Bildung & Enlightenment

To practice democracy, the Greek sophists wanted the people to be enlightened to tell nature form choice in order to avoid being patronized by choices presented as nature; and the philosophers rejected choice and democracy by claiming that the physical is examples of metaphysical structures only visible to the Plato Academy.

The Christian Church replaced Plato's metaphysical structures with the unpredictable will of a metaphysical Lord, and replaced the academy with the monastery.

The reformation turned monasteries into universities.

Brahe and Newton reinstalled the sophist distinction by creating a natural science induced from observations, also used for validation through testing deduced predictions. Newton discovered that falling objects as moons and apples follow their own will made predictable by formulas. Inspired by this, humans also wanted to follow their own will and use enlightenment to replace the double patronization from the Prince and the Lord by democracy. Two were installed, one in the US still having its first republic; and one in France now having its fifth.

To stop Enlightenment and democracy in spreading from France, the Germen autocracy asked Humboldt to invent a Bildung-based education that would keep the people unenlightened but sort out the elite for jobs in a strong central administration.

Thus today two different educational institutions exist.

Outside the EU the US enlightenment school has set the international standard. It's diagnose is: IT, the outside world, is un-enlightened to you. For you to survive in it, it will be labeled by categories and category relations organized in modules to be retaken until learned.

Inside the EU Humboldt Bildung education still exists. It's diagnose is: YOU are un-Builded, but we the Builded will save you by the discourse didactics identifying the content of Bildung. You must follow its cure, and you should know that Bildung is only for the chosen few. You will choose between fixed packages, study for 2-3 years, and you will only have one chance at the exam.

Free lecture by Allan.Tarp@MATHeCADEMY.net

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Foucault, Mathematics & Education

Two discourses about the natural fact many exist, both called Mathematics. One suppresses the other.

Two discourses about learning exist, both called education. One is based upon European Bildung, the other upon North-American Enlightenment.

The French post-structuralist thinker Michel Foucault gives one understanding of competing discourses.

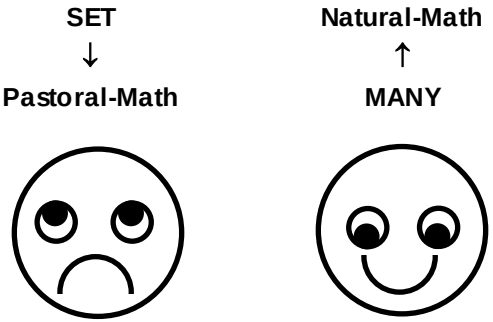
* The orthodox discourse called 'deduced mathematics' consists of concepts defined as examples of the abstraction Set; and of theorems deduced from metaphysical axioms. It presents the outside world as its applications.

* The heterodox discourse called 'induced mathematics' consists of concepts defined as abstractions from examples of the natural fact many; and theorems validated by testing deduced predictions. It presents the outside world as its roots.

* The educational discourse called 'enlightenment' originates in the Enlightenment period and was developed in its US democracy wanting as many as possible to be enlightened as much as possible to practice democracy.

* The educational discourse called 'Bildung' originates in the post-Enlightenment period and was developed in Germany to stop enlightenment and democracy in spreading from France, the place of the second Enlightenment-democracy; and to sort out the elite for a central administration patronizing its population.

As a professor on the history of thought systems, Michel Foucault created a discourse on discourses claiming to be scientific, especially human sciences. Foucault has shown how a human discipline disciplines itself and its objects, in contrast to a natural discipline disciplining itself by its objects. Thus human disciplines discipline its writers through conceptual force forcing researchers to research and teachers to teach and learners to learn inside the orthodox discourse; and disciplines its human objects by forcing individuals to accept the identity-verdicts stated by the discourse's IS-statements, thus imprisoning humans in an invisible identity-prison created and guarded by the pastoral power of the discourse.



Foucault & Pastoral Mathematics

Mathematics is a Discourse
But is it Pastoral or Natural?

Set-based Mathematics:

The orthodox discourse hiding its alternative discourse and diagnosing students as ignorants in need of a patronizing institution, well suited for EU Bildung education wanting to identify the elite for a strong central administration

Many-based Mathematics:

The heterodox discourse enlightening the natural fact many through counting and adding, well suited for international enlightenment education wanting as many as possible to be enlightened as much as possible for a democracy

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Foucault: Disciplines Discipline

French post-structuralism has revived the sophist skepticism towards hidden patronization. Michel Foucault has shown how a human discipline disciplines both itself and its objects, in contrast to a natural discipline disciplining itself by its objects.

To avoid being a pseudo-science, a human discipline should use its object to accommodate itself. Instead it assimilates its object to itself, thus making its categories judgments instead of labels. By including all three power forms, installing, enforcing and judging laws, human disciplines set themselves above democracy.

