




# From Meme to Virtual Reality

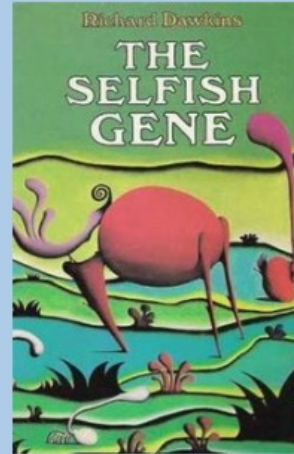
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Lecture 21 - 24th May 2023

Technology in Mathematics Education



# WHAT ARE MEMES?



1976



## RICHARD DAWKINS "The Selfish Gene"

from Greek μίμημα 'that which is imitated'

meme : human culture = gene : biological heritage

# WHAT ARE INTERNET MEMES?

1993

**MEMES**

*Fashions*

*Ideas*

*Art*

*Tunes*

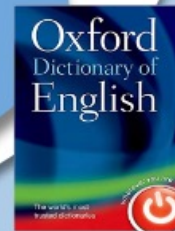
**INTERNET MEMES**

*Captioned images*

*(Image Macros)*

*Videos*

*Texts*



➡ A digital artefact, typically **humorous in nature**, that is copied and **spread rapidly** by Internet users, often with **slight variations**

Oxford Dictionary of English, **2019**

(Bini, 2019)

# EXAMPLES OF DIVERSE INTERNET MEMES GENRES

**Performances:**  
the bottle cap challenge



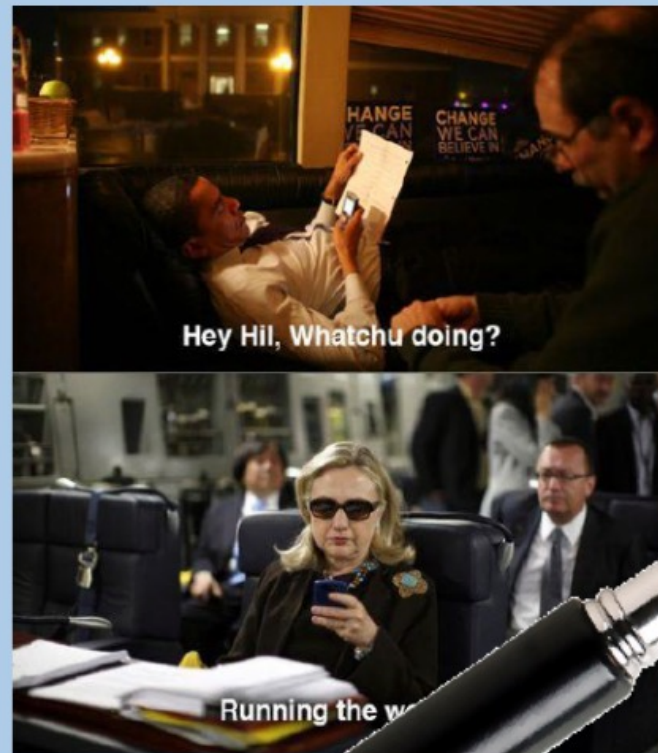
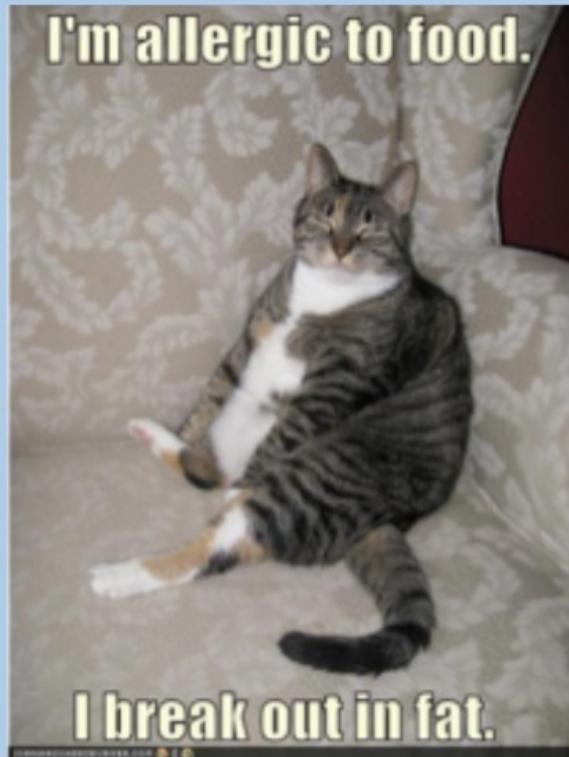
**Photo Fads:**  
the leaning tower of Pisa forced perspective



**Image macros:**  
the Success Kid



# THE EVOLUTION OF IMAGE MACROS



from LOLcats

itics

...and mathematics

# OUR FOCUS: MATHS IMAGE MACROS

[source Facebook]

WHEN YOUR LONG DIVISION



ENDS UP WITH NO REMAINDER

imgflip.com

Arithmetics



Trigonometry

Me using  $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  to find roots of  $x^2 - 1 = 0$ .



Algebra

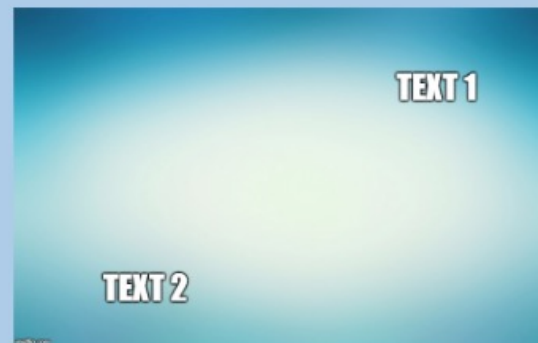
# THE **TRIPLE-S** CONSTRUCT OF THE PARTIAL MEANINGS OF INTERNET MEMES (BINI & ROBUTTI, 2019)



