-in Modules

The smallest units in the process

Aids flexibility and Decision-making



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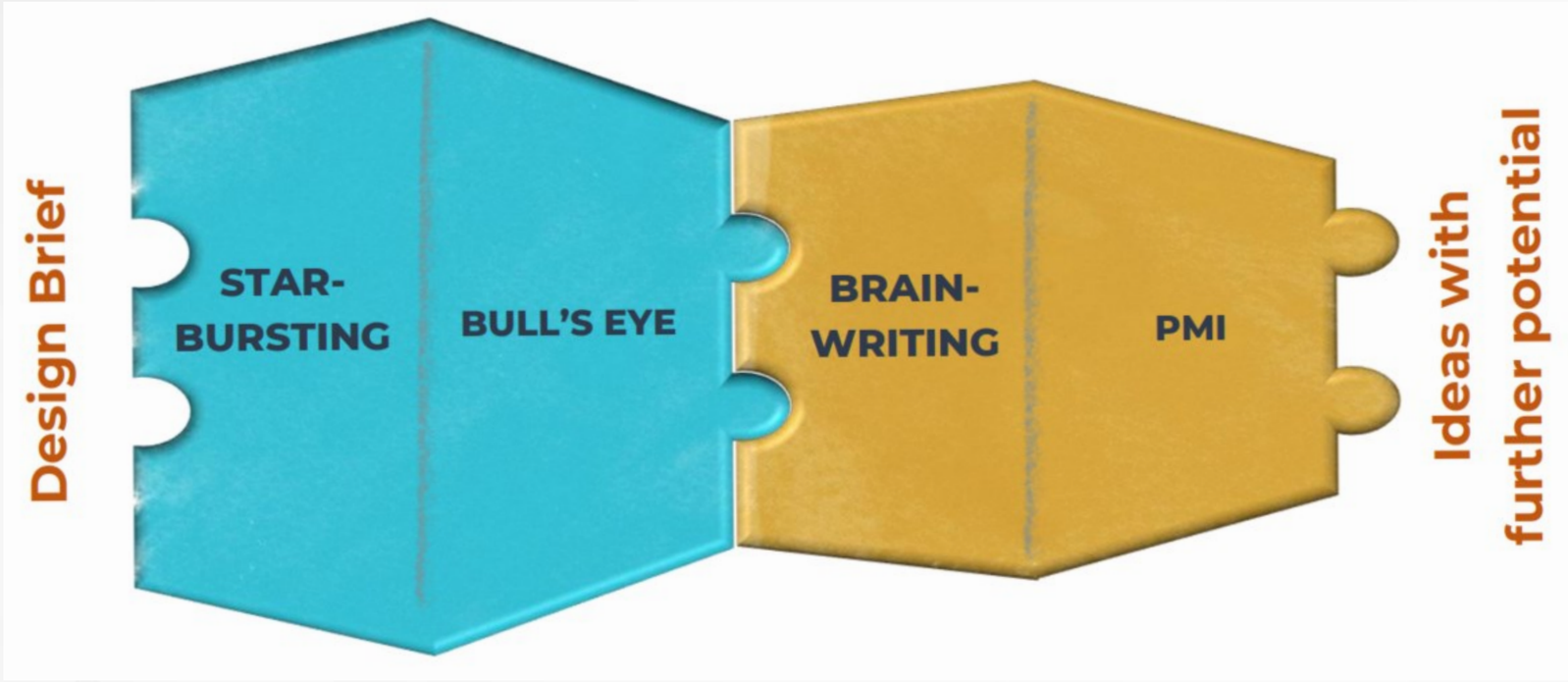
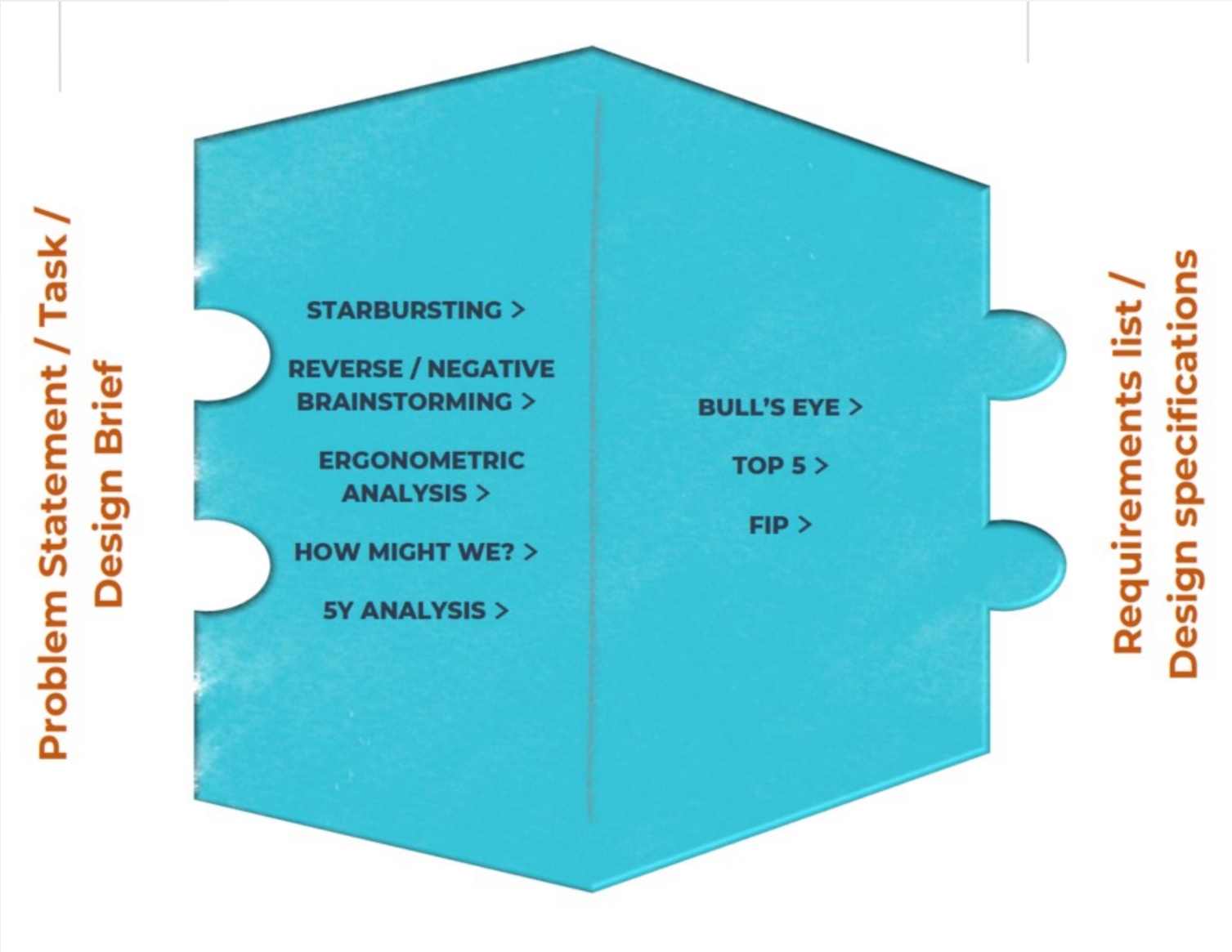


