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The Evolution of Umwelt and Communication

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Abstract: Existing educational practices focus on subject matter knowledge that is, through the act of teaching, brought into the heads of students. Materials, texts, or images qua aspects of the learning environment are treated as given in terms of fixed and unambiguous structures (ontologies). Drawing on examples from a large database on learning physics through laboratory activities, I show that (a) students do not perceive and act in worlds shared with physicists and physics teachers and (b) during collective activities, students evolve new domain ontologies and language games by interacting with each other. Because of structural constraints in the environment (teacher, textbook, equipment), initially quite different ontologies and language games converge; the shared language games often become more commensurable with (existing) scientific ontologies and language games. In this co-evolution of ontology and language game, gestures provide an important bridge between laboratory experiences in science and scientific discourse about abstract entities.

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