SINGLE-PANE



MULTI-PANE



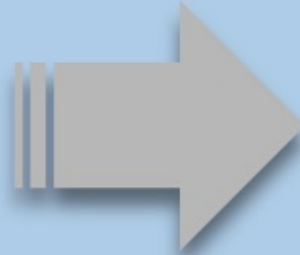
OBJECT-LABELING



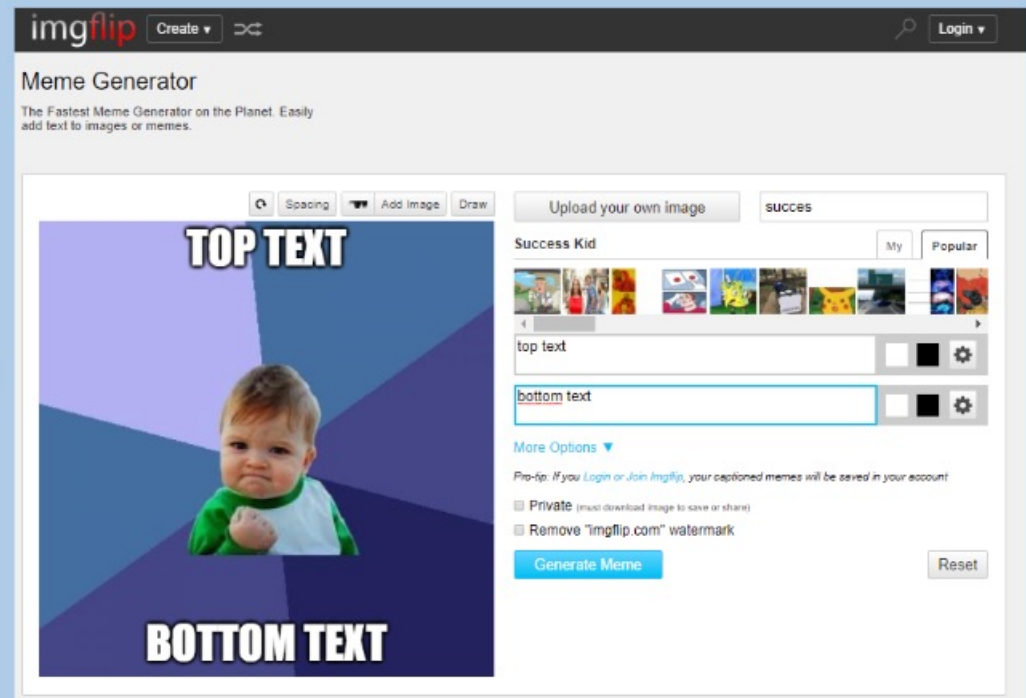
WHITE BORDER

The **first partial meaning** is **STRUCTURAL** and lies in having a recognizable and consistent aesthetic, given by the text font, colour and position, and by the image visual impact.

# MOBILE DEVICES' SCROLLING GESTURE SHAPES STRUCTURAL RULES



# STRUCTURAL RULES SHAPE MEME GENERATOR WEBSITES



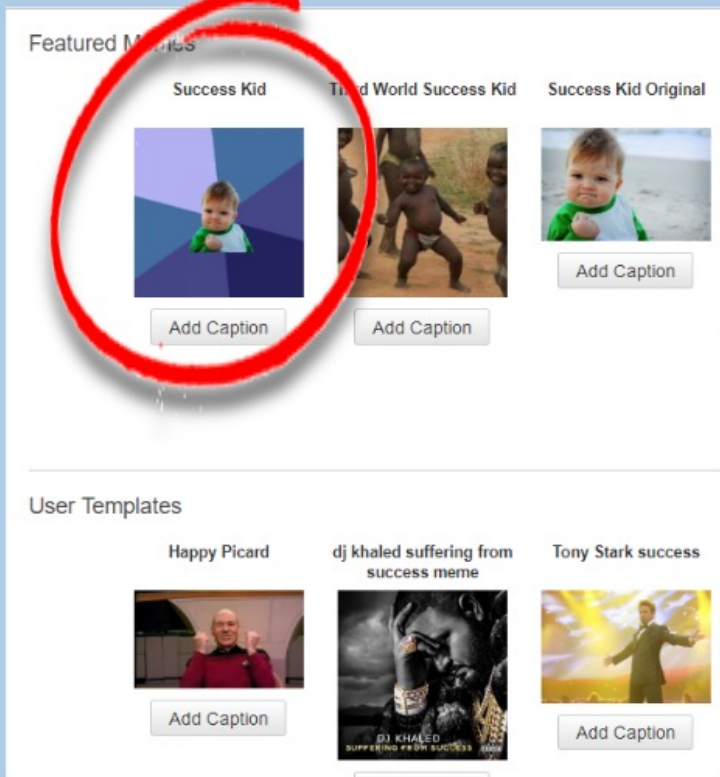


# THE **TRIPLE-S** CONSTRUCT OF THE PARTIAL MEANINGS OF INTERNET MEMES (BINI & RO BUTTI, 2019)



The **second partial meaning** is ***SOCIAL*** and lies in the shared conventions of viral images, compositional setups and syntaxes.

# THE MEMESPHERE SHAPES SOCIAL RULES LIKE TEMPLATES NAME & USE



# SOCIAL RULES SHAPE WEBSITES LIKE KNOW YOUR MEME



# THE **TRIPLE-S** CONSTRUCT OF THE PARTIAL MEANINGS OF INTERNET MEMES (BINI & RO BUTTI, 2019)



general humor



maths



Politics

[Obama's staff on Twitter, June 2013]

The **third partial meaning** is **SPECIALIZED** and lies in images, symbols or text referring to a specific topic.