Tool Organisation

Specific Design and Creativity tools

Purposefully sorted within the modules (Phase/divergent/ convergent....)



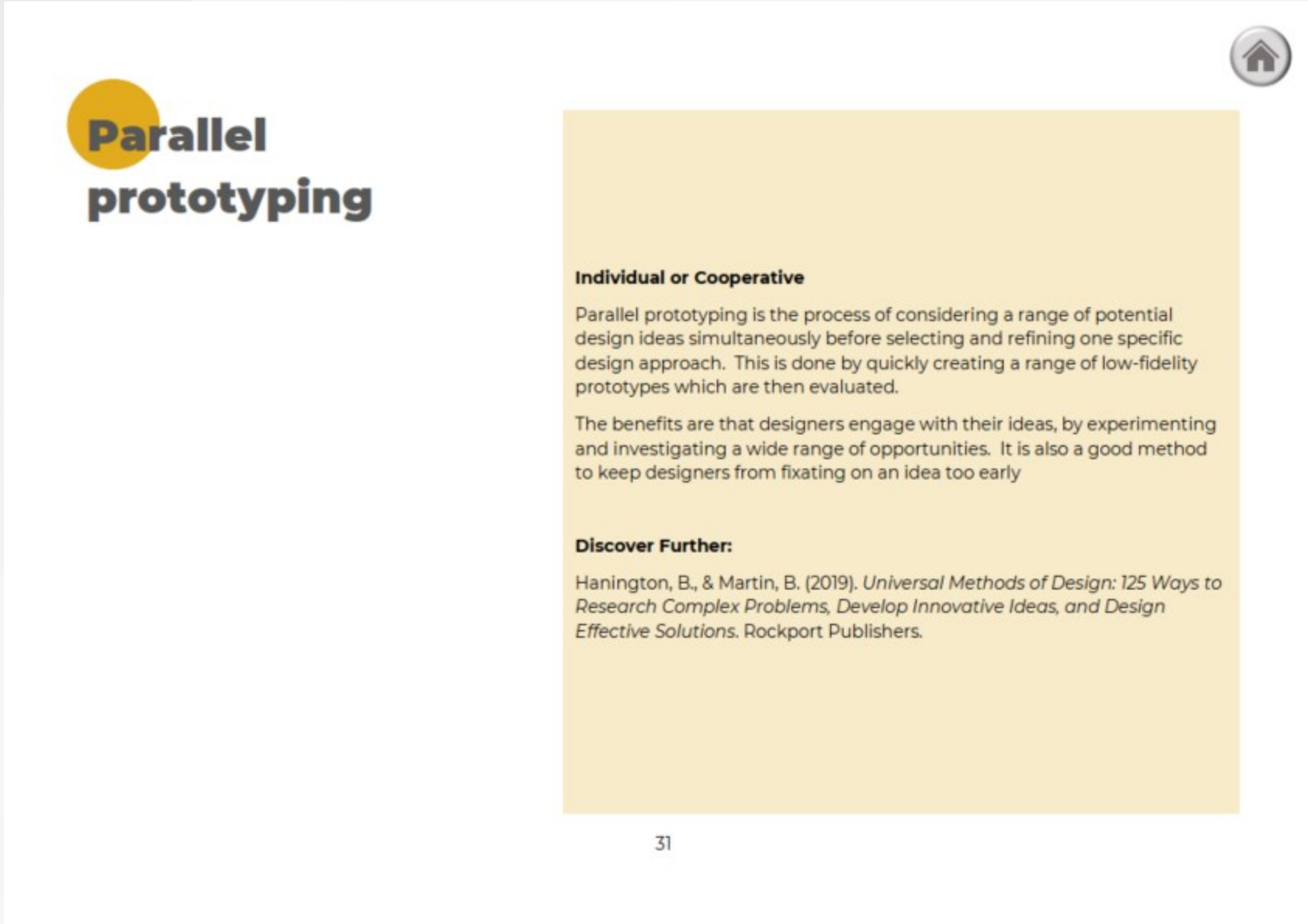
Colour Coding

For Scaffolding purposes

Open ended Scenarios
vs
Product analysis / case studies

Tools with specific intent

Aesthetic and Functional expression and manipulation of ideas



Parallel prototyping

Individual or Cooperative

Parallel prototyping is the process of considering a range of potential design ideas simultaneously before selecting and refining one specific design approach. This is done by quickly creating a range of low-fidelity prototypes which are then evaluated.

The benefits are that designers engage with their ideas, by experimenting and investigating a wide range of opportunities. It is also a good method to keep designers from fixating on an idea too early

Discover Further:

Hanington, B., & Martin, B. (2019). *Universal Methods of Design: 125 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions*. Rockport Publishers.

