Distributed Cognition and Gesture: Propagating a Functional System Through Impromptu Teaching

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ABSTRACT

On a beach in France, a lifeguard makes three attempts to teach a colleague how to find south using a wristwatch and the sun. In these attempts, the lifeguard constructs and coordinates representations in multiple spaces: in the sand, in the surroundings, over his digital watch, and in the air (in gesture space). He uses his hands, eyes, and body to build and link these conceptual elements and to enact their coordination in a distributed cognitive functional system.

FUNCTIONAL SYSTEM

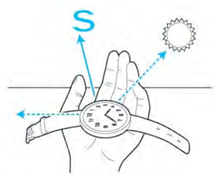
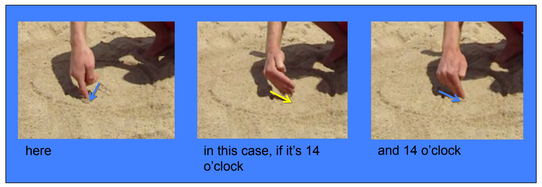


Image from lifehacker.com

Hold a watch with 12 o'clock at left. Move your arm so the hour hand points at the sun. The spot halfway between the hour hand and the 12 (or 1 for Daylight Saving Time) is south. In our data, the lifeguard finds the spot halfway between the hour hand and the 2.

FIRST ATTEMPT

In the first attempt, the lifeguard constructs a diagram in the sand, gestures over the diagram, and gestures toward the surrounding geography (Williams & Harrison 2012).

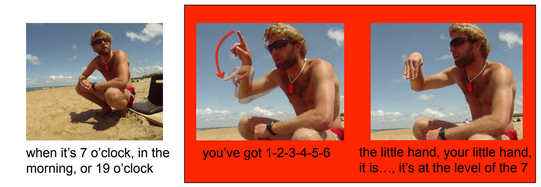


TRANSCRIPT CONVENTIONS

Speech is translated from French.
Representational spaces are color-coded:
SAND
SURROUNDINGS
WRISTWATCH
AIR (gesture space)

SECOND ATTEMPT

In the second attempt, the lifeguard draws in the sand, gestures over his diagram, gestures over his watch, and gestures in the air in front of him (gesture space).



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THIRD ATTEMPT

In the third attempt, the lifeguard gestures toward the sky, enacts the process with his upper body, removes his digital watch and gestures over the watch and toward the sky.

DISCUSSION

In this moment of impromptu teaching, the lifeguard confronts several problems at once:

1. how to represent the elements of the conventional functional system;
2. how to represent the process of bringing these elements into coordination to find south;
3. how to ensure the novice understands and is able to use the system; and
4. how to do the above while monitoring the swim zone (his primary work task).

Several constraints pose a challenge for instruction:

- It is midday, so the sun is near the reference position, leaving no angle to bisect.
- The lifeguard is wearing a digital (not analog) watch.
- The are no traditional drawing or writing tools at hand.

The lifeguard meets these challenges by imposing hypothetical times and using the sand, his digital watch, the surroundings, and (briefly) his gesture space to depict key elements of the system: the watch states (positions of the hour hand and reference time), the resulting angle and its bisection, and how these link to the sun and the surrounding geography. At one point, he enacts the bodily motion that brings these elements into coordination.

The four representational spaces the lifeguard employs differ greatly in their affordances—their scale, durability, inscribability, and mobility. Most of the lifeguard's gestures couple with structure in these spaces, and he links elements in the different spaces through repeated handshapes, gesture holds with gaze shifts, and gestures that move across space boundaries. These manipulations of the environment and orchestrations of gesture, gaze, and talk serve to guide the learner's conceptualization of the system's elements and their relation to one another.

CONCLUSIONS

Distributed cognition: Human cognition is characterized by functional systems that coordinate material and conceptual elements through bodily action and perception.

Situated instruction: Though the elements of a functional system (and ways of representing those elements) may be conventional, instructional discourse must be fitted to the present purpose, addressee, and available resources.

Embodied teaching: When we teach, we use our bodies to create, highlight, and link representations in multiple media (which may include the body itself) and to enact the processes through which these representations are coordinated to produce functional outcomes.

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