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Bildung and Pedagogical Tact Revisited from the Perspective of 4E Cognition

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> Abstract • We focus on the Herbartian notions of “Bildung” and “pedagogical tact” evoked by Theo Hug in his insightful discussion of the interplay and relations between education and 4E cognition. We raise the question of whether the development of pedagogical tact in mathematics teaching needs to be grounded on embodied, enactive and extended cognition in the teacher-learner interaction. In particular, we discuss the current “learnification” of teaching and education, as highlighted by the author.

« 1 » In his target article, Theo Hug highlights the lack of a systematic review and appraisal of the historical, contemporary and future aspects of the multifaceted relationship between 4E cognition and education (§8). Although the situation is better regarding *mathematics* education, the question remains of how relations between 4E approaches and traditional educational approaches can be clarified to further interdisciplinary discourses and to foster educational developments open to the future (ibid).

« 2 » The author pertinently remarks that the key Herbartian notions of *Bildung*, *Bildsamkeit*, and “pedagogical tact,” which later influenced John Dewey (English 2013), have been increasingly neglected in the last decades, even in German *Didaktik*. As Hug points out in §10, instead of “Education as Bildung,” we witness the overwhelming reductionist “learnification” of education (Biesta 2015, 2021), nowadays. According to this dominant ideology, teaching and the whole spectrum of intentional educational endeavours should aim at learning as a necessary outcome to be assessed and measured:

“There is however more to teaching than learning, just as there is more to education than learning. In order to bring this ‘more’ to the fore, it is important to ‘free’ teaching from learning.” (Biesta 2021: 11)

Curiously enough, this “learnification” becomes widespread at the same time as the current E-turn in cognitive science with its manifold implications for education, e.g., “learning is moving in new ways” (Abrahamson & Sánchez-García 2016; Hutto & Abrahamson 2022). This suggests revisiting the original theory of Bildung of Johann Friedrich Herbart and Wilhelm von Humboldt, from the perspective of embodied cognition and, more generally, 4E cognition. Indeed, as Malte Brinkmann (2021: 122) points out, “Humboldt only hints at the idea of the connection between mentality and corporeality and refers only to language or speech. He lacks a theory of embodiment.” Nevertheless, he argues, embodiment, corporeality, non-linguistic and social dimensions of the interaction between world and self are essential. So, to what extent could a contemporary theory of Bildung be developed, which would take into account the key role of the lived body, as suggested by Brinkmann, instead of just relying on language as in von Humboldt’s theoretical outlook? **Q1**

« 3 » We deeply share the author’s appreciation of Herbart’s pioneering contributions to pedagogy, particularly his insightful notion of pedagogical tact. Recall that Dewey, one century later, emphasized “plasticity or the power to learn from experience” (Dewey 1916: 57). “This means power to modify actions on the basis of the results of prior experiences, the power to develop dispositions” (ibid: 49). As we discuss next, Dewey’s plasticity is closely related to Herbart’s pedagogical tact and demarcates Dewey’s concept of perfectibility, an English rendering of Herbart’s *Bildsamkeit*.

« 4 » According to Herbart (1802: 20), pedagogical tact is the “quick evaluation and judgment – not proceeding like routine –” of what should be done in an individual situation. Teaching with pedagogical tact entails “recognising that, in order to learn, students must be allowed to make errors in judgement, become frustrated, or find themselves in anguish as they break with routines or once-trusted ideas” (English 2013: 147).

« 5 » Pedagogical tact acknowledges that “the existential experience of teachers necessarily involves risk and improvisation” (English 2013: 129). Indeed, pedagogical tact allows the teacher to use –

“the moments of being thrown off course by unplanned and unforeseen interactions with learners, not as stopping points in teacher–learner interaction (and the teacher-supported learning process of learners), but as moments for new and previously unforeseen learning opportunities for learners.” (ibid: 51)

« 6 » Unfortunately, although Herbart was especially interested in the teaching of mathematics (Beiser 2022: 63–65) and his notion of pedagogical tact entailed cultivating “the voice of the learner” and, even more, helping the learner “find his voice” (English 2013: 127), what we observe nowadays in most mathematics classrooms, more than two centuries after Herbart, is just the opposite: a widespread “cognitive abuse” (Soto-Andrade 2018; Watson 2021). Indeed, mathematics teaching too often degenerates into trying “to make students think in particular ways rather than develop their own ways of thinking, ignoring or negating the student’s own thinking” (Watson 2021: 76), although, on the contrary, students’ perceptions and thoughts should “be heard and respected and used as the clay with which robust mathematical thinking could be moulded” (ibid: 77).