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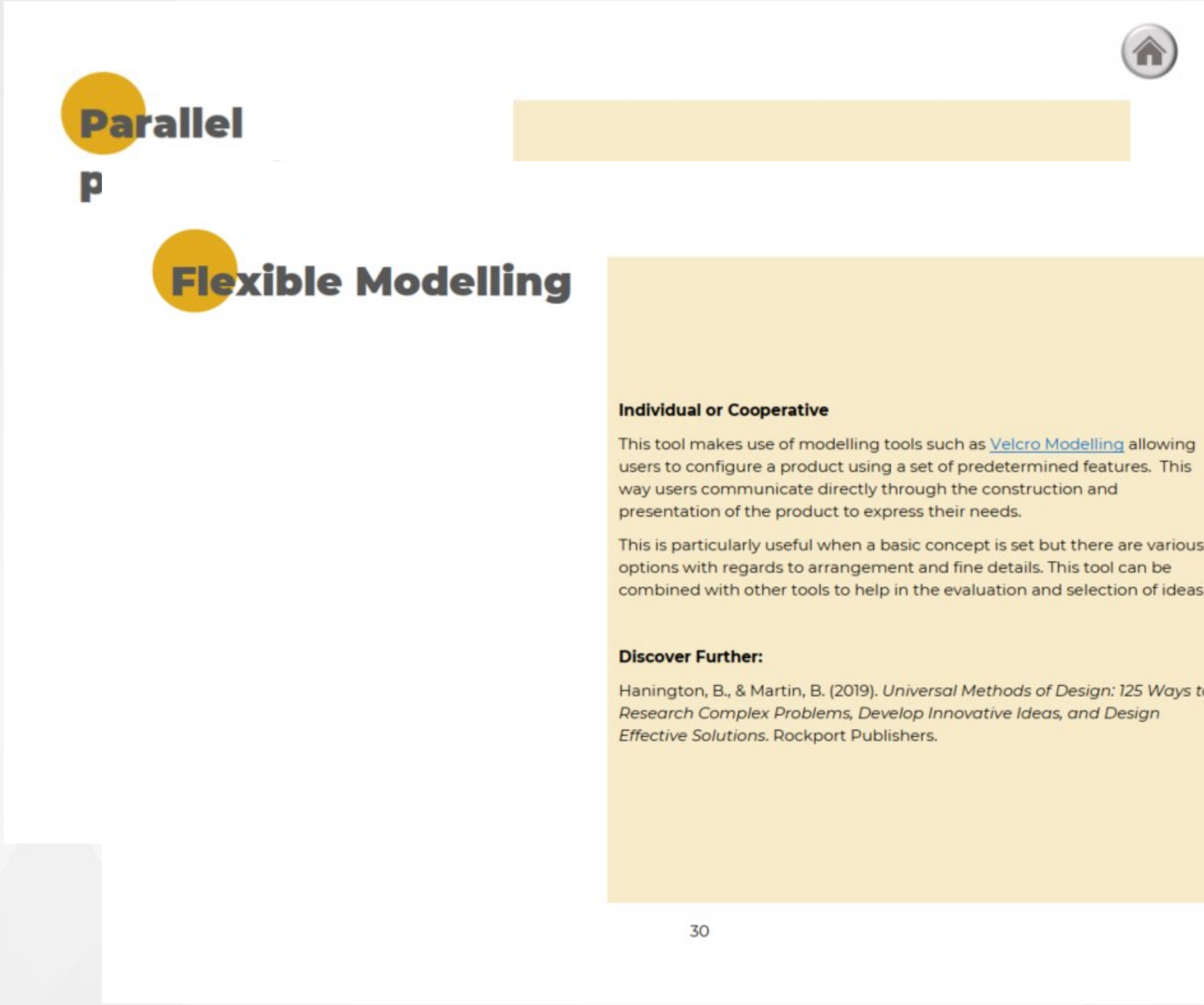
Tools with specific intent

