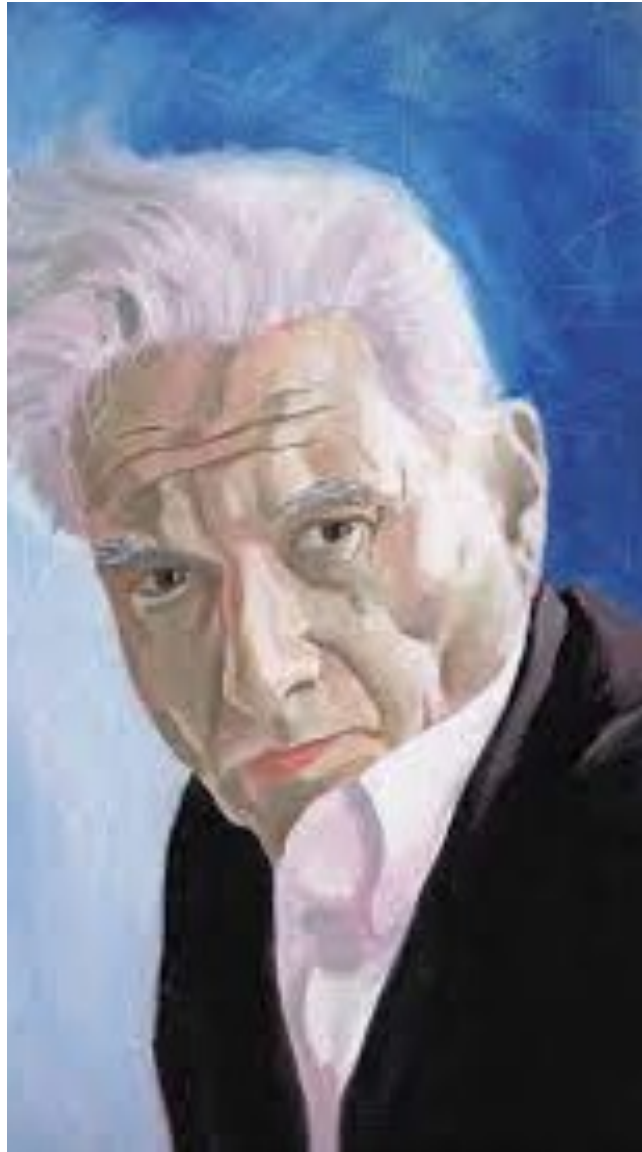


Exploring the Transgressive Organics of Mathematical Traces

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Traces in/of mathematical activity

- A trace is something (some thing) that **makes present** something **other than itself**.
 - “The concept of trace is coextensive with the living in general: As soon as there is referral to another or to something else, there is a trace”
- Both **shape and are shaped by human activity** as we go beyond the trace
 - offering insights into the transgressive nature of (mathematical) traces

A transgressive organics

- Mathematics is not just out there:
We *must* make sense of the sounds/marks, they do not mean anything in themselves.
- We see mathematics as an activity rather than a collection of concepts
 - A dynamic interplay between traces and human engagement (of a special kind)

$$\frac{16}{64} = \frac{1}{4}$$

This is not mathematics



**“being a mathematician,
again like being a poet, or
a composer or an
engineer, **means doing**,
rather than knowing or
understanding”**

Seymore Papert

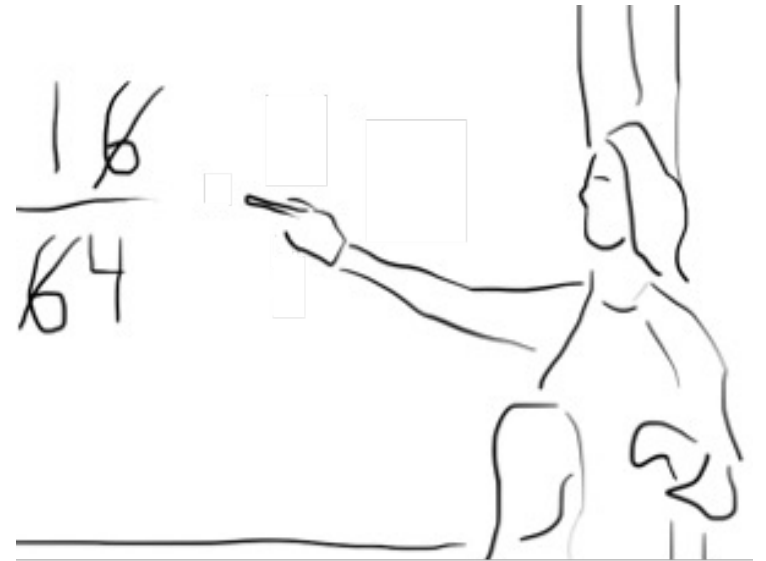
In the classroom

Mary: I found a new way to reduce fractions. Here, I have 16 over 64, and if I cross out the 6s, I get $\frac{1}{4}$. Is this method working?

Samy: Because you do 4×6 , it gives you 64. If you do “ $\times 6$ ” you get the same answer.

Mary: Okay... if you do one times...

Samy: Eh no, “ $\times 16$ ”.



