

Matematika Realistik Webinar: Embodied Cognition Paradigm in Realistics Mathematics Education



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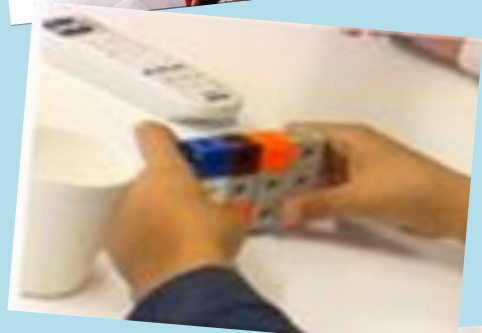
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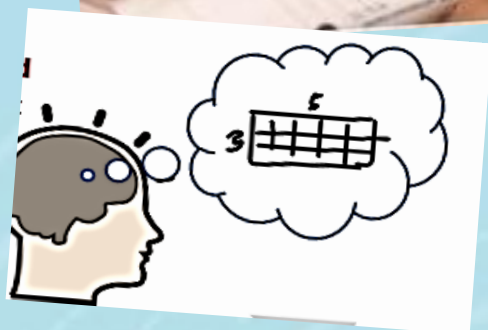
Matematika Realistik Webinar: Embodied Cognition Paradigm in Realistics Mathematics Education bersama Susilahudin Putrawangsa Ph.D.(c)
Dec 11, 2022 1:00 PM - 2:30 PM [Show more](#)



EMBODIED COGNITION PARADIGM IN REALISTIC MATHEMATICS EDUCATION

An alternative approach to making mathematics "realistic"

S. Putrawangsa



11 December 2022

Host



UNESA
Universitas Negeri Surabaya

Affiliation



**UNIVERSITY OF
CANBERRA**

Affiliation



Realistic Mathematics Education

Didactical Phenomenology

Embodied Cognition

Embodied Didactical Phenomena (EDP)

Examples



Realistic Mathematics Education



Realistic Mathematics Education

“Realistic”

Mathematization

**Didactical
Phenomenology**



Realistic Mathematics Education

“Realistic”

**Imaginable situations
(real in students’ minds)**

**Make sense or
meaningful experiences**

**Real-fantasy-or-math-
world contexts**

Mathematization

**Didactical
Phenomenology**



Realistic Mathematics Education

“Realistic”

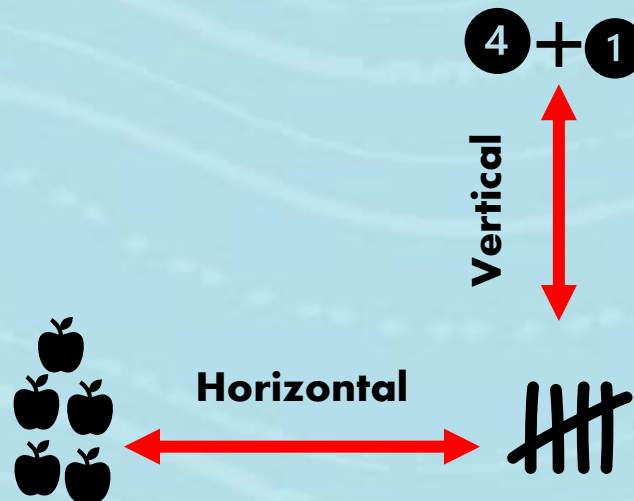
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Mathematization

**Mathematics as a human
activity**



**Didactical
Phenomenology**



Realistic Mathematics Education

"Realistic"

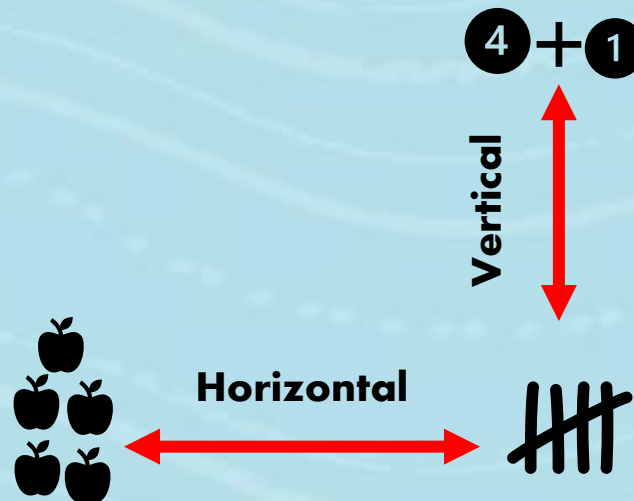
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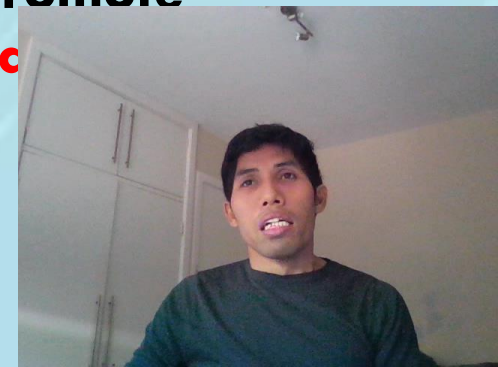
Mathematization

Mathematics as a human
activity



Didactical Phenomenology

"The art of identifying
suitable learning
phenomena or
contexts that are
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and promote
mathematics



Realistic Mathematics Education

"Realistic"

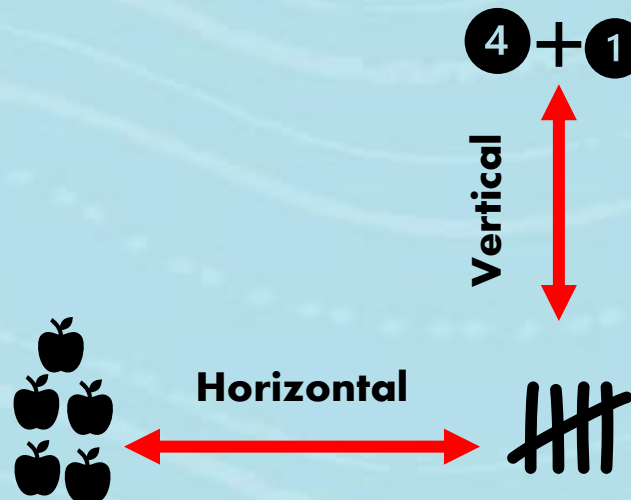
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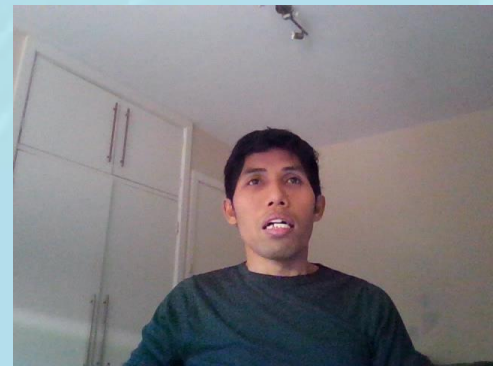
Didactical Phenomenology