Aesthetic and Functional expression and manipulation of ideas



Tools with specific intent

Aesthetic and Functional expression and manipulation of ideas

Parallel p

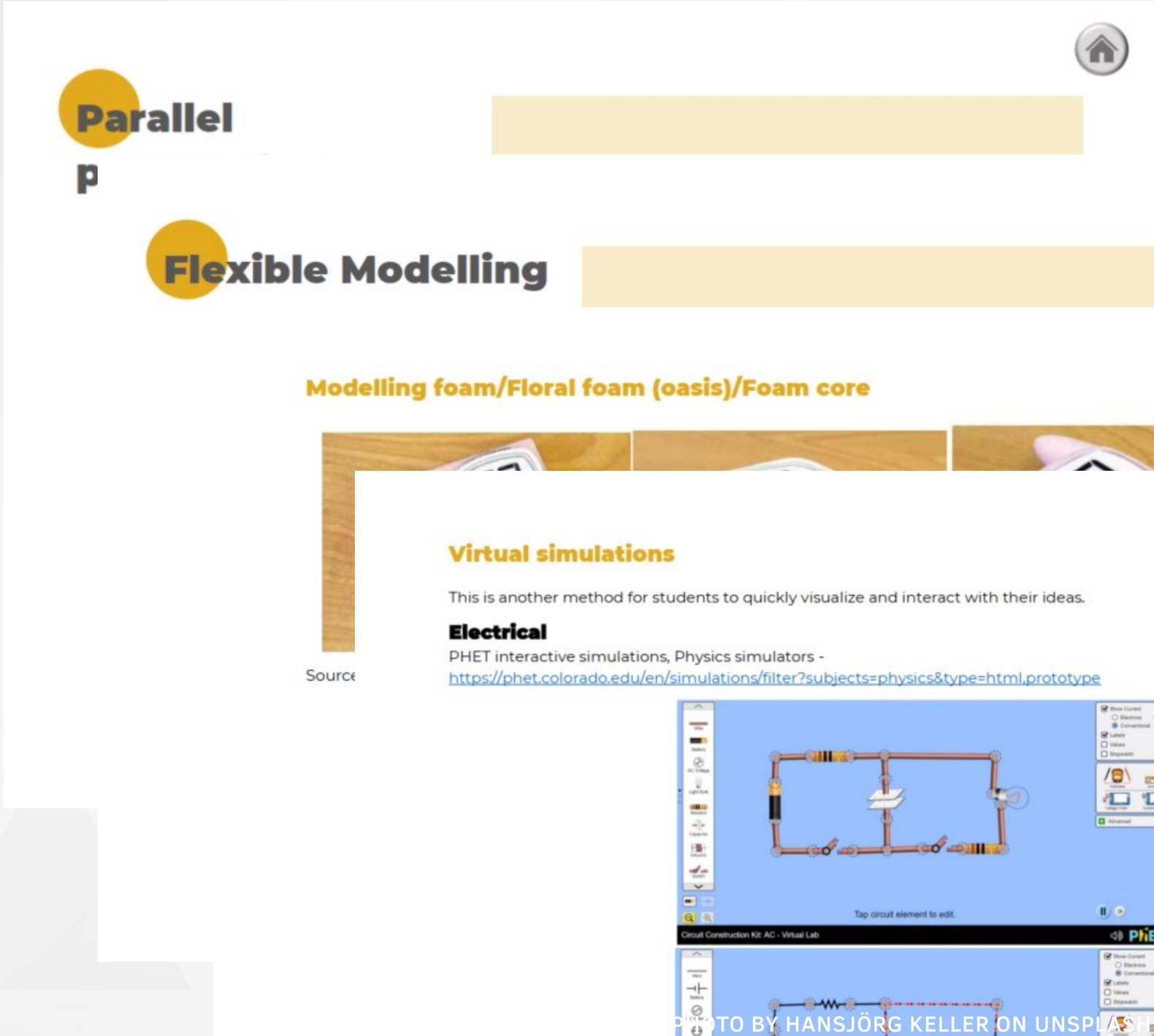
Flexible Modelling

Modelling foam/Floral foam (oasis)/Foam core

Source: (Hallgrimsson, 2012)

Tools with specific intent

Aesthetic and Functional expression and manipulation of ideas



Tools with specific intent

Short-term (energisers) and long-term creation of a learning environment that support creativity

Uses for a paper clip

Individual or Cooperative

This is a brainstorming exercise in practice, which can be used on its own as an energizer. Besides that it can be useful to set the tone for the lesson to come, it can also be helpful to introduce the brainstorming rules in a game-based setup in preparation for brainstorming during other tasks.

It can also be beneficial to allow students to lead the brainstorming session themselves to help them learn the rules, while giving the teacher the possibility to observe the dynamics in the class.

Method:

- Introduce the energizer by posing the question: "How many uses for a paper clip?"
- Ideas can be written on the whiteboard.
- If ideas seem to dry up, use mind maps/concept maps/ word webs for further association
- Help students to generalize using their own responses – E.g.: if someone says, 'it can be used as a nose ring", it can be generalized as: Paper clip as jewellery, and suggest "How else could it be used as jewellery?"
- Encourage humour – for example adding a ridiculous response into the melting pot.
- Use other point of views – example – what would [batman] use it for?
- Consider adding other tools – example: SCAMPER.
- Have fun!

Discover Further:

Bowkett, S. (2007). *100+ ideas for teaching creativity* (2nd ed.). Continuum New York.

Tools with specific intent

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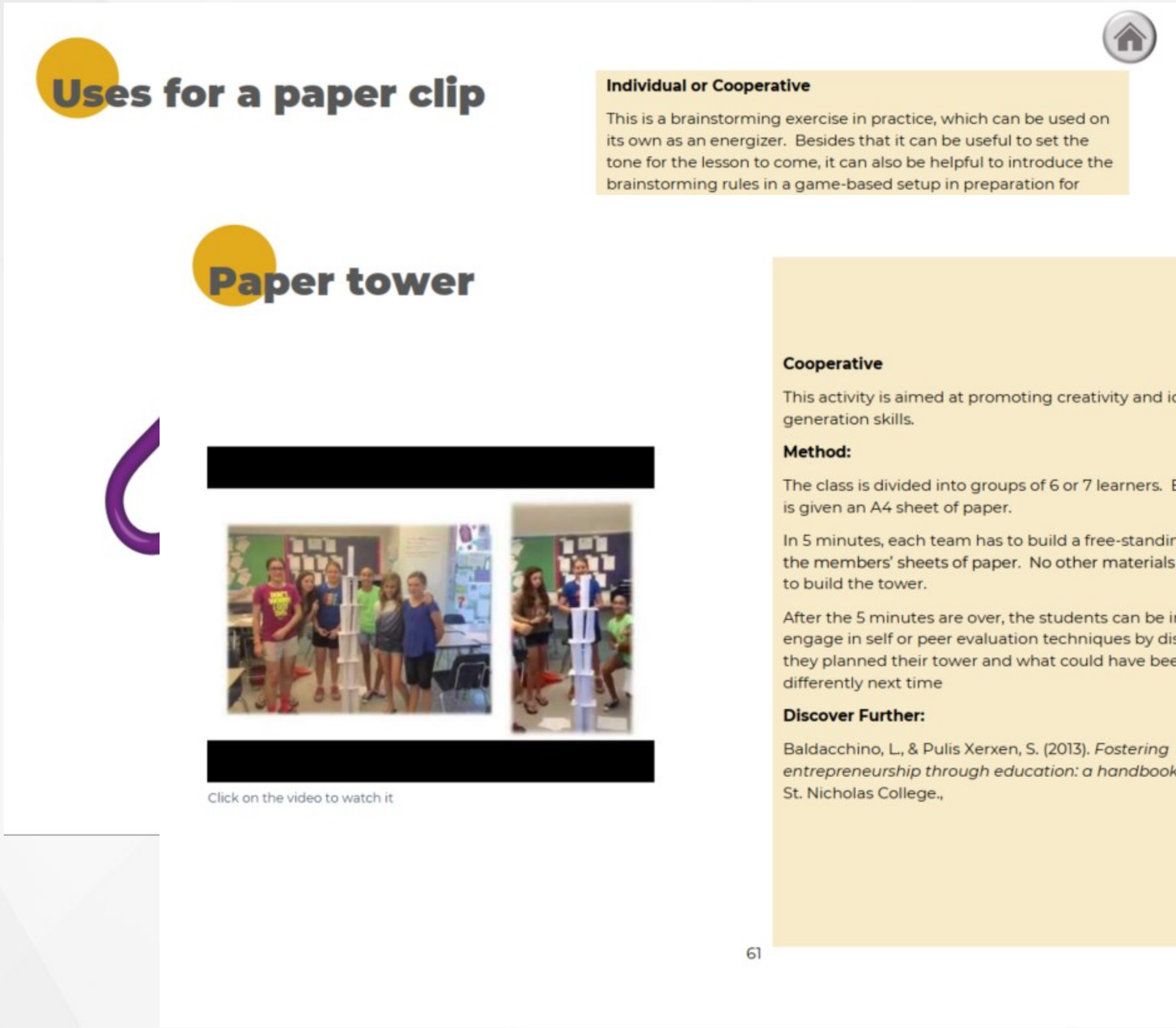

