A Mathematics Teacher Using Communicative Rationality Towards Children

Allan.Tarp@gmail.com, MATHeCADEMY.net, April 2019

Defining, as Habermas, communicative rationality as 'wanting to reach understanding to secure the participant speakers an intersubjectively shared lifeworld, thereby securing the horizon within which everyone can refer to one and the same objective world'; and defining the objective world as 'the totality of entities concerning which true propositions are possible' (thus, to avoid self-reference, not seeing propositions as part of the objective world); and seeing a speech act as 'a <u>speaker</u> pursuing the aim of reaching understanding with a <u>hearer</u> about <u>something</u>', we might ask:

How can a math teacher use communicative rationality to establish a non-patronizing power-free rational dialogue with grade one children about the objective fact Many, present in both the children and the teacher's life-world; thus accepting four fingers held together two by two being rationalized as (as do children) 'the total is two twos' and not just as 'four'?

It turns out, that accepting the children's 2dimensional block-numbers instead of letting the system-world colonize their lifeworld by enforcing upon them 1dimensional line-numbers, will allow co-creating and co-developing a mastery of Many (a post-setcentric 'ManyMath') where digits are icons with as many strokes as they represent (5 strokes in the 5-icon); and where also operations are icons for the counting process (division is a broom sweeping away bundles, multiplication is a lift stacking bundles into a block, subtraction is a rope drawing away the block to look for unbundle singles, placed next to the block as decimals or on-top of the block counted in bundles as fractions or negative numbers).

Once counted, a total can be recounted in the same unit to create underload and overload ($T = 5 = 1B3 \ 2s = 2B1 \ 2s = 3B\text{-}1 \ 2s$); or in another unit predicted by a calculator with the recount formula '$T = (T/B)*B$' saying 'From T, T/B times, B can be taken away'; or from tens to icons rooting equations solved by recounting ($? \ 7s = u*7 = 42 = (42/7)*7$, so $? = u = 42/7$); or from icons to tens rooting multiplication tables ($T = 7 \ 8s = ?tens$); or in a different units creating per-numbers used to bridge the unites by recounting (with $T = 2kg = 3\$$ we have the per-number $2kg/3\$ = 2/3 \ kg/\$$, and $T = 6kg = (6/2)*2kg = (6/2)*3\$ = 9\$$).

Once counted and recounted, totals can be added on-top needing recounting (proportionality) to make the units like, or next-to that by adding areas is integral calculus, that leads to differential calculus when reversed.

In short, having as a dream to establish third generation Enlightenment republics in Europe, Habermas uses Weber's warning against rationalization taken too far to become an iron cage to, in Habermas' version, warn against a colonization of the lifeworld by systems.

Thus, in the case of mathematics education, the institutionalized system wants to colonize the children's own Many-math by forcing upon them, not mathematics, but 'meta-matism', a mixture of 'meta-matics' defining concepts as examples of abstractions instead of as abstractions from examples; and 'mathe-matism' true inside itself where 2+3 IS 5 unconditionally, but seldom outside in the objective world where adding numbers without units creates counter-examples as for example 2weeks + 3days = 17 days = 2 3/7 weeks.

Maybe Marx has a point in his Feuerbach Thesis 11: "Philosophers have hitherto only interpreted the world in various ways; the point is to change it."

Tarp, A. (2018). Mastering Many. *Journal of Mathematics Education 11*(1), 103-117.