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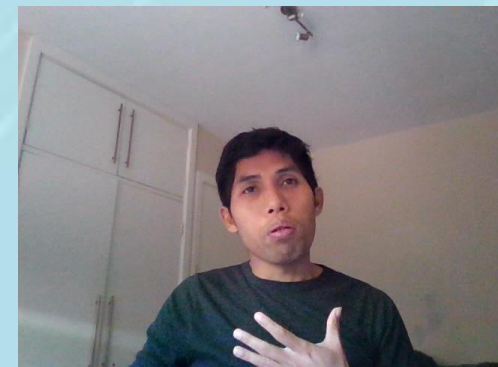
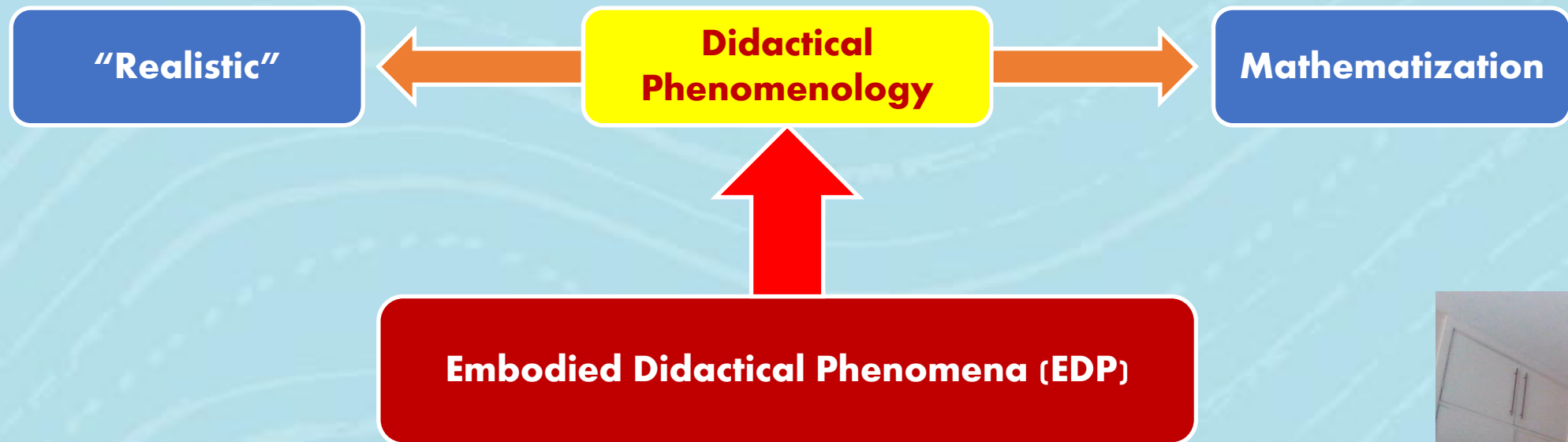
Didactical Phenomenology

“The art of identifying suitable learning phenomena or contexts that are **“realistic”** for students and promote **mathematization”**



Didactical Phenomenology

“The art of identifying suitable learning phenomena or contexts that are **“realistic”** for students and promote **mathematization**”



"Realistic"



Mathematization

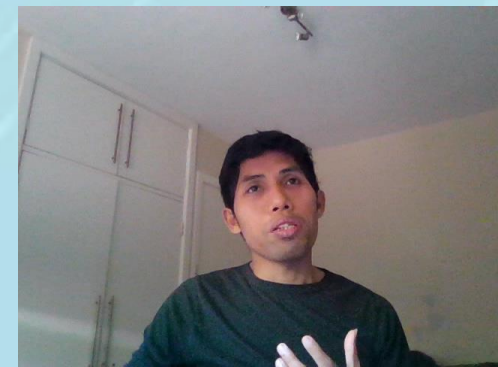


Embodied Didactical Phenomena (EDP)





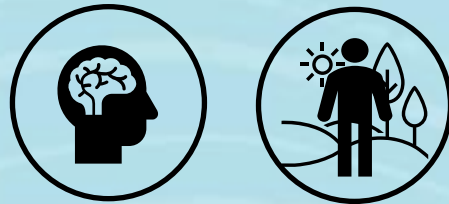
Embodied Cognition





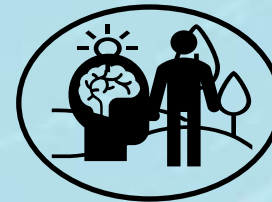
Embodied Cognition

Dualism



Plato
Descartes

Monism



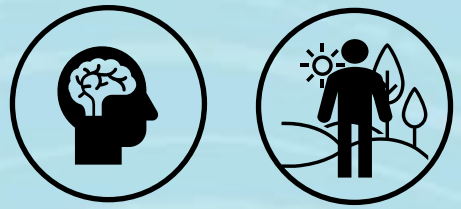
Aristotle
Merleau-Ponty





Embodied Cognition

Dualism



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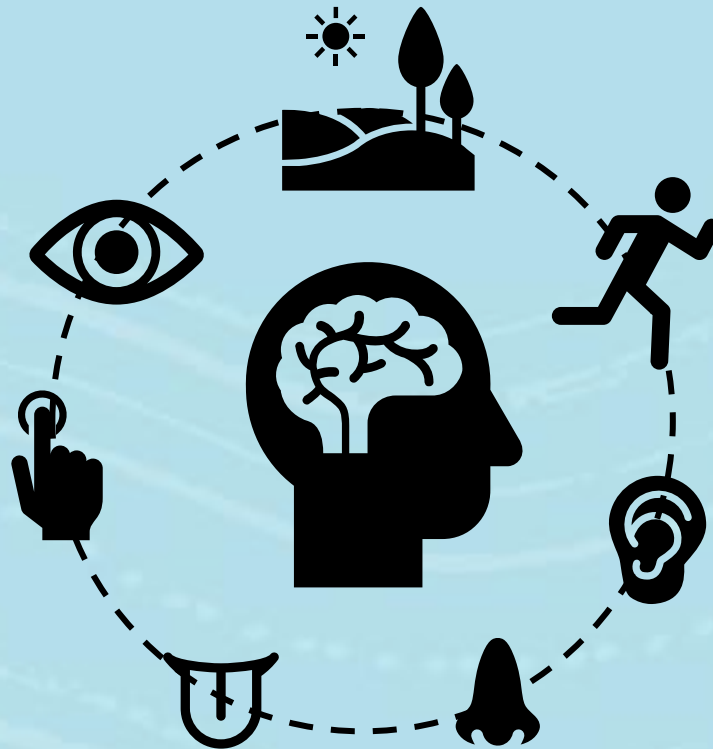