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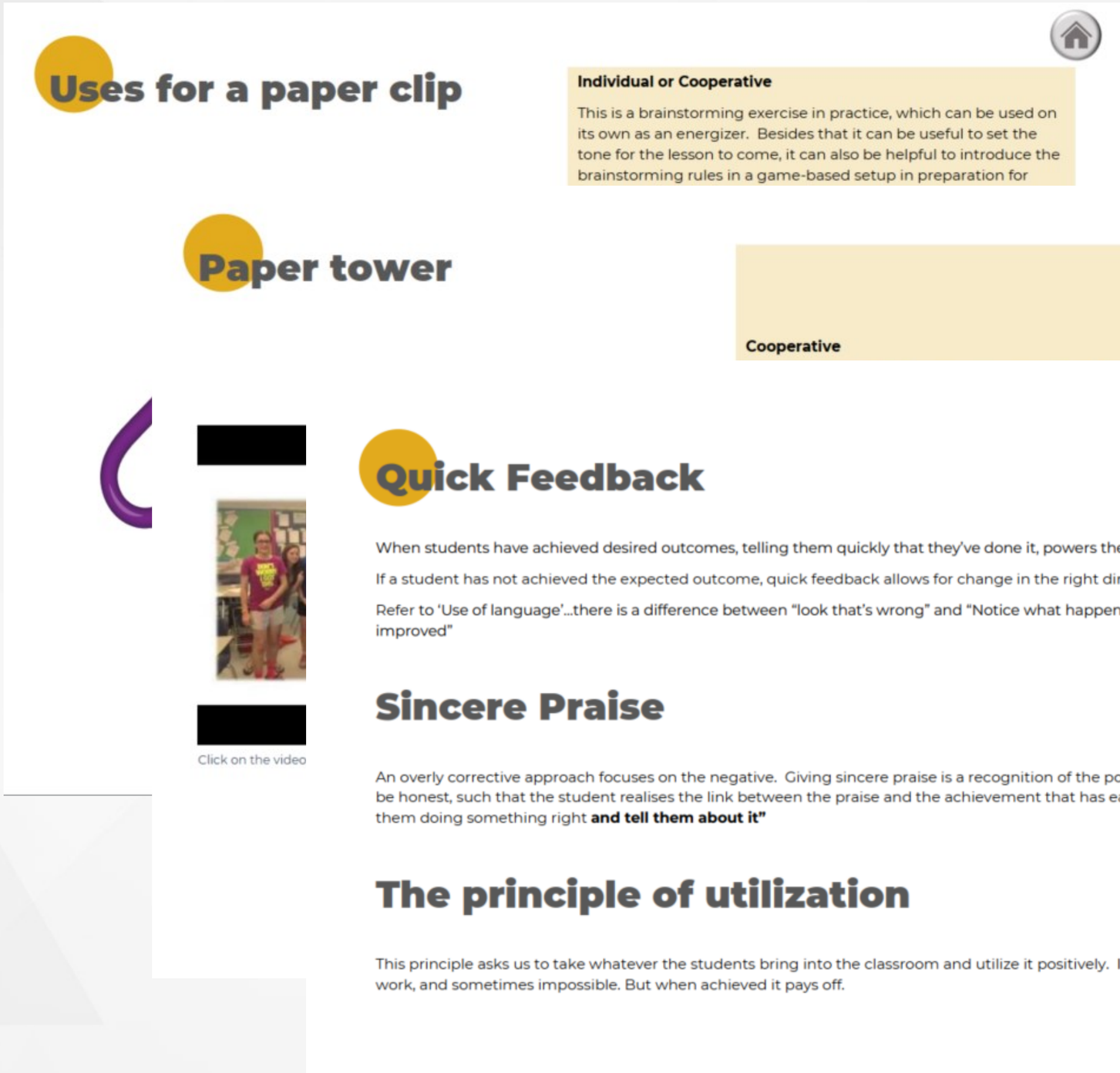

Tools with specific intent

Tools that counter for Design Fixation

Reverse Brainstorming / Negative Brainstorming / The Anti-problem

Click on the video to watch it

Individual or Cooperative

Combines traditional brainstorming approach with 'reversal' methods.

Can be used to further discover a defined problem. Can also be used to help people get unstuck and running out of ideas for solutions.

Helps evaluation of a problem differently and breaking out of existing patterns.

Steps:

Having identified a problem, participants focus on, and aim to generate ideas of all possible ways to CREATE that problem or how to make it worse.

Ask the question:

"How could I possibly cause the problem?"

The rules for brainstorming apply

This would lay the foundations for further brainstorming to generate solutions for the problem by tackling each possibility generated in the reverse-brainstorming session.