## The Success Kid

*Structural Meaning*



*Social Meaning*

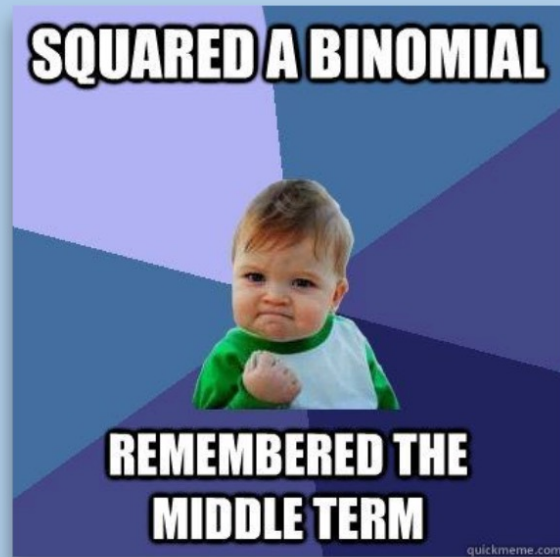


**Didactic use: emphasize correct practices related to positive emotions**

## EXAMPLES



## EXAMPLES

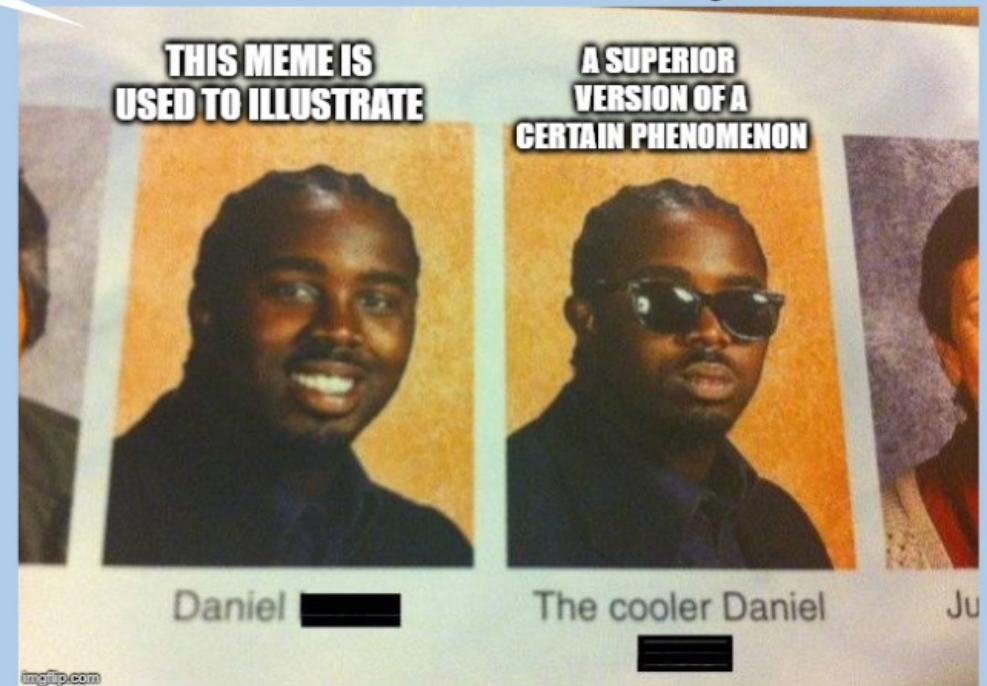


## The cooler Daniel

*Structural Meaning*



*Social Meaning*



**Didactic use: compare different levels of mathematical concepts**

# EXAMPLES



**Distracted boyfriend**

*Structural Meaning*



*Social Meaning*



**Didactic use: draw attention to misconceptions and classic errors**



## EXAMPLES



## EXAMPLES

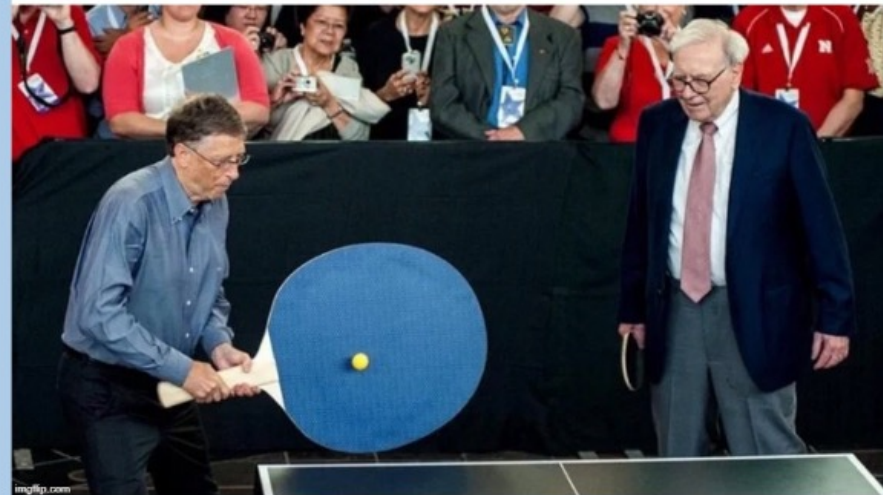


## Bill Gates' giant ping pong paddle

*Social Meaning*

*Structural Meaning*

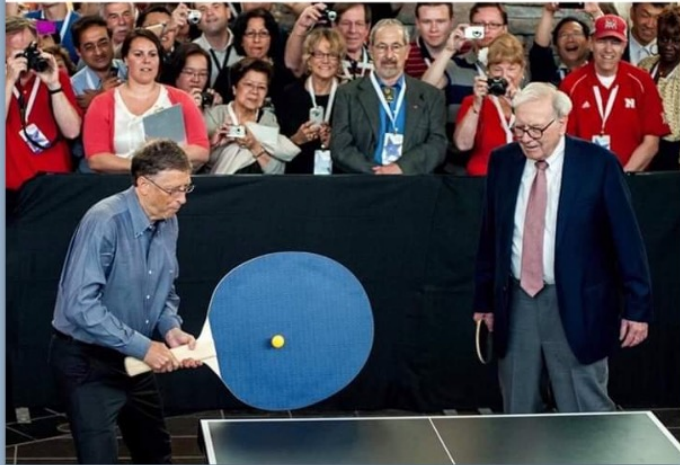
This meme is used to make fun at a tool that is too powerful for a particular job



**Didactic use: focus on optimized procedures**

## EXAMPLES

Using a calculator to make sure  $4+3$  equals  $7$  on a test



## EXAMPLES

Me using  $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  to find

roots of  $x^2 - 1 = 0$ .