"Realistic"

Embodied Didactical Phenomena (EDP)

Mathematization

Embodied Cognition



Mind-sensorimotor interactions with the environment



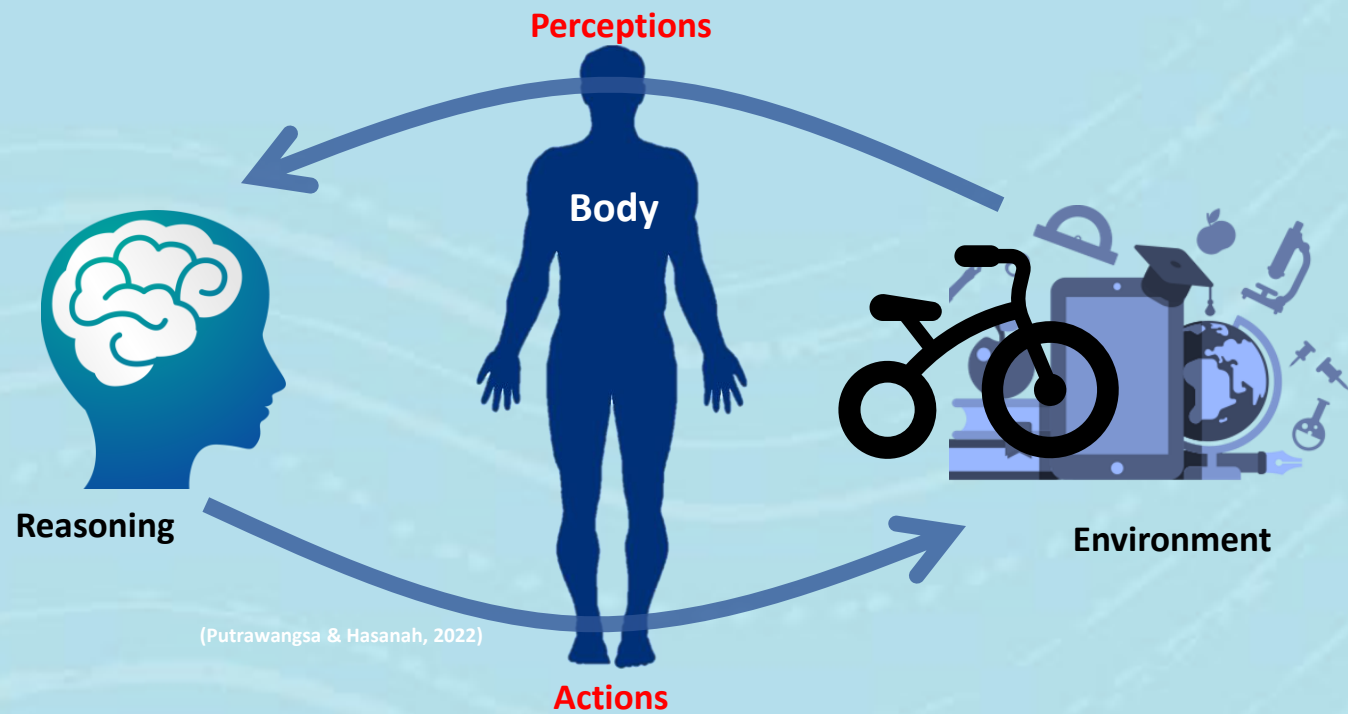


Embodied Cognition



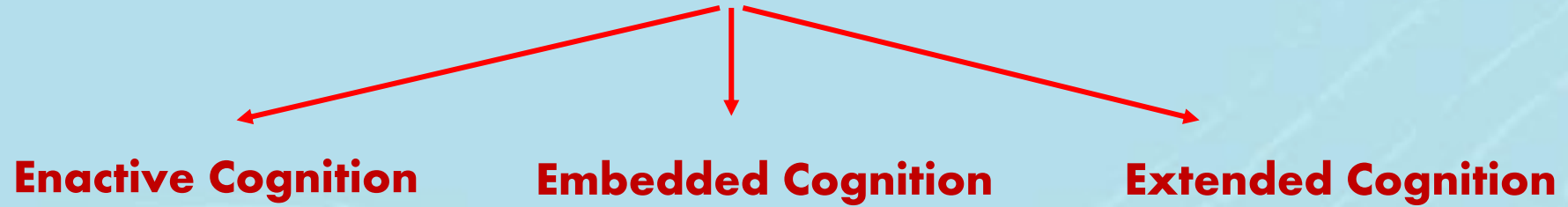


Embodied Cognition





Embodied Cognition



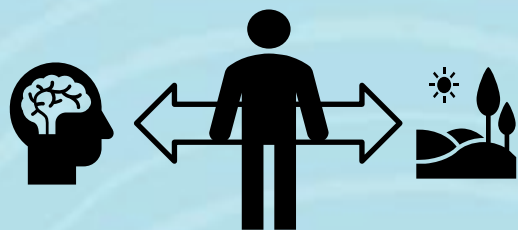


Embodied Cognition

Enactive Cognition

Embedded Cognition

Extended Cognition



"Realistic"

Embodied Didactical Phenomena (EDP)

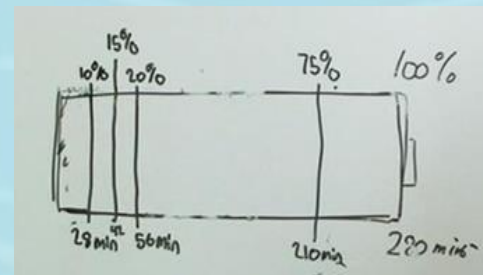
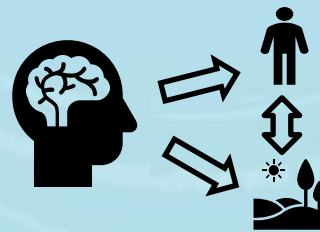
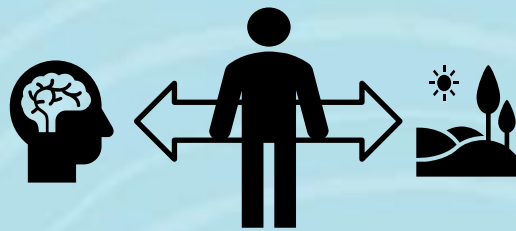
Mathematization