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Tools with specific intent

Tools that counter for Design Fixation

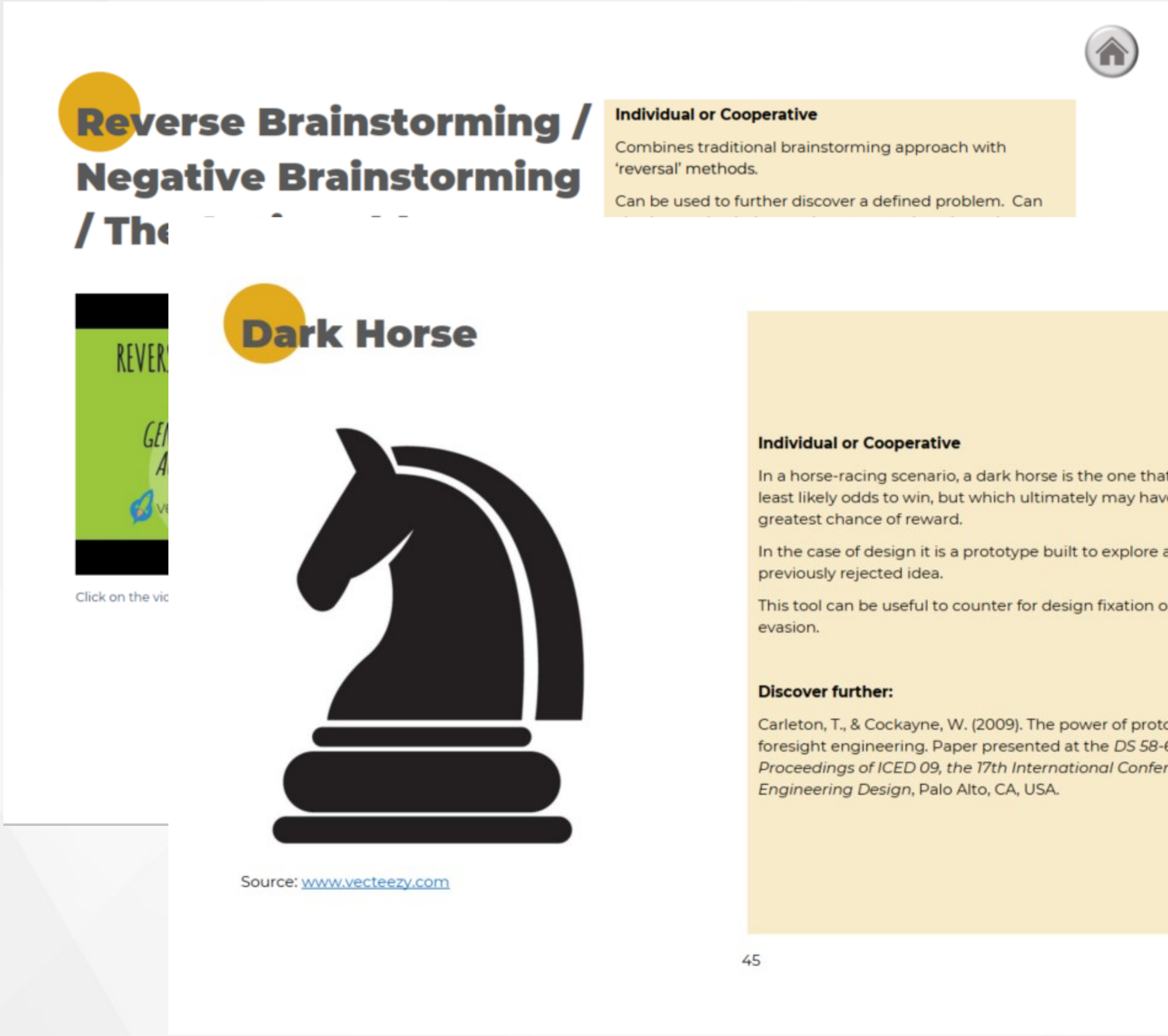


PHOTO BY HANSJÖRG KELLER ON UNSPLASH

Teachers’ idea of having a toolkit

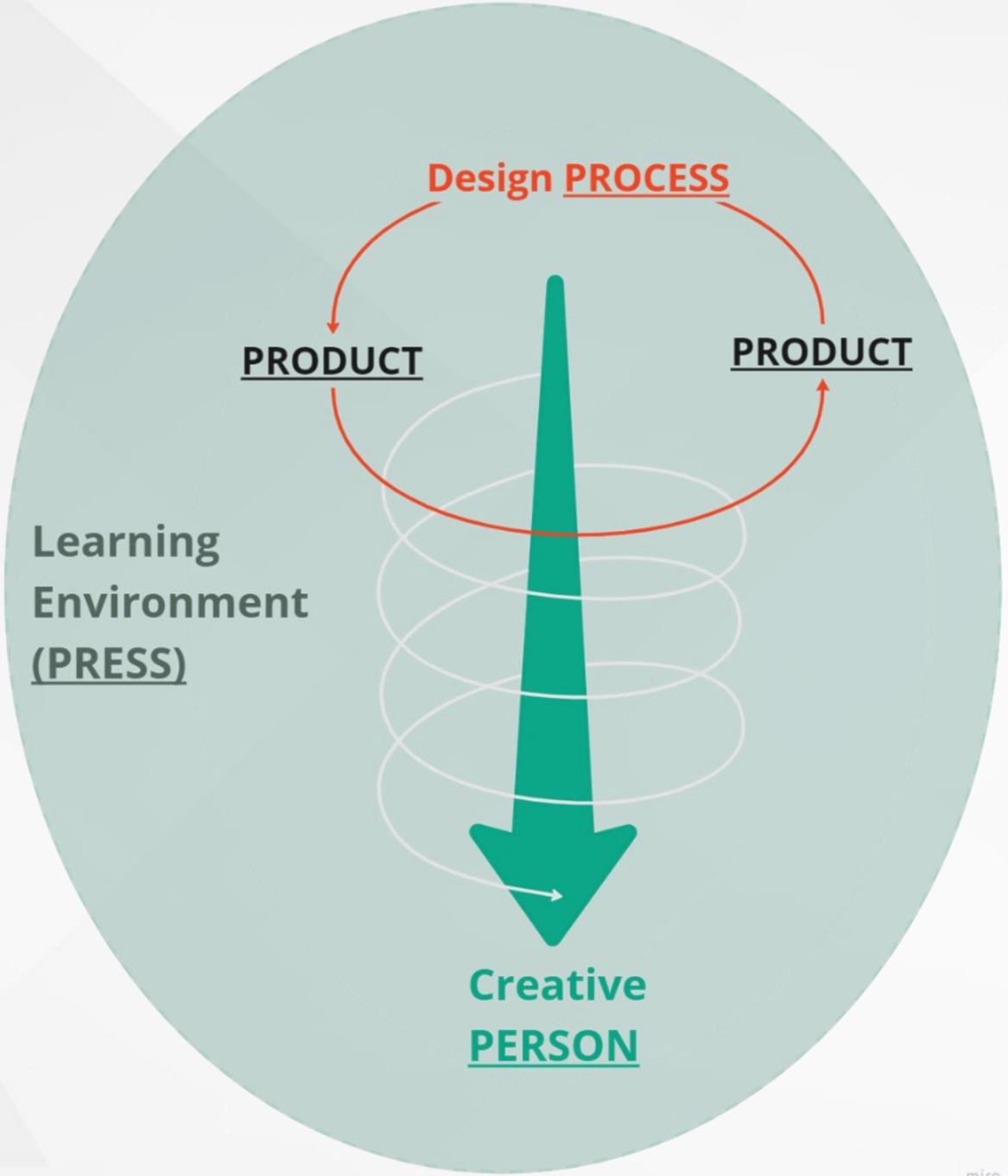
Teachers welcome the idea of having a toolkit

