

INTERACTIVE TEACHERS: The Problem of Learners' Minds ¹

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SUMMARY

What makes the *Homo sapiens sapiens* a successful interactive teacher? Human teachers clearly understood that their learners had a different perspective on the situation than they did, and they had some ideas about specifically “what that perspective was” and “how it might be changed”. Different conceptions of learners minds held by teachers lead to different kinds of pedagogical practice. This new research agenda explores learners' own frameworks to understand better how they come to the views that finally prove most useful to them.

From this socio-cognitive perspective, teaching and learning are one special form of sharing or coming to share beliefs, goals, and intentions. So, different approaches to learning and different forms of instruction - from imitation, to instruction, to discovery, to collaboration - reflect differing beliefs and assumptions about the learner - from actor, to knower, to private experiencer, to collaborative thinker.

The hominid niche must be characterized in its fundamentals not only by being “cognitive”, where the “social” operates at a uniquely high level, but also “deeply social”, where the “social” operates at a uniquely, cognitively, interdependent level. We are successful interactive teachers and learners because we have a “deep social mind”.

KEY-WORDS

Teacher; Learner; Interaction; “Theory of mind”; Social mind; Socio-cognitive niche; Socio-cognitive perspective; Collaboration.

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Introduction

Teaching occurs only because of someone assumptions about the learner. TOMASELLO (1999a)⁴ use this to explain why chimps did not teach - they lacked a “theory of mind”. From this viewpoint, how human teachers achieve such meetings of mind, especially across the age and experience gaps that separate teachers from learners? More particularly, as expressed by teachers, “How do we reach the learners?” or as expressed by learners themselves, “What are they trying to get at?”. This the classic problem of “Other Mind”.

We teach, talk, demonstrate, argue, exemplify because of the assumption we make about learners’ knowledge and beliefs - in a word, about their minds. As teachers, we know something of the content of the other person’s perspective. Human teachers clearly understood that their learners had a different perspective on the situation than they did, and they had some ideas about specifically “what that perspective was” and “how it might be changed” (CALAFATE, 1999)⁵.

From this perspective, we can ask “What makes the *Homo sapiens sapiens* a successful interactive teacher?”.

1. Human cognition & Social organization: the ability to “mentalize”

In the view of TOMASELLO (1999b)⁶, primates and mammals are certainly social, and some may even have social organizations for which it is useful to apply the term culture. But human social organization is something else, and this social organization was an integral part by which human cognition came to have many of its most distinctive characteristics. That is, although the cognition of many mammalian and primate species is influenced in important ways by their social environments, human cognition, at least in its species-unique aspects, is actually socially constituted.

Human beings understand that other people are “mental agents” with thoughts and beliefs of their own, that other people have their own unique mental perspectives on events and activities to which, in some situation, they must relate their own mental perspectives. The ability to “mentalize”, that is to understand other people’s behavior in terms of their mental states, is a major ingredient in successful teaching. A rudimentary form of this ability

⁴ TOMASELLO, M. *The Cultural Origins of Human Cognition*. Harvard: Harvard University Press, 1999a.

⁵ CALAFATE, L.C. *HOMO DOCENS. An ethological essay about teaching behaviour. Technical Report, FCUP, Porto, Portugal.*(1999)

⁶ TOMASELLO, M. “The Human Adaptation For Culture”. *Annu. Rev. Anthropol.*, (1999b) 28: 509-529.

may be seen in great apes, but in humans it is developed to a high level (TOMASELLO & CALL, 1997)⁷.

2. The “pedagogical niche”: models of learners’ minds

What makes human cognition different? Each new generation of children develops in the “ontogenetic niche” characteristic of its culture, including in some cases explicitly “pedagogical niches” (CALAFATE, 2000)⁸. On the adult side, there is a uniquely human “pedagogic disposition” to exploit the learners “predispositions to culture”, for teachers to demonstrate correct performance for the benefit of the learner (PREMACK & PREMACK, 1996)⁹.

Different conceptions of learners’ minds held by teachers lead to different kinds of pedagogical practice. Conceiving of learners as unable to do something leads teachers to provide demonstrations for them to imitate (demonstration). Conceiving of learners as ignorant of something leads teachers to provide them with information about it (didactic instruction). Conceiving of learners as having their own ideas about something leads teachers to engage them in discussion of it (participation in the collaborative discourse). Conceiving of learners as knowledgeable members of the culture leads teachers to engage them in reflection on what is known in the world beyond what the learners themselves know (participation in a world of objective knowledge).