These traces are both **traces of**
and **traces for** mathematical
activity

Require transgression:
“illegitimately and impossibly
going beyond”

Density and ambiguity in/of mathematical traces

I found a new way to reduce fractions. Here, I have 16 over 64, and if I cross out the 6s, I get $\frac{1}{4}$. Is this method working?



- High mathematical density in the first utterance.
 - Historically, culturally developed form of mathematics brought into conversation
- To make sense, we have to **interpret mathematically** what is presented
- Interpretation is much more than “decoding”
 - What is the “method” she is referring to?
 - 16/64 is an example of what?
 - What does it mean for the method to “work”?

One way to (possibly) go

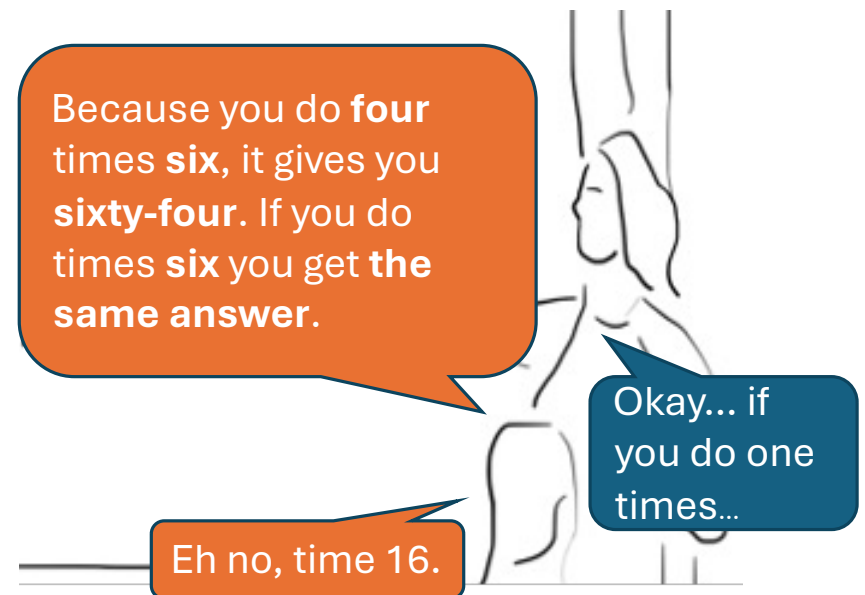
Mary offers a **trace for** doing math

The student apparently answers to:

- the crossing out of 6s
- the presence of a 4 and 64
- the resulting obtention of an equivalent fraction.

The student's answer, a **trace of** his mathematical activity, is examined

- The necessity to transgress the traces to derive meaning
- The trace itself can transgress or betray



Ok, if you do times 16 on the top and the bottom we get 16 over 64.

$$\frac{16}{64} = \frac{1}{4} \begin{array}{l} \times 16 \\ \times 16 \end{array}$$

Does it work all the time?

Lets verify. What can we do to check?

Not with 25/52

Meaning is derived by reading beyond the trace

“Mathematical” is a quality one might or might not assign (at some point) to given traces...

Doing the impossible : The learning paradox

- How can we learn something new while simultaneously challenging existing knowledge structures?
- How can we unintentionally learn, since we cannot precisely intend to know what we don't know?

We **become familiar** with ideas, language, tools, practices... without “full understanding”, and (ab)use them

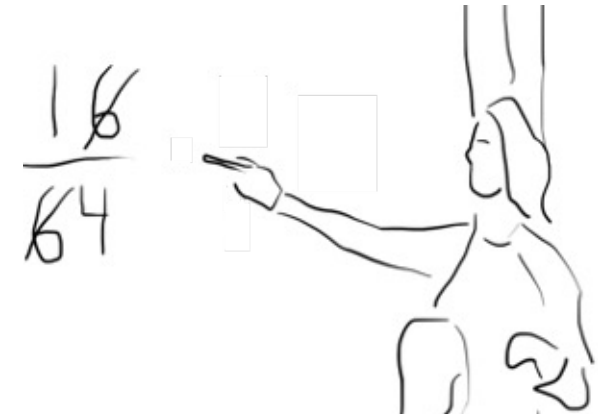
Encountering something new

- Ambiguity and uncertainty are inherent to encountering something new
- (re)Interpreting traces and readily understandings, engaging with the absurd, making sense

In the same way, **mathematical ideas develop & propagate by crossing** temporal, spatial, social, cultural boundaries

The (extra) ordinary

- This somehow happens **everyday** in math classes, when students are presented with new ideas, concepts, methods, etc.
 - Mathematics education is about **getting students do “do mathematics”** with these ideas, concepts, methods, etc.
- We tend to emphasize (a false) natural (historical, cultural, social) development, as we **re-trace** it with/for students
 - Giving the impression that the **math is already done**
- There is potential for more (mathematically) “transgressive” approaches
 - E.g. Here with “weird fractions”



A hand-drawn terrarium background. The scene is filled with various green plants and mosses, some growing on branches. In the foreground, a hand is holding a pencil, and the background is covered in intricate line drawings of faces and other patterns, suggesting a creative or artistic theme.

Thank you

For more, contact us!

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