Embodied Cognition

Enactive Cognition

Embedded Cognition

Extended Cognition



"Realistic"

Embodied Didactical Phenomena (EDP)

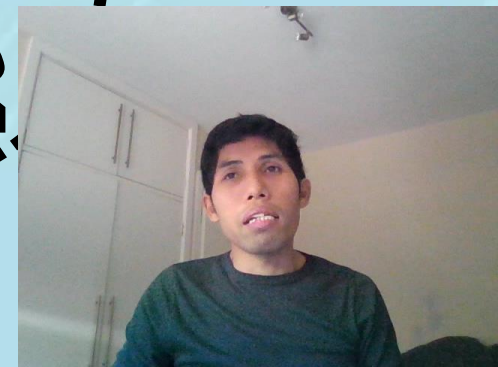
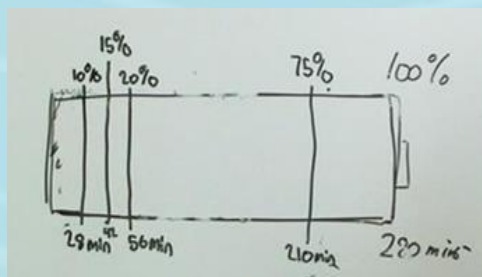
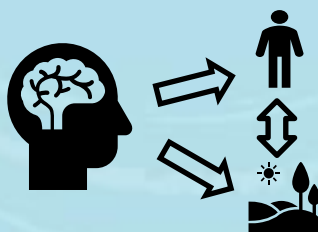
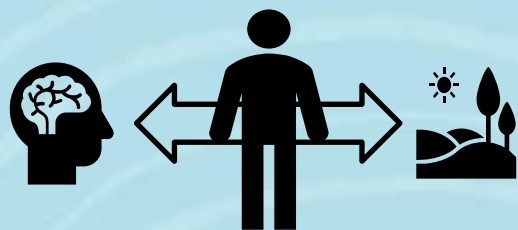
Mathematization

Embodied Cognition

Enactive Cognition

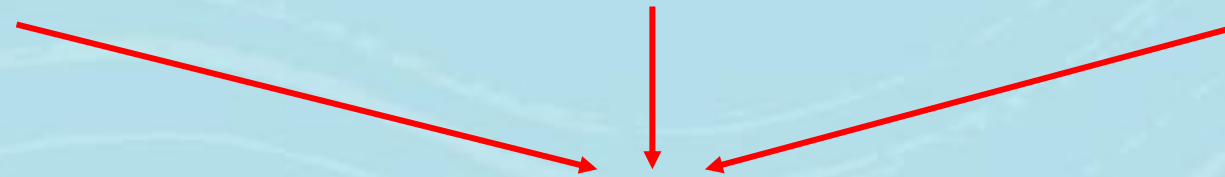
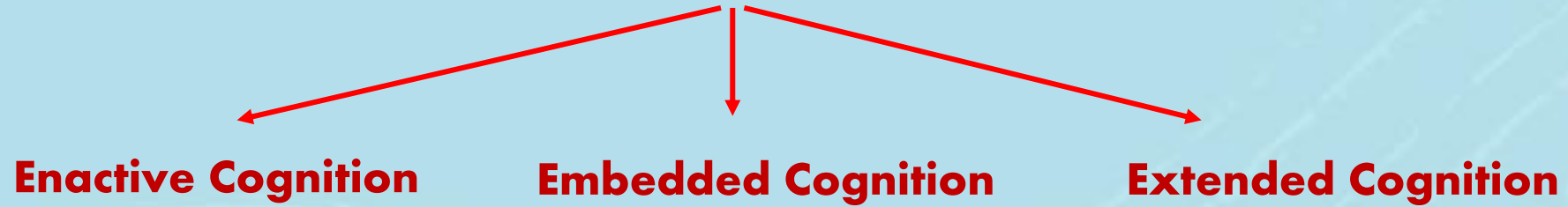
Embedded Cognition

Extended Cognition





Embodied Cognition



Embodied Mathematics

The notion that mathematical understanding and skills are developed and through **actions and interactions** with the **spatial environment**