3. The hominide “social-cognitive niche”

Hominid evolution occurred in the context of a loss of forest cover creating seasonal savannah habitats, that were hostile and more open than forests. In this new ecological niche, the hominid niche become differentiated in a new way: as a “cognitive niche”.

A capacity for conceptually abstracting from a situation a model of what manipulations are necessary to achieve proximate goals that correlate with fitness is the core of our zoological distinctiveness. However, this should not allow us to miss another, no less fundamental aspect of the human approach - its “social interdependence”.

3.1. The interactive “deep social mind”

⁷ TOMASELLO, M. & CALL, J. *Primate Cognition*. Oxford: Oxford University Press. (1997).

⁸ CALAFATE, L.C. (2000). “HOMO DISCENS. “An ethological essay about learning behaviour”. *Technical Report, FCUP*, Porto, Portugal.

⁹ PREMACK, D. & PREMACK, A.J. “Why Animals Lack Pedagogy and Some Cultures Have More of It Than Others”. In: *The Handbook of Education and Human Development. New Models of Learning, Teaching and Schooling*. London: Blackwell. Ed. by D.R. Olson & N. Torrance. (1996). pp. 302-323.

WHITEN (1999)¹⁰ suggests that the differentiation of the hominid niche must be characterized in its fundamentals not only by being “cognitive”, where the “social” operates at a uniquely high level, but also “deeply social”, where the “social” operates at a uniquely, cognitively, interdependent level. There are several aspects of this “deep social mind”.

3.1.1. Cooperation: “the problem of collective action”

First there is cooperation. Hominid cooperation became unusually deep in several aspects, including coordination in many enterprises.

Under the broad heading of cooperation we can include several patterns of behaviour in which individuals coordinate their actions to their mutual benefit, or benefit of a part or whole of the group. We define the term cooperation as the action of two or more individuals directed simultaneously toward the same goal, making it more probable that the goal will be attained. This “cooperative coordination” is achieved through high-level cognitive operations (discussion, planning and social decision-making), and involves information transfer from individual to individual. Such deep coordination is clearly the product of minds that are deeply social.

The most complex level of cooperation is collaboration in which individuals perform different complementary actions.

3.1.2. Cultural learning: learning culture

Second there is culture. Increasingly, hominids came to be what they were through a social process of cultural transmission, and in this further sense have deeply social - that is, extremely socially shaped minds.

Through what TOMASELLO, KRUGER & RATNER (1993)¹¹ described as the “ratchet effect” of cultural transmission, the cognitive niche can become a progressively deepening furrow. Cognitive achievements, such as the acquisition of difficult-to-obtain knowledge and the solving of specific problems, do not need to be repeated in each generation because they can be acquired socially, and each advance builds on the shoulders of the last.

3.1.3. “Mind-reading”: towards a cognitive interpenetration model

Third there is the capacity to recognize and discriminate the states of mind of others (and oneself). Reading others’ minds makes minds deeply social in that those minds interpenetrate each other. Cognitive social interdependence is what binds all these three

¹⁰ WHITEN, A. ‘The evolution of deep social mind in humans’. In: *The Descent of Mind. Psychological perspectives on hominid evolution*. Oxford: Oxford University Press. Ed. by M.C. Corballis & S.E.L. Lea. (1999). pps. 173-193.

¹¹ TOMASELLO, M., KRUGER, A.C. & RATNER, H.H. “Cultural Learning”. *Behavioral and Brain Sciences*,

components to constitute deep social mind. Like cultural learning (the cultural component of deep social mind), “mind-reading” seems to enable a deepening of the cognitive niche.

Strangely, the bulk of what become a vast scientific literature on the subject over the last ten years has been almost exclusively devoted to the development of this capacity in young children and learners. There has been relatively little work done to chart everyday mind-reading in adults and teachers - “how we do it” and “what use it for”. Integration of research in children’s and learners’ theory of mind and research into teachers beliefs may lead to a new conception of the reciprocity of teaching and learning. In this new “pedagogical niche” the teacher is the environment of the learner and the learner is the environment of the teacher.