« 7 » So, despite the advent of 4E cognition and its implications for education, currently, disembodied teaching prevails, shaped by metaphors we are no longer aware of such as: “teaching is transmitting knowledge,” “knowledge is a commodity,” “teaching is handing over tools and procedures” (Sfard 2009; Soto-Andrade 2018), and learnification (§10) leads us to the sort of schools that could be suitably metaphorised as “donut factories.” Although we agree with the author’s caveats in §27, we wonder whether the 4E turn in cognitive science sends us back, to some extent, to the “romantic” *Bildungsideal*, where embodiment, extended cognition and intercorporeality in teaching and learning and enaction, were implicit. Let us emphasise that Herbart was inspired by Pestalozzi (Beiser 2022), whose approach to pedagogy was based on his

“heart-mind-hand” triad (Buol 1976: 82). We may see today, in retrospect, pedagogical tact as an early antidote against cognitive abuse in the teaching of mathematics; i.e., listening to the idiosyncratic ideas, metaphors and explorations of the learners instead of having them behave in prescribed manners (Watson 2021: 76). This motivates our second question: How strong is the correlation between the practice of pedagogical tact and 4E-cognition-informed teaching? Does each foster the other? **Q2**

« 8 » Hug recalls in Footnote 1 that Herbart emphasised the need for a focus on basic concepts that are “native” (that is, original or endemic) to the discipline in order to ‘avoid the risk of being governed by a stranger as a distant, conquered province’ (Herbart 1806: 8).” Among these native notions to education, especially appreciated by Herbart, are Pestalozzi’s *Anschaungen* (Pestalozzi 1803; Herbart 1804; Beiser 2022), usually translated as “sense (mainly visual) perceptions” or also “intuitions” (Beiser 2022: 60), which emphasise concrete observation, often of mathematical shapes, as a means to understand the lived world.

« 9 » *Anschaungen* evolved later into the *Grundvorstellungen* (basic notions), well-known in the German *Mathematikdidaktik* (vom Hofe 1995; Reyes-Santander & Soto-Andrade 2011; vom Hofe & Reyes-Santander 2021), which are closely related to (embodied) metaphors in mathematics education (Sfard 2009; Soto-Andrade & Reyes-Santander 2011; Abrahamson, Gutiérrez & Baddorf 2012; Soto-Andrade 2020). Indeed, *Grundvorstellungen* are often functionally equivalent to metaphors, e.g., “addition is putting together” is both a *Grundvorstellung* and an embodied metaphor for addition. Like metaphors, *Grundvorstellungen* work as a prescriptive antidote to cognitive abuse in mathematics teaching in German primary schools, thanks to their grounded, enactive and “bottom-up” approach to “abstract” mathematical notions.

« 10 » Notice that Pestalozzi’s integrated “Herz-Geist-Hand” (“heart-mind-hand”) approach to cognition and education (Buol 1976: 82) may also be seen as a forerunner of enacted, embodied, extended cognition, besides providing soil for *Anschaungen* and *Grundvorstellungen* to grow in (vom Hofe & Reyes-Santander 2021). Indeed,

Pestalozzi intended “das Kind von dunkeln *Anschaungen* zu deutlichen Begriffen zu erheben” [to raise the child from obscure intuitive perceptions to clear concepts] (Buol 1976: 62) thanks to his triadic pedagogical approach. In a *Grundvorstellung*, or metaphor, like “adding is putting together,” we find the embodied action of putting together (hand), with some intention or (affective) motivation (heart) and the ensuing numerical calculation (mind). A previous underlying *Anschaung*, in this case, might be the experiential perception that you can *hold in your hand* a quantity of items (e.g., marbles). This motivates our final question: How does the German native thread from *Anschaungen* to *Grundvorstellungen*, which converges later with the “metaphoric thread” in mathematics education, intertwines with Herbart’s pedagogical tact and with 4E cognition? Could we posit that pedagogical tact entails listening to the idiosyncratic and tentative *Anschaungen*, *Grundvorstellungen*, and embodied metaphors of the learners enmeshed in an open-ended problematic situation? **Q3**

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