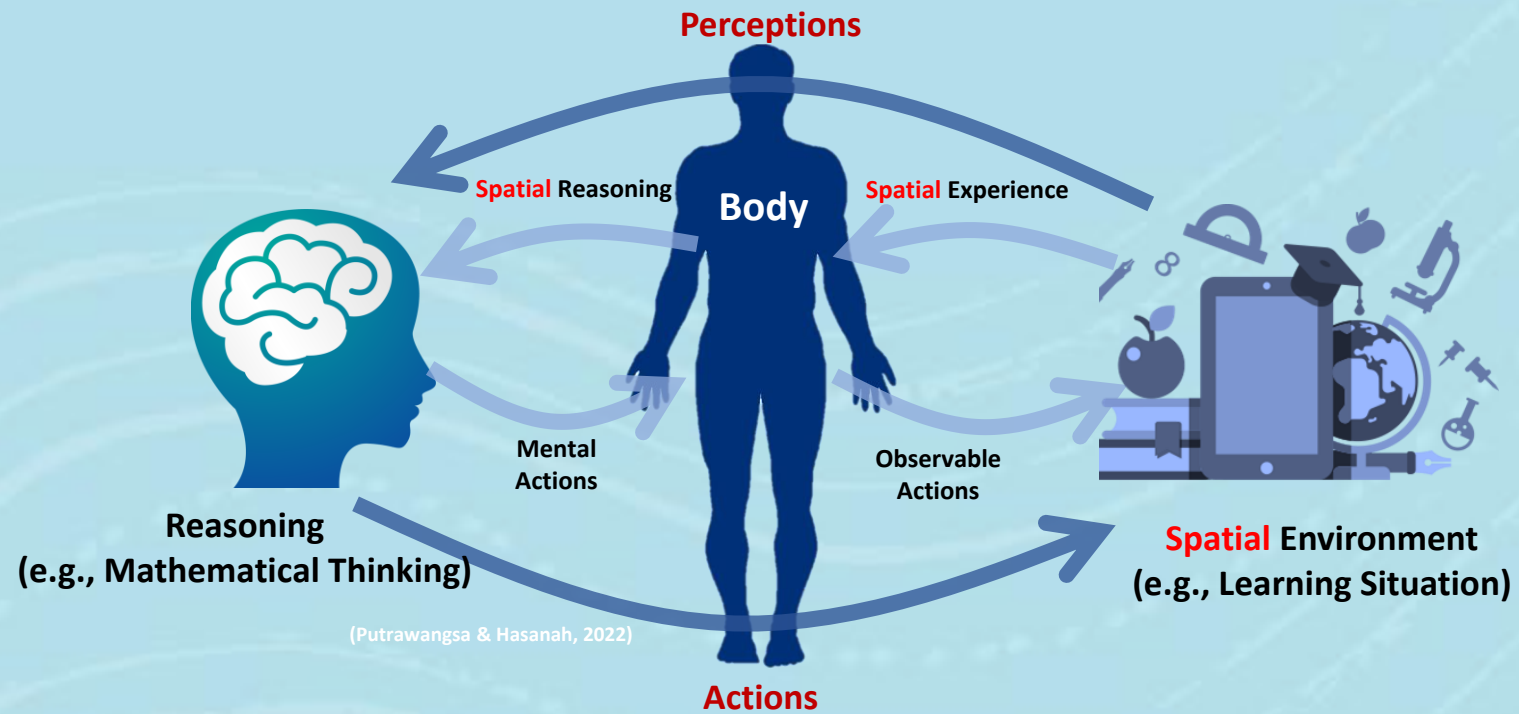


“Realistic”

Embodied Didactical Phenomena (EDP)

Mathematization

Embodied Mathematics





Learning phenomena that **involve or require** students to **enact, extend or embed themselves** in **spatial environments** to make sense, conjecture, test, express, or refine their reasoning as they are **developing an understanding** of the ideas, concepts or relations underpinning the phenomena.



“Realistic”

Embodied Didactical Phenomena (EDP)

Mathematization

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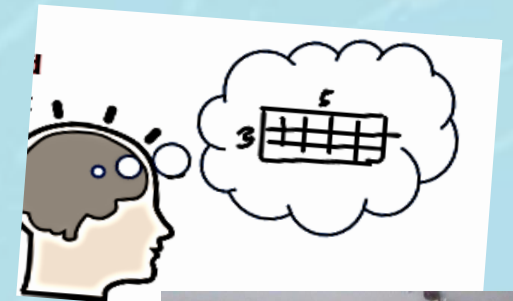
Navigating self in spatial environments



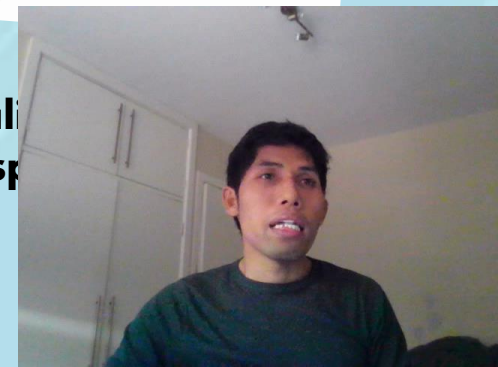
Interacting with spatial entities

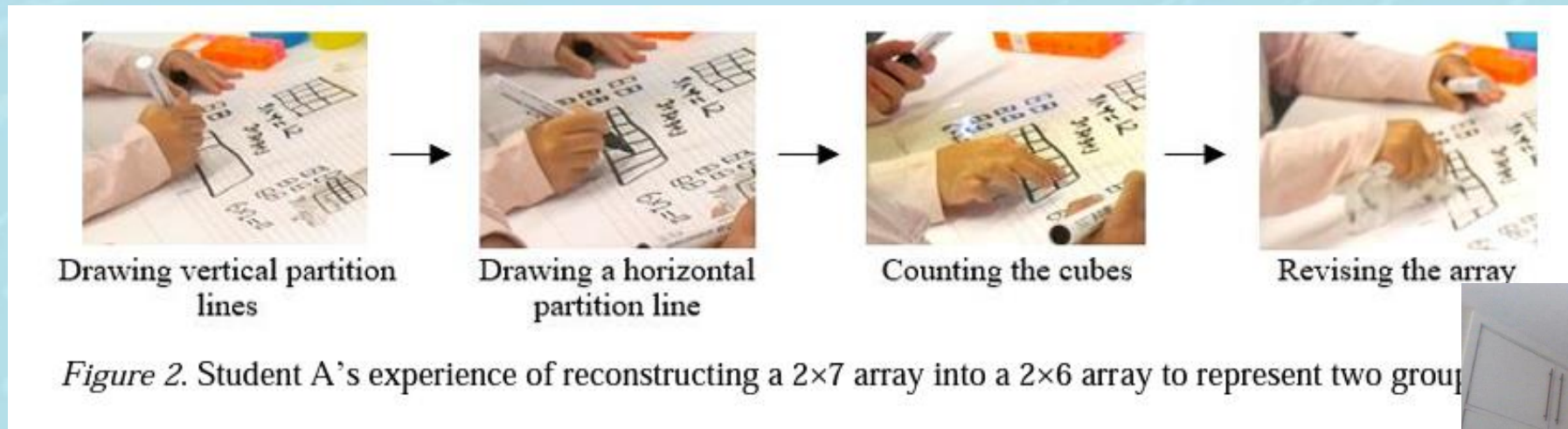
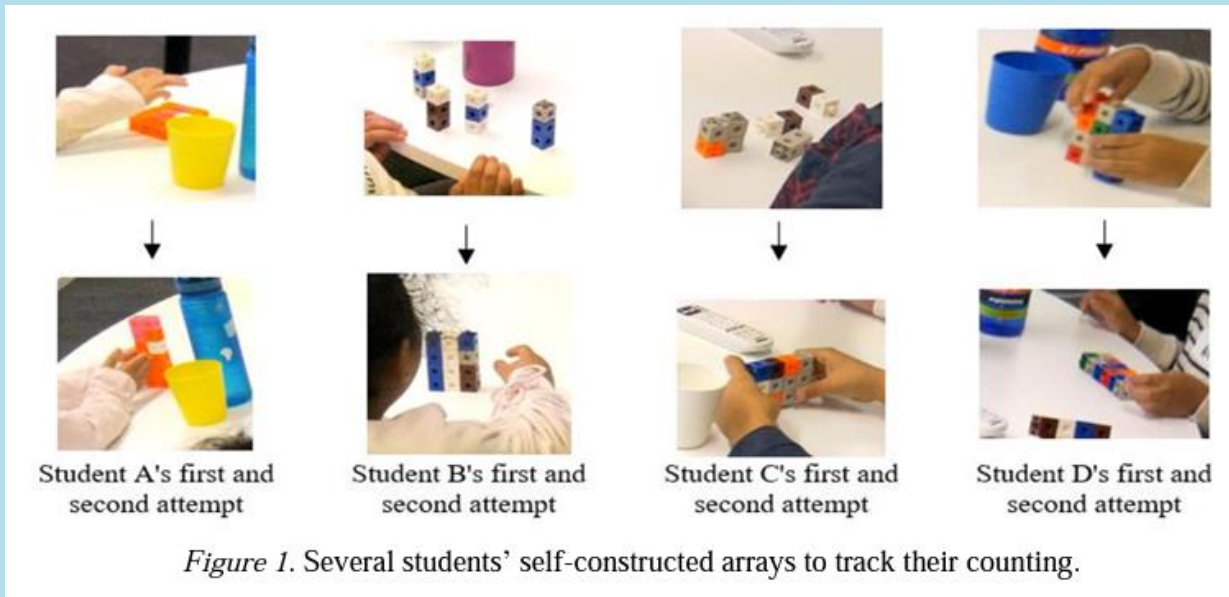