3.2. The adaptive behavioural complex

A final word should be added about the ways in which the various aspects of deep social mind distinguished here interact. The ways in which they might do so suggests they act together as an adaptive complex, reinforcing the effects each has on the depth of penetration of the cognitive niche.

For example, mind-reading can support cultural transmission, both in terms of acquiring mental contents from others and teaching others. By other hand, culture supports mind-reading, through the transfer of the underlying social skills.

4. New research trends

“What learners do” is not enough. The new pedagogical agenda is to determine “what they think they are doing” and “what their reasons are for doing it”. The new work on children’s theories of mind emphasizes the importance of understanding that children only gradually come to appreciate that they are acting not directly on the world but in terms of the beliefs they hold about the world. This view attempts to build an exchange of understanding between the teacher and the learner.

Four lines of recent research have enriched this new perspective on teaching and learning (OLSON & BRUNER, 1996)¹². The first has to do with how children develop their ability to “read other minds”, usually labeled as research on intersubjectivity. The second is on the child’s grasp of another’s “intentional states”, often referred as “theories of mind”. The third is the study of “metacognition”, for example, what learners think about learning, remembering and thinking (especially their own), and how thinking about their own cognitive operations affects their mental states.

¹² OLSON, D.R. & BRUNER, JS. “Folk Psychology and Folk Pedagogy”. In . D.R. Olson & N. Torrance. *The Handbook of Education and Human Development. New Models of Learning, Teaching and Schooling.*

Studies in “collaborative learning and problem solving” comprise the fourth line of new research, which focuses on how learners explicate and revise their beliefs in the context of discourse (CALAFATE et al., 1997-1999)¹³.

What all this research has in common is an effort to understand how children themselves organize their own learning, remembering, guessing, thinking. This agenda explores learners’ own frameworks to understand better how they come to the views that finally prove most useful to them.

Conclusions

The awareness that other people have beliefs and desires different from our own and that their behaviour can be explained by these beliefs and desires has been referred to as “theory of mind” (PREMACK, 1988¹⁴; PREMACK & WOODRUFF, 1978¹⁵), which may be regarded as a major prerequisite for pedagogy.

We are successful interactive teachers and learners because we have a “deep social mind”. From this new socio-cognitive perspective, teaching and learning are no longer to be seen as two activities, causally linked - one knows X because one was taught X - but rather as one special form of sharing or coming to share beliefs, goals, and intentions. So, different approaches to learning and different forms of instruction - from imitation, to instruction, to discovery, to collaboration - reflect differing beliefs and assumptions about the learner - from actor, to knower, to private experiencer, to collaborative thinker.

Cognitive programs enable human minds to transform sets of unrelated individuals into groups that can act as co-ordinated units, solving the “problem of collective action” (CALAFATE & VILAR CORREIA, in prep.¹⁶). The human brain contains mechanisms that are functionally specialised for, joint attention, cooperation, social exchange and inferring the contents of others’ minds (FRITH & FRITH, 1999¹⁷).

¹³ CALAFATE, L.C., VILAR CORREIA, M.R., GOMES, P.P., LOPES, M.C., CALHEIROS, F.C., BRITO, M.C & CALDAS, F.B. (1997-1999). A structural analysis of cooperative learning strategies in a multimedia environment during the teaching of Biology and Mathematics by modelling and simulation of population dynamics in ecosystems and environmental problems. <http://www.fct.mct.pt/projx/>

¹⁴ PREMACK, D. “Does the chimpanzee have a theory of mind?” revisited. In R.W. Byrne & A. Whiten. *Machiavellian Intelligence*. Oxford: Clarendon Press. (1988). pp. 160-179.

¹⁵ PREMACK, D. & WOODRUFF, G. “Does chimpanzee have a theory of mind?” *Behavioral and Brain Sciences*, 1. (1978).pp. 515-526.

¹⁶ CALAFATE, L.C. & VILAR CORREIA, M.R. (in prep.). “Human Ethology & Cooperative Educational Settings”. *Research Report, FCUP, Porto*.

¹⁷ FRITH, C.H. & FRITH, U. “Interacting Minds - A Biological Basis”. *Science*, 286. (1999). 1692-1695.