## OTHER EXAMPLES

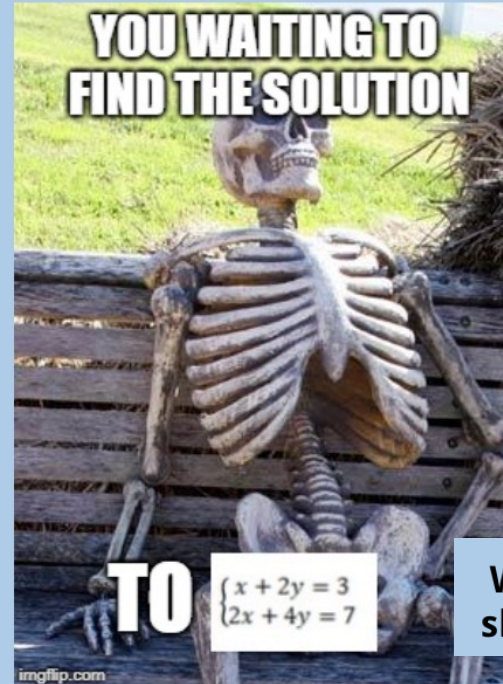
$$\int e^x x^2 dx$$



Me Opening up  
to Someone

## OTHER EXAMPLES

YOU WAITING TO  
FIND THE SOLUTION



Waiting  
skeleton

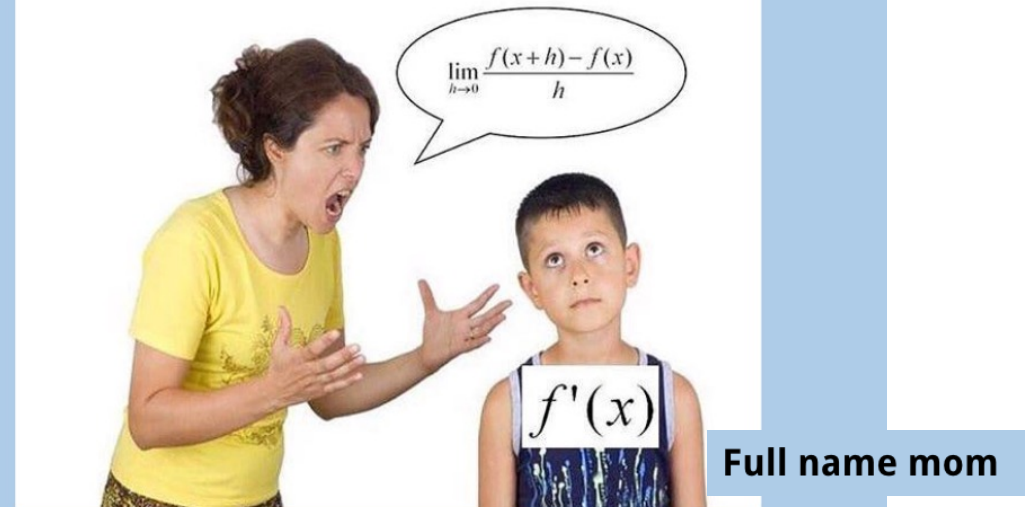
## OTHER EXAMPLES



Classroom suggestion

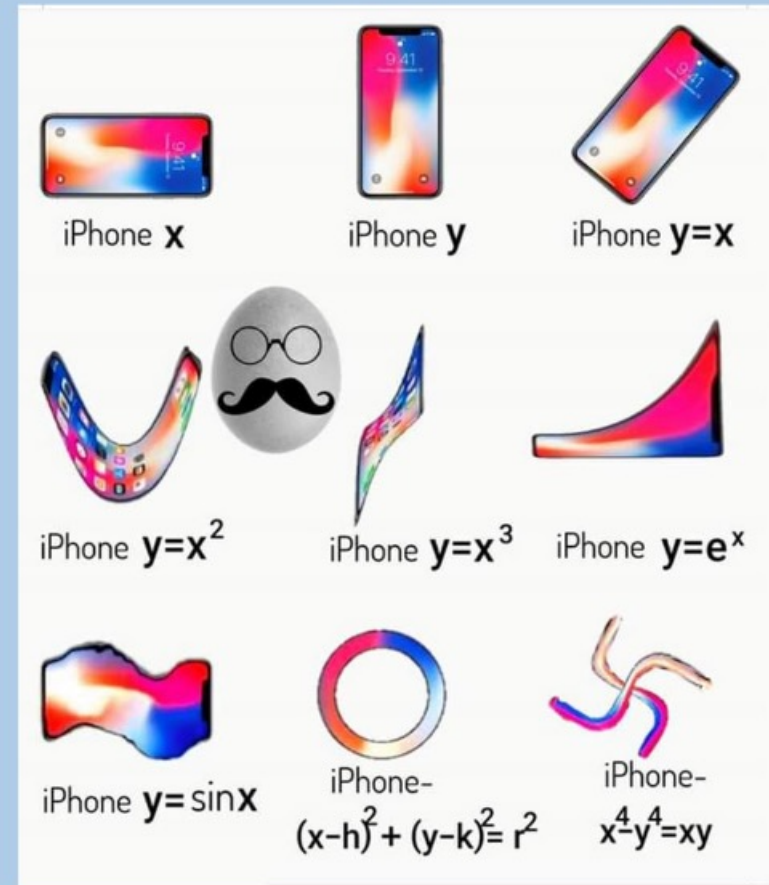
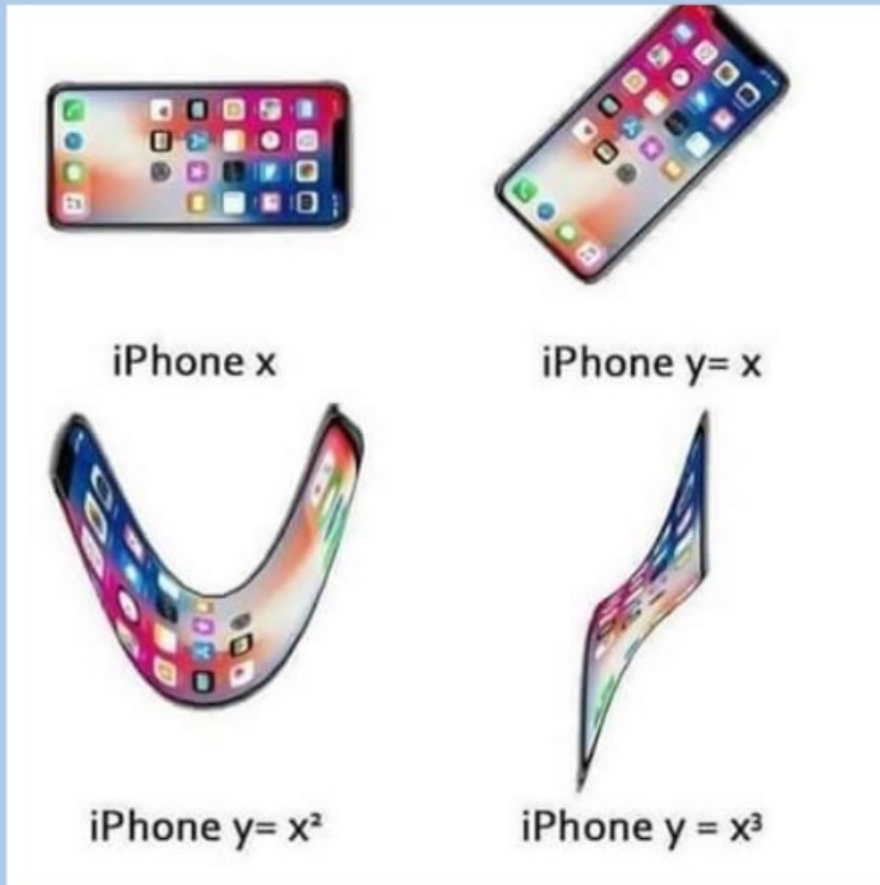
## OTHER EXAMPLES