BUT

They do not want it to restrict their autonomy

Toolkit with 3 layers

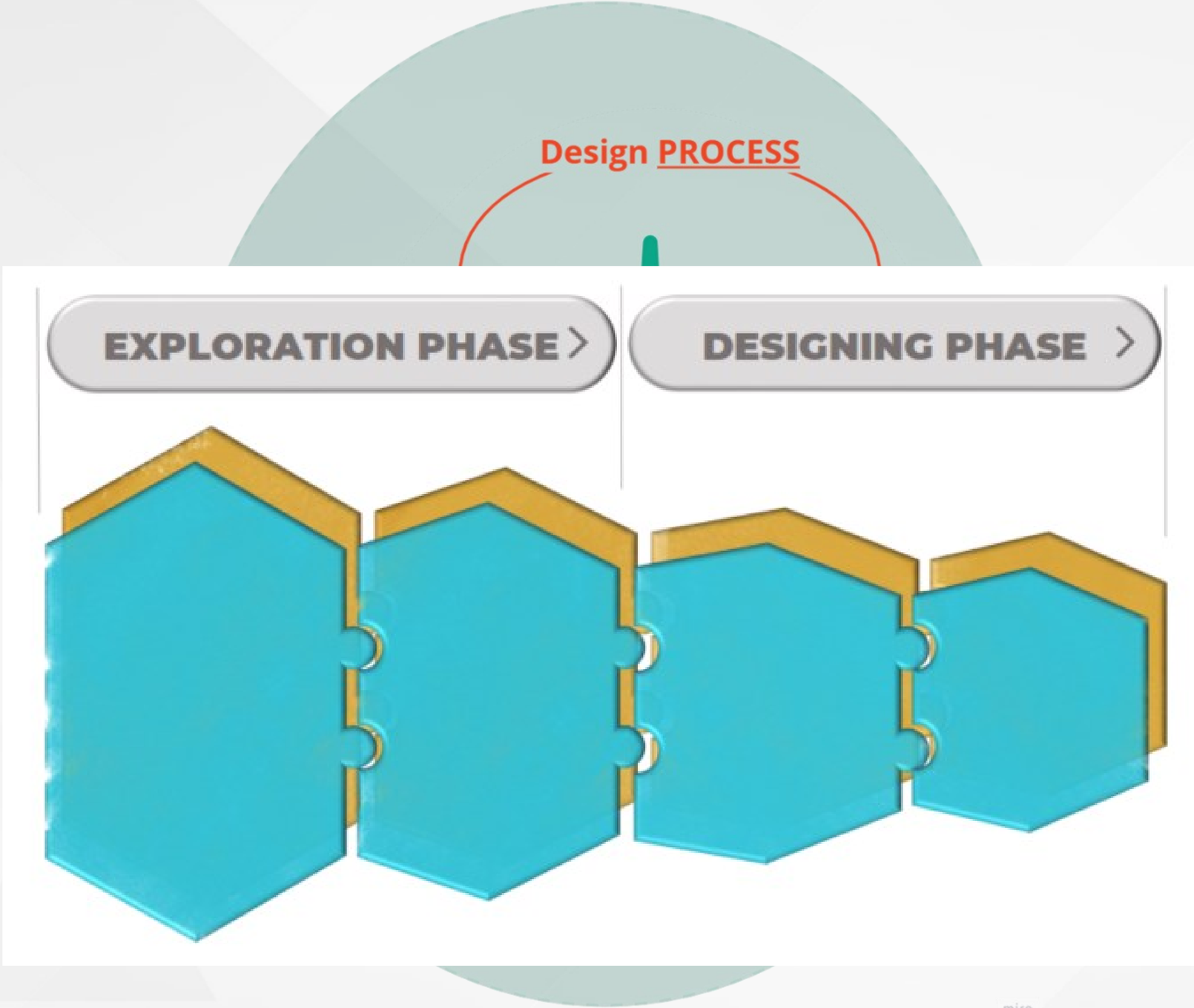
The underlying philosophy



Toolkit with 3 layers

The underlying philosophy

The organisation of the design process



Toolkit with 3 layers

The underlying philosophy

The organisation of the design process

A library of tools

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Methodology

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Exploratory Research

Literature Review

D&T Teacher Interviews (n= 4)

Toolkit Development

Phase 02:

Toolkit Evaluation

D&T Teacher Interviews (n = 3)