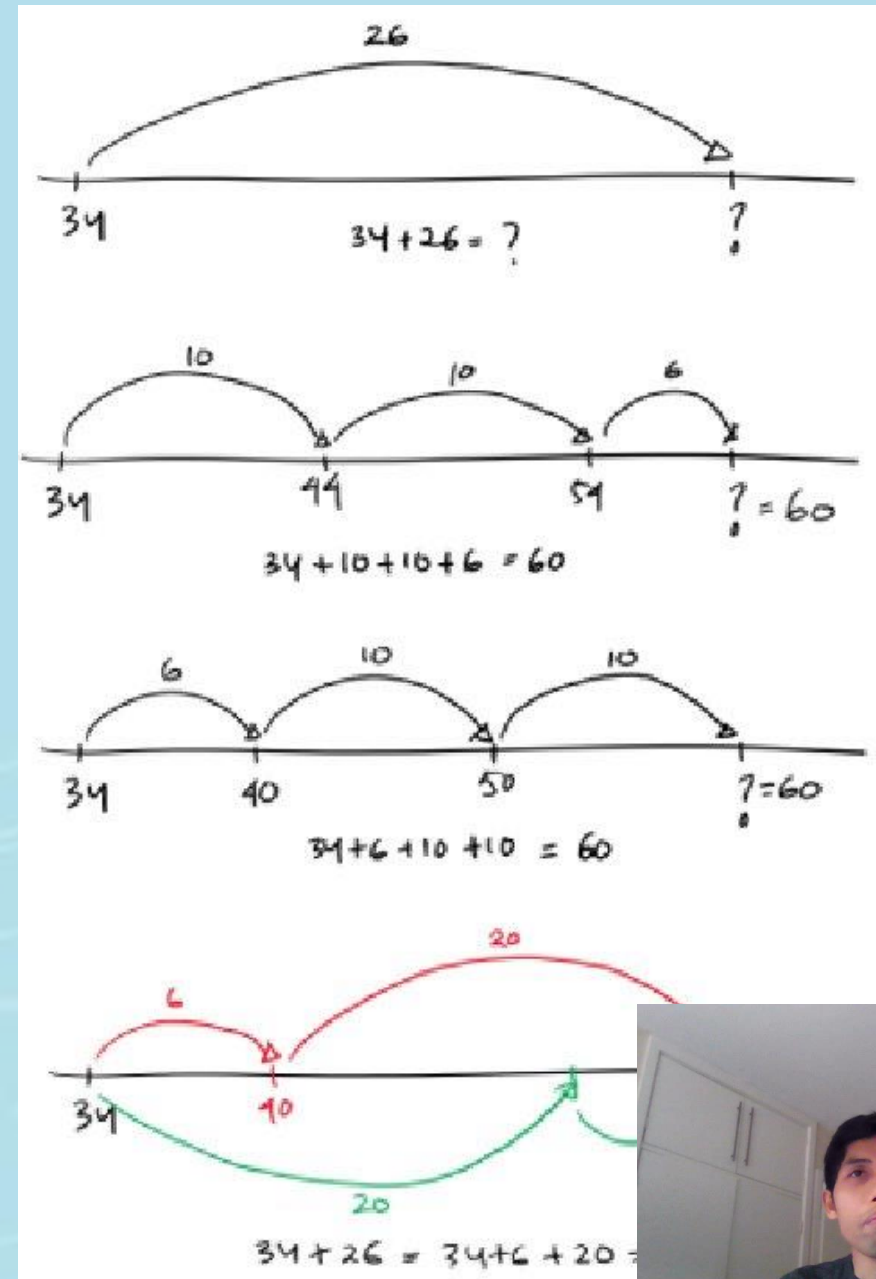
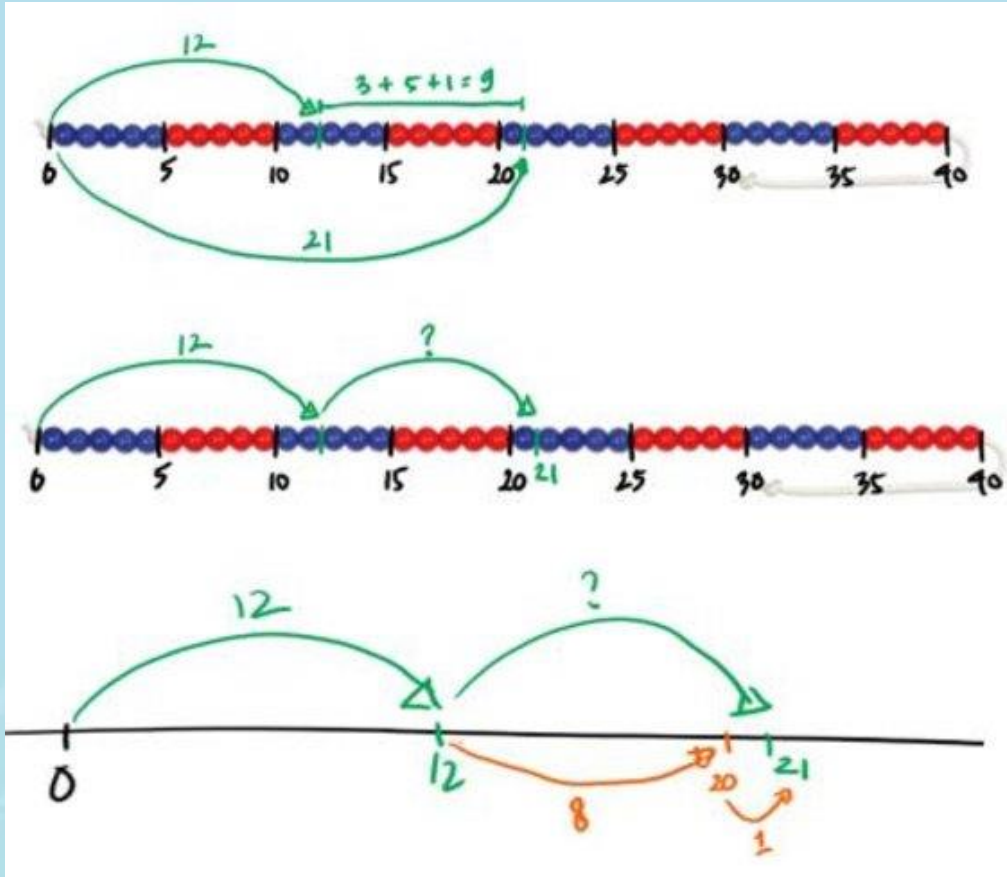
Modelling concepts in spatial representations