When your mom calls you by your full name:




Full name mom

# OTHER EXAMPLES



# Possible activities for students

1. SEARCH 2. CREATION 3. DISCUSSION	ANALYSIS OF PARTIAL MEANINGS	DEEPENING OF THE SPECIALIZED MEANING	POSSIBLE DIDACTIC USES
1. <b>Web search</b> for a meme on an assigned or free topic	<b>Packing of partial meanings</b>	Deepening of the mathematical meaning through video, written text, presentation, GeoGebra applet	Systematization of knowledge Formative evaluation Metacognition Motivation Engagement
<b>Creation</b> of a meme on an assigned or free topic	<b>Unpacking of partial meanings</b>	Collective discussion of the mathematical meaning	
3. <b>Class discussion</b> on memes found or created by classmates or teacher	<b>Packing and unpacking of partial meanings</b>		



**Meme as tools to systematize the knowledge already acquired by the class on a given topic,** with particular attention to the following aspects:

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#### COGNITIVE

- **strengthening of the mathematical discourse** and of the topic vocabulary
- **improvement of the ability to relate different representations** of a concept

#### NON-COGNITIVE

- **widening of the spectrum of student involvement** by leveraging on non-strictly educational skills;
- **openness to humour, creativity and emotions** in a subject traditionally distant from these elements;
- **updating of the teacher-student relationship**, thanks to the two-way exchange triggered by memes (the teacher learns about an artefact representative of youth culture while students learn maths);
- **engaging and motivating students**, using memes to connect with them in a different way.



## BEFORE THE ACTIVITY: FOR THE TEACHER

**Identify a topic already developed in class for which reorganization and systematization can be useful:** the understanding and therefore the creation of a meme requires, in fact, to be able to access the third level of partial meaning (the specialized one).

**Set up the virtual space for sharing works:** memes, although extrapolated from the social context and brought into the school environment, maintain their value as “*social currency*” within the class group, and their message is strengthened by sharing and likes.

*The most convenient environment for sharing is a Padlet board, but any other sharing tool that allows reactions is fine; if digital resources are scarce, the memes themselves, printed and hung in the classroom, are an excellent solution!*

To maximize peer exchange, it is preferable to have the activity performed in pairs, using on-line devices.

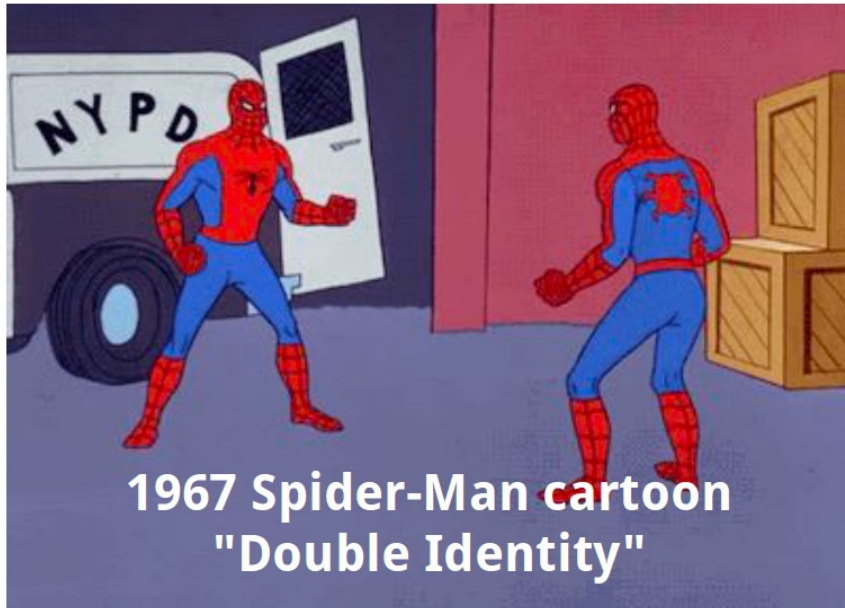
Students will create:

- a **meme (in the language you prefer) on a specific topic selected by the teacher**, created with an online device using one of the [webapps for creating memes](#) already seen on the [“Understanding and creating a meme” page](#);

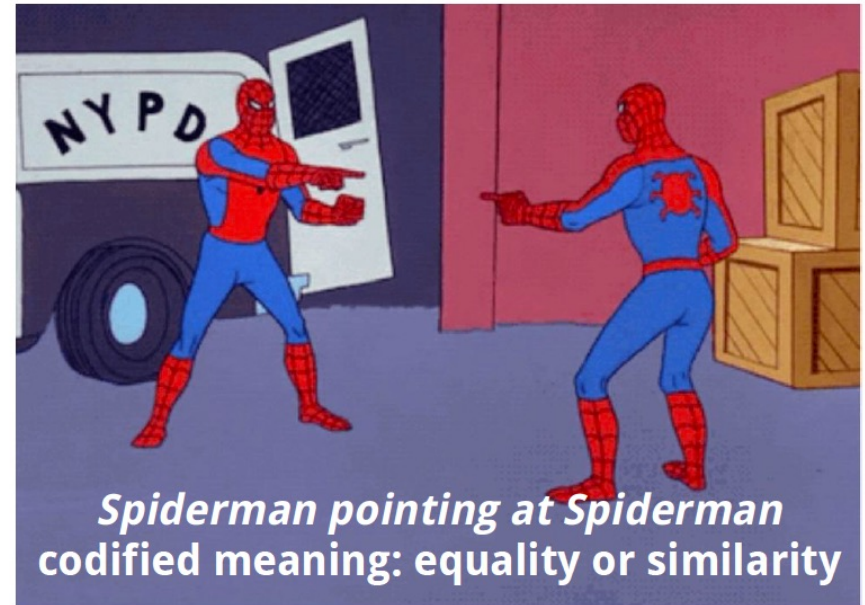
to which, at the discretion of the teacher, it will be possible to add:

- a **short video** (in your chosen language) max 2/3 minutes, a **written text or a short PowerPoint presentation explaining the mathematical content needed to understand the meme (not the joke!)**, created with a smartphone or a tablet; to facilitate sharing, the video can be uploaded to [Youtube](#) (using the “unlisted” option if you do not want it to be visible to the public);
- a **GeoGebra applet, which graphically or symbolically illustrates the mathematical content**, created with the GeoGebra sw downloaded to the device in use or through the online app.