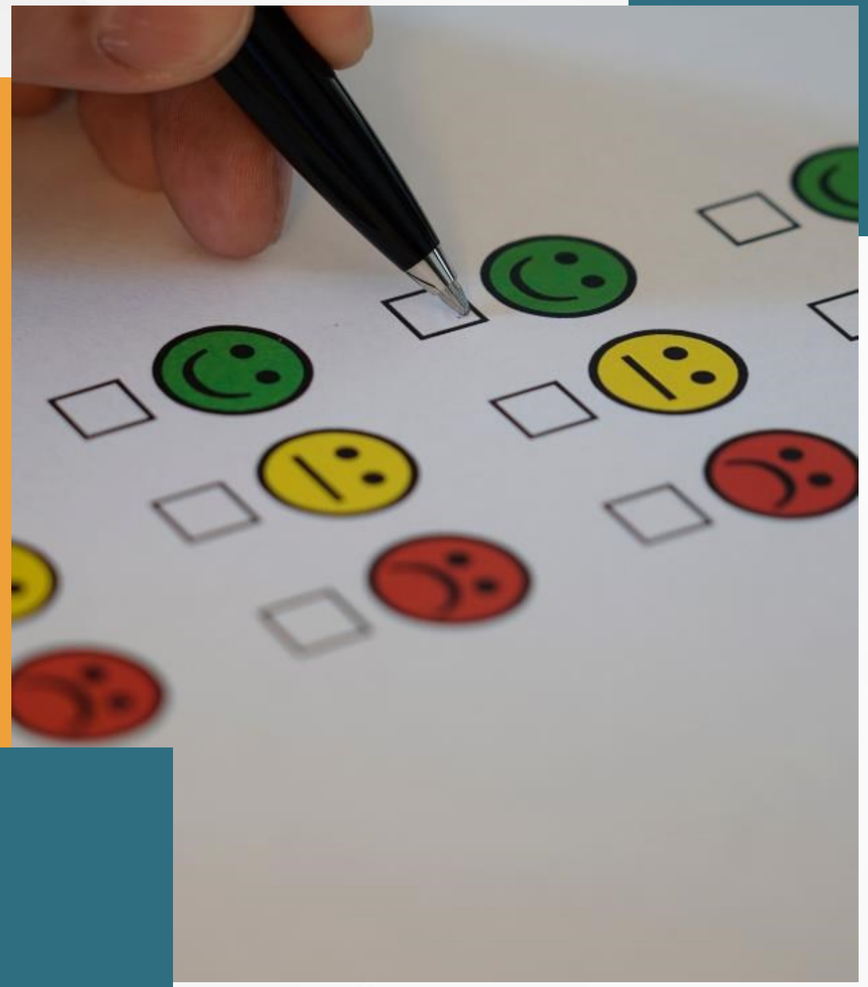
Feedback

Toolkit Evaluation

Facilitates research and exploration by students

Addresses Design Fixation

Helps students think deeper about the design process



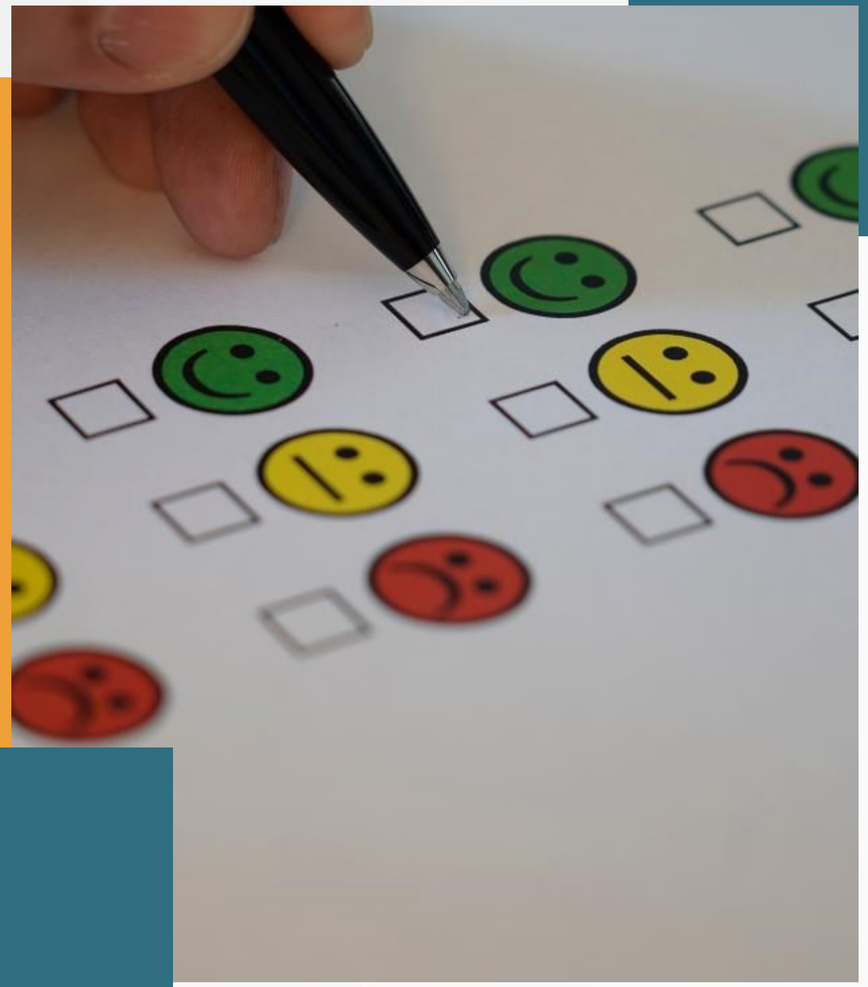
Toolkit Evaluation

Concerned with Time:

To learn to use the toolkit

To fit the toolkit with delivering the content of the syllabus

Layout



Future Possibilities

Improvements on graphical communication elements

Developed on more interactive and accessible platforms

Cooperative Space for the D&T teachers community

Conclusion

The Value of Design and Technology in Education:

The answer to bridge the gap between traditional schooling and Creativity

THANK YOU