Visualizing spatial

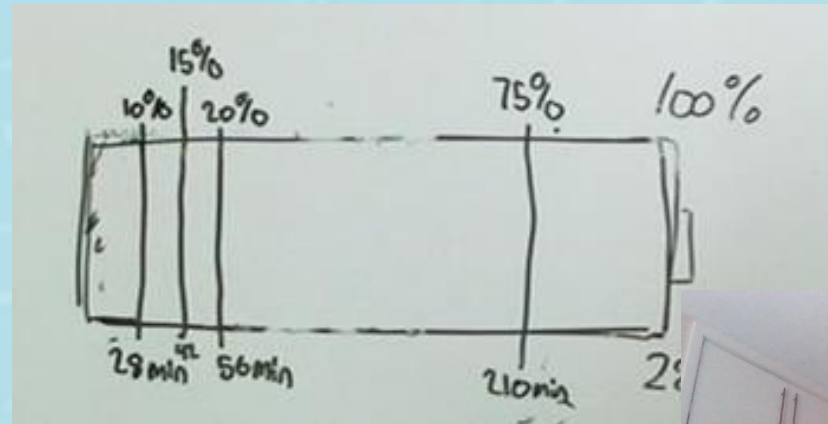
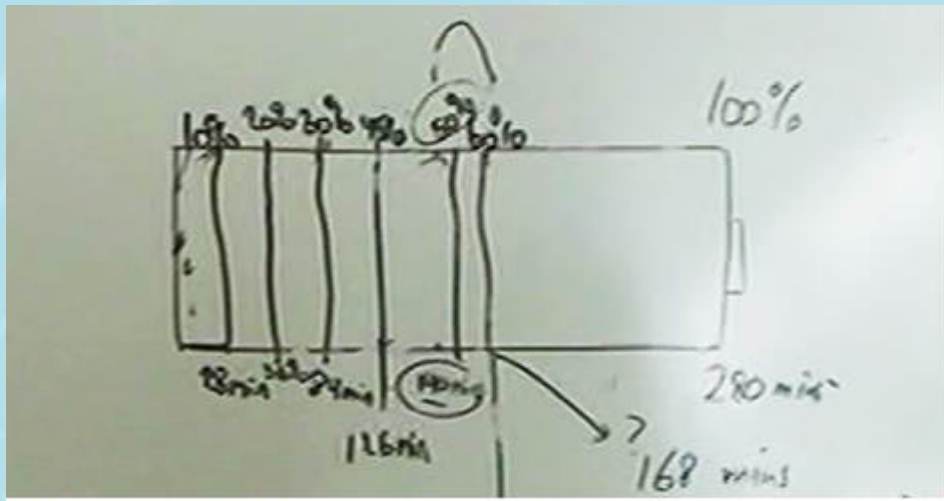
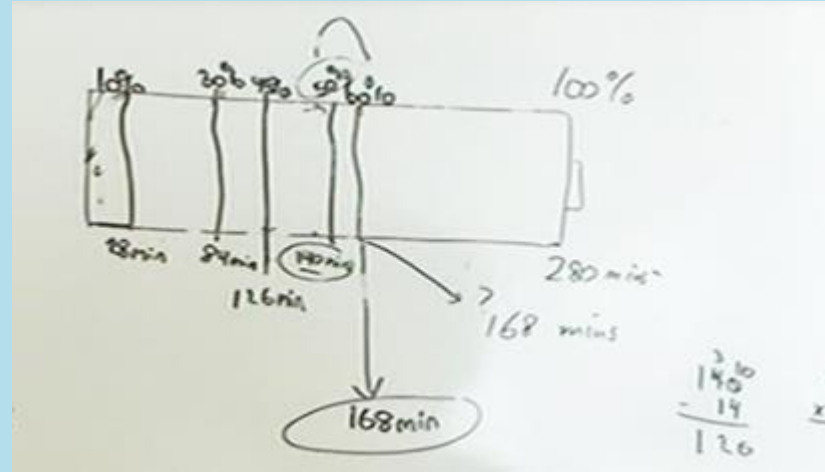
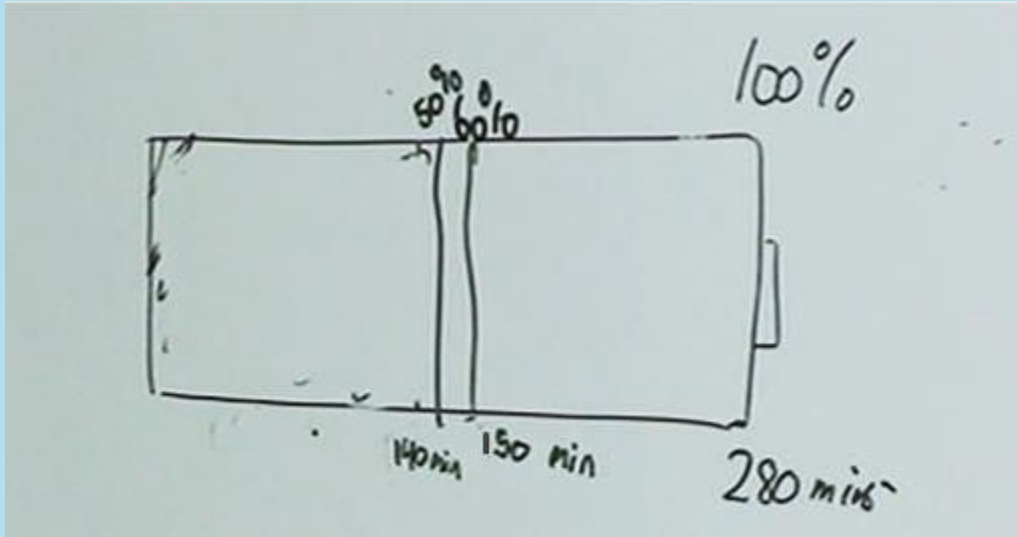