A human discipline disciplines itself by conceptual force only allowing the discourse to comment on existing categories. Thus 'man' first became the subject of a discourse after the Enlightenment period, only allowing 'man' to describe and not to be described.

A human discipline disciplines its humans objects by using its categories as judgments imprisoning individuals in an identity-prison of normalizing verdicts accompanied by normalizing institutions promising salvation if the accused accepts the verdicts, come to the salvation institution and becomes a lackey. If not, the doomed cause their doom themselves. This pastoral power makes individuals exert moral self-discipline, making the soul the prison of the body.

Thus instead of producing global universal truth, human disciplines produce local regional and temporarily truth. And instead of emancipating humans, they fix humans in forced identities & pastoral normalizing institutions.

To escape the identity-prison of the human sciences, humans can disclose the ideological nature of the pastoral discourses by using concept archaeology to uncover their objects, concepts, themes and experts; and genealogy to uncover their disciplinarian effects.

To fight the conceptual force of the human sciences, humans can set up counter-categories, at the individual level through ethical and aesthetical choices, and at a collective level as counter-discourses allowing their objects to accommodate its categories and theory.

US-based Grounded Theory creates counter-discourses.

SET-based Mathematics

The set-based discourse about many defines its concepts as examples of abstractions; and proves its statements as deductions from metaphysical axioms.

It neglects the problem that building on Set makes the discourse self-referring thus importing the problems of the classical liar-paradox 'this sentence is false' being false if true and true if false as pointed out by Russell.

It neglects facts that should make it accommodate e.g. claiming that 2+3 IS 5 in spite of counter-examples: 2weks+3days = 17days, 2m+3cm = 203cm etc.

It defines natural numbers as a number-set generated by a follower-principle; and integers & rational numbers as examples of set-products of ordered pairs of elements.

It defines operations as examples of functions between number-sets, i.e. as many-one relations or subsets of set-products of number-sets.

It defines calculation formulas as examples of functions.

It defines calculations as a set of number-names.

It defines equations as equivalence relations in the set of number-names to be solved by identical operations on both sides of the equality sign aiming at neutralizing the numbers ins front of the unknown number.

Differential and integral calculus is defined as examples of operations on functions, i.e. functions between sets of functions.

Geometry is presented as examples of coordinate-sets, i.e. as an example of 2-fold, 3-fold or n-fold set-products of number-sets.

Defining its concepts as examples of abstractions, the set-based discourse might be labeled 'meta-matics'.

Claiming statements as '2+3 IS 5' to be universal truths in spite of countless counter examples it might be labeled 'mathematism'.

Suppressing its alternative natural discourse, it presents its choice as nature. Thus the set-based discourse might be labeled a pastoral discourse, which might be deconstructed into grounded categories and category-relations to become a grounded many-based discourse.

Many-based Mathematics

The many-based discourse about many defines its concepts as abstractions from examples, and proves its statements by testing deduced predictions.

It presents two basic actions when dealing with many, counting and adding. 1.order-counting takes place until ten and produces number-icons containing the number of sticks illustrated: 4 sticks in the 4-icon etc.

2.order-counting uses bundling and stacking sticks to describe many by decimal-numbers carrying units where the decimal point separates bundles from unbundled singles as e.g. T = 2.3 4s.

3.order-counting bundles in tens, the only number with its own name but without its own icon.

Operations are also presented as icons for the activities involved in counting: /3 means taking away 3s, -3 means taking away 3, *3 means stacking 3s, and +3 means juxtaposing 3 1s next to a stack.

Addition can be vertical on-top, or horizontal next-to. Adding T1 = 2 4s to T2 = 3 5s on-top the units must be the same so the 4s must be recounted as 5s or vice versa. The result is predicted by two formulas, the re-bundle formula T = (T/b)*b saying that to count T in bs, bs must be taken away from T T/b times; and the re-stack formula T = (T–b)+b saying that a bundle b can always be moved from the top of a stack and placed next to it. Thus T = 2 4s = (2* 4/5)* 5 =1.? 5s, T = 2 4s = 2* 4 – 1*5 + 1*5 = 3 + 1*5, so T = 2 4s = 1.3 5s.

Adding next-to means adding or integrating 4s and 5s as 9s. Reversing integration is called differentiation, taking place when a 9-stack is split sideward in 4s and 5s.

Reversed addition is described by an equation to be solved by reversed operations predicting the result.

2 + ? = 6 , ? = 6 – 2 and 2 * ? = 6 , ? = 6/2

The many-based discourse introduces the two core parts of mathematics, proportionality and integration, in first grade as part of '1digit mathematics', postponing the number 10, which is a cognitive bomb by being the only number with a name but without an icon, and claiming to be the follower of 9 in spite of counting in 7s makes 10 the follower of six, and 13 the follower of nine.