## TEMPLATES



## TEMPLATES



This “**memeification**” of digital images is a process of “**resemiotisation**, whereby content is lifted from a text in the source domain and recast in a modified form during the production of a subsequent derivative text in the target domain.” (Laineste, & Voolaid, 2016, p. 28).



*Spiderman pointing at Spiderman*  
codified meaning: equality or similarity

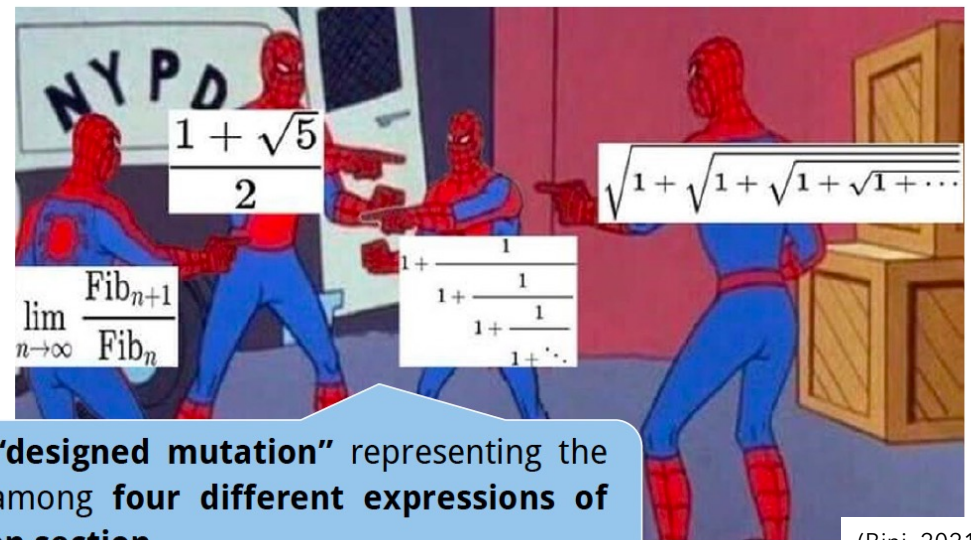
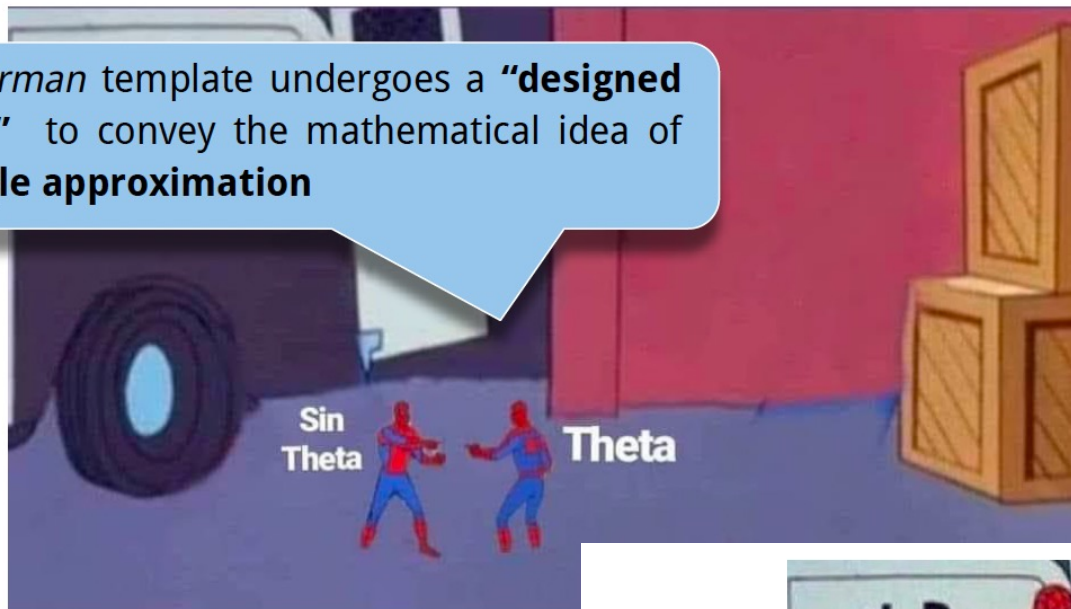
## CRACKING THE PUZZLE



The *Spiderman* template is used to represent the mathematical **property of the derivative of the exponential function**

