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Apprenticeship in Microbiology: Embodied adaptation to experimental and technological aspects of learning.

Abstract

Laboratory work is embodied practice. The practitioners' bodily resources constitute the major elements of this work, along with the highly specific environment surrounding the experimental work processes. Like all manual labor, scientific experiments make use of a variety of tools, both cognitive and embodied, as well as of material objects in the immediate context of the experimental situation.

Experiments in microbiology require skills and techniques that emphasize the adaptability of the practitioner's sensitivities and dexterity, especially with regard to operating specific tools and instruments essential to microbiology.

Certain hand- and finger movements are repeated over and over again, until they become an ingrained habit, a skill that is performed without conscious thought. Opening a tube with one hand, pipetting micro-amounts of liquid into tiny tubes, spreading bacterial cultures on agar in Petri plates with a certain wrist movement – all those skills require intensive training and more than a little talent. These expressive uses of gesture occur even when the scientist is demonstrating a manual skill without necessarily holding a tool or object in her hand. The knowledge acquired in this context of bodily information processing illustrates how the corporeal memory retains a sensibility for how to perform the task; hand gestures and finger movements demonstrate embodied adaptability for skilled manual work.

In cases where researchers use larger tools to perform operations, experts use gestures to illustrate activities occurring within a machine or instrument that are otherwise invisible. What happens within a NanoDrop measuring instrument, for example, cannot be seen, but it can be efficiently visualized and conveyed to the novice using illustrative hand movements as well as verbal explanations. This complex integration of words and gestures is linking the body to the tool environment, where tools and abstract symbols are included as co-participants in the experimental framework.