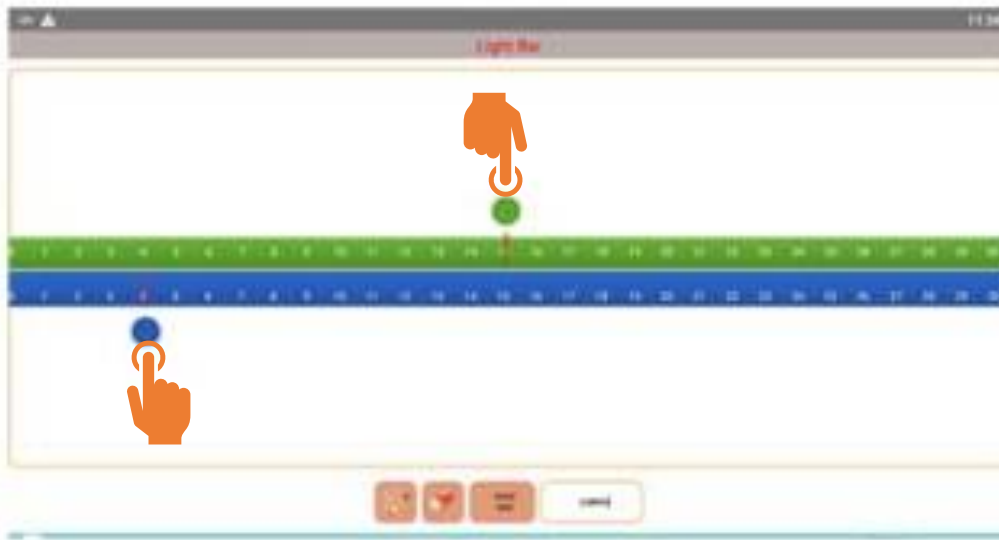
<https://www.researchgate.net/publication/362271113> The potential of spatial reasoning in mediating mathematical understanding The case of number line





[https://www.researchgate.net/publication/359992419 Developing Students' Understanding of Percentage of Spatial Representation](https://www.researchgate.net/publication/359992419_Developing_Students'_Understanding_of_Percentage_of_Spatial_Representation)





a



b

Figure 3. An example of a spatialized digital learning tool

Green	Blue
27	21
26	20
20	14
10	4
7	1



$$27 - 21 = 26 - 20 = 6$$

$$26 - 20 = 20 - 14 = 6$$

$$20 - 14 = 10 - 4 = 6$$

$$10 - 4 = 7 - 1 = 6$$



$$A - B = (A + N) - (B + N)$$



$$\text{So, } 27 - 21 = 7 - 1 = 6$$



Sensorimotor-Based Digital Media: An Alternative Design of Digital Tools in Mathematics Education

Authors
Susilahudin Putr

Corresponding Author
Susilahudin Putr

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DOI
<https://doi.org/10.21>

Keywords
instrumental appro

Abstract
Regarding the contr
way (what and how)
the effectiveness of s
supporting comprehe
experiences) potential
for learning abstract a
abstract concepts.

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Mathematics Education in Digital Era: Utilizing Spatialized Instrumentation in Digital Learning Tools to Promote Conceptual Understanding

S Putrawangsa^{1,2} and U Hasanah³
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Citation S Putrawangsa and U Hasanah 2020 *J. Phys*
DOI 10.1088/1742-6596/1657/1/012086

Article PDF

References

Article information

Abstract

Although digital technology is widely use
design and utilized a digital learning tool
propose the idea of spatial instrumental
and implementing digital learning tools
through progressive mathematics. The
encourage them to use their basic und
we outline theories that underlie ideas
tools developed under these ideas, ar

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Turn on MathJax

The potential of spatial reasoning in mediating mathematical understanding: The case of number line

AIP Conference Proceedings 2479, 020021 (2022); <https://doi.org/10.1063/5.0099540>

Susilahudin Putrawangsa^{1,a)} and

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TOPICS

Learning and learning models



MATHEMATICS TEACHING RESEARCH JOURNAL

Vol 13, No 4
WINTER 2021

Developing Students' Understanding of Percentage: The Role of Spatial Representation

4

RESEARCH PAPER

Susilahudin

¹Mataram Islamic State Unive
³Unive

putrawangsa@uinmatara

Abstract: The main goal of th
students' understanding of pe
representation of percentage
pedagogical concepts of Real
from year-four primary stud
classroom observation during
design of the learning interve
several fundamental ideas o

Embodied Task to Promote Spatial Reasoning and Early Understanding of Multiplication

Susilahuiddin Putrawangsa
University of Canberra
Putra.Putrawangsa@canberra.edu.au

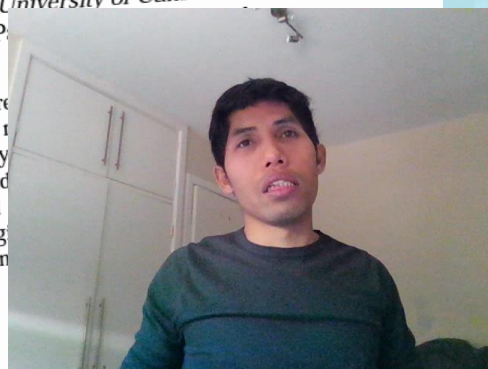
Sitti Patahuddin
University of Canberra
Sitti.P

This study enquires into the embodied processes of childre
considering how such processes can expand access to spatial r
develop students' understanding of multiplication. The analy
as they completed two embodied tasks. The aim was to und
stimulate students to use spatial reasoning to explore and
groups in array forms. The findings suggest that engag
stimulate them to think about mathematics spatially an
mathematical ideas.

Introduction

ResearchGate

<https://www.researchgate.net/profile/Susilahudin-Putrawangsa>



Contact & Collaboration

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