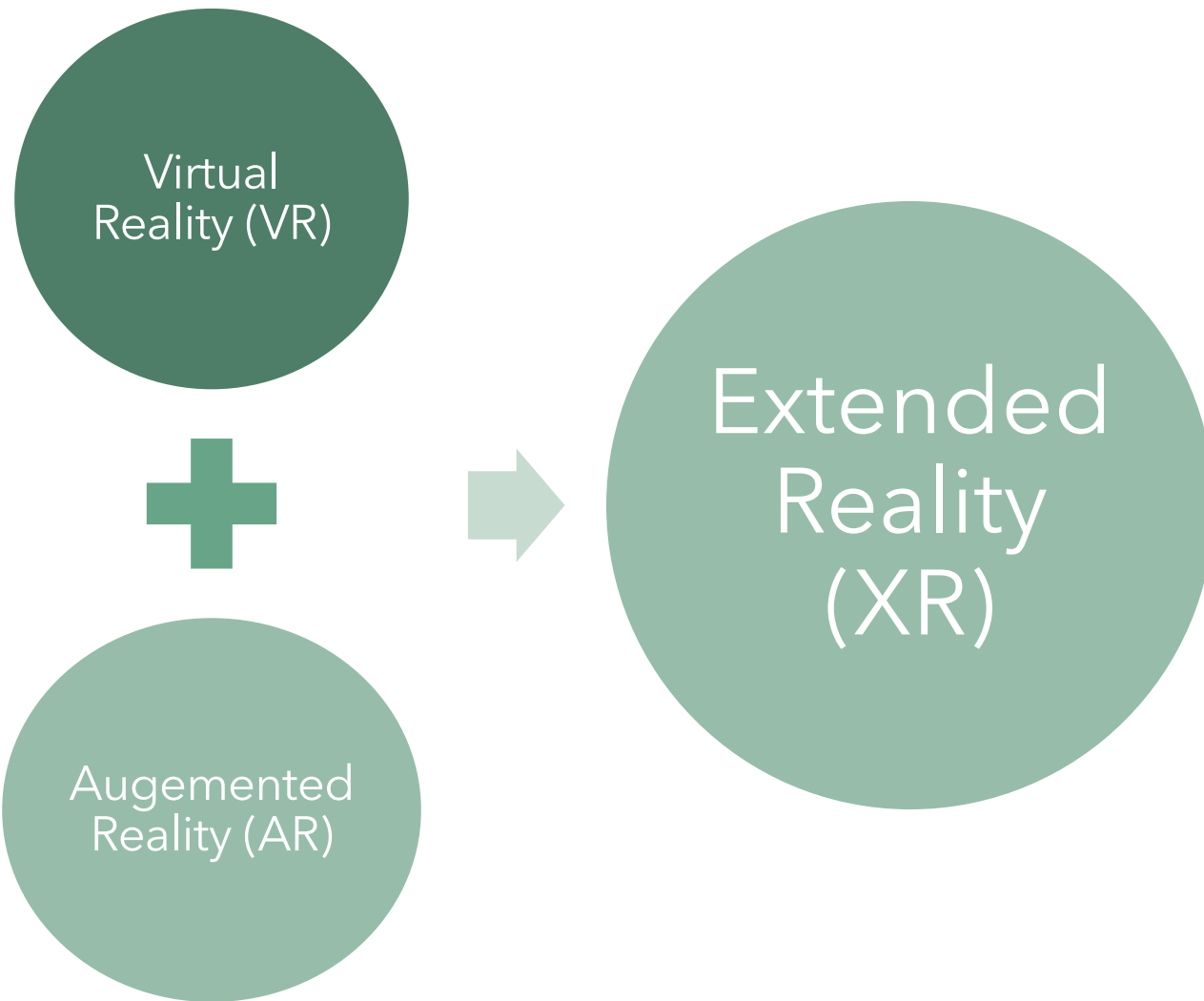
(Bini, 2021)

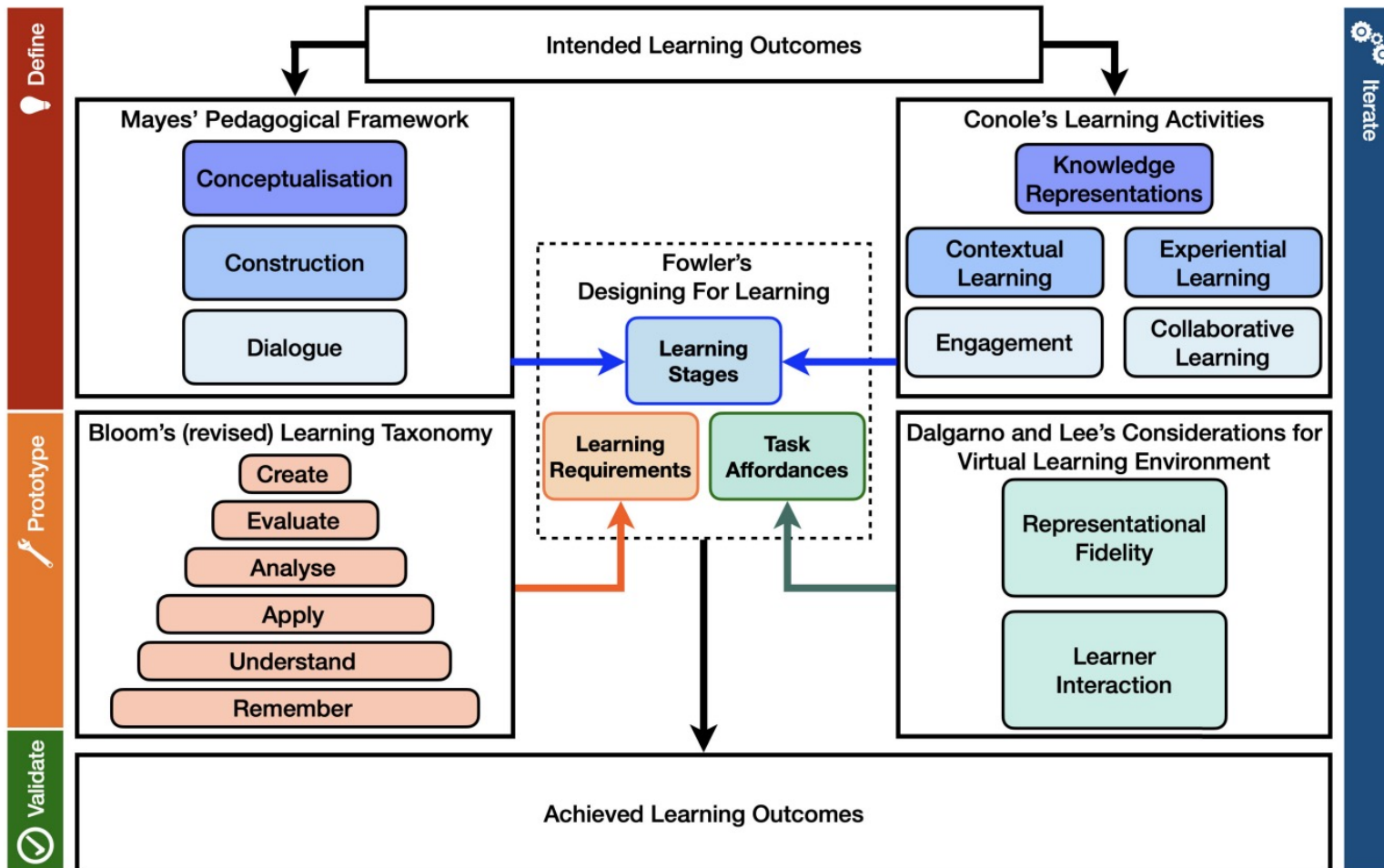
The *Spiderman* template undergoes a “**designed mutation**” to convey the mathematical idea of **small angle approximation**



Another “**designed mutation**” representing the relation among **four different expressions of the golden section**

(Bini, 2021)





An enhanced framework for extended reality learning environments

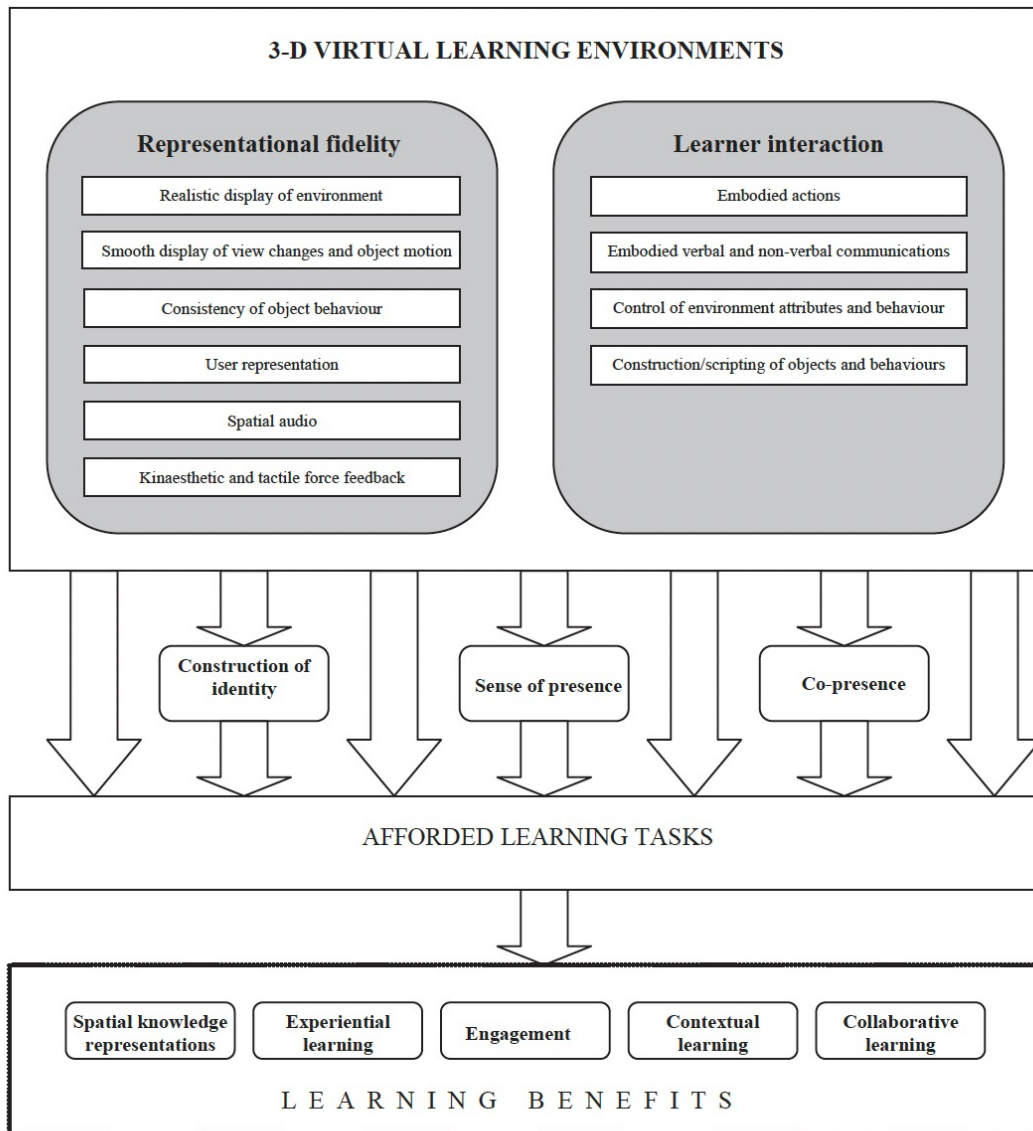


Figure 1: Dalgarno and Lee's elaborated model of learning in a 3-D VLE

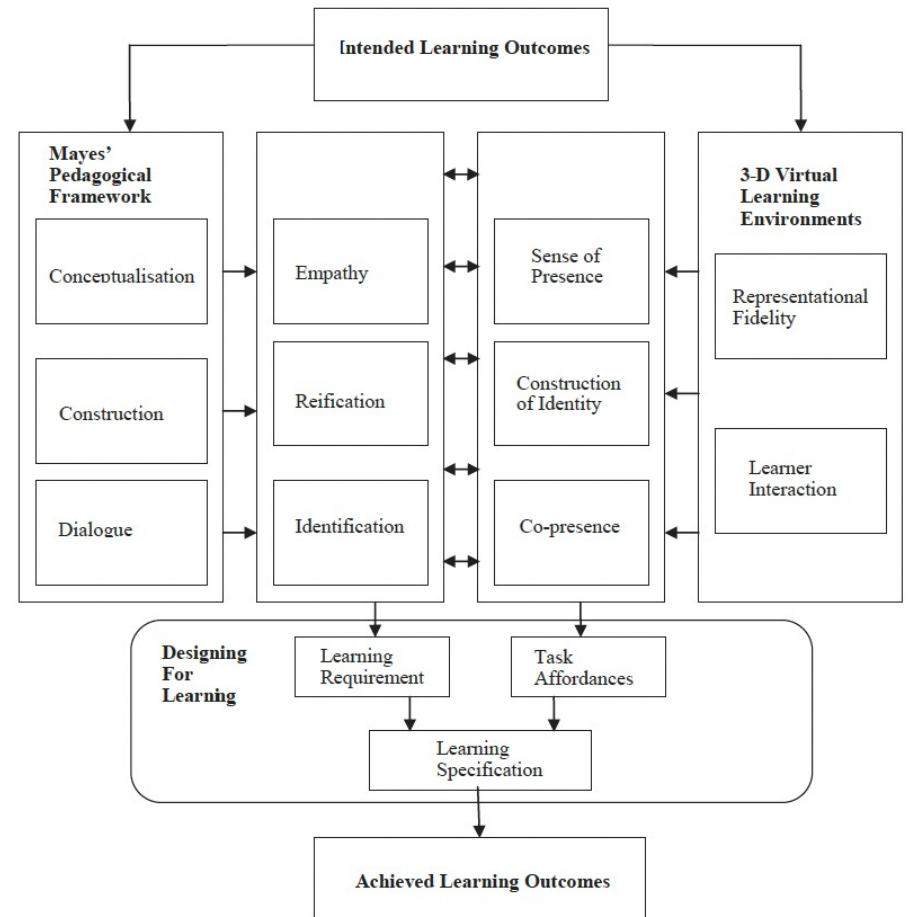


Figure 2: An enhanced model of learning in 3-D VLEs

(Fowler, 2015)



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