

Learning to Perform Action Sequences

The question:
How that which is inside a person
might change over time
as a consequence of
repeated interactions with a task
world.

Rules of the game

- Functional specifications only, implementational details are still unknown.
- Pay attention to the nature of experience in interaction with the world.
- Pay attention to cultural practices that shape experience and representational activities.

A place where space matters



Engine-Out Procedure

- | | |
|--------------|------------|
| • Control | • Identify |
| • Airspeed | • Verify |
| • Mixture | • Feather |
| • Propellers | • Cutoff |
| • Power | • Secure |
| • Flaps | |
| • Gear | |

Cockpit



Airspeed Indicator:
a great piece of wideware



Absolutely Sinful Chocolate Chocolate Chip Cookies

- Submitted by: **Marsha**
- " This recipe was given to me by my grandmother 10 years ago. They were always a HUGE hit at work pig-outs and now my family loves them! A wonderful soft cookie that is incredibly chocolaty. "
- **Makes 2 dozen**
- **Prep Time:** 15 Minutes
Cook Time: 12 Minutes
Ready in: 40 Minutes

Ingredients

- 2 1/2 (1 ounce) squares unsweetened chocolate
- 1/2 cup butter
- 2 cups all-purpose flour
- 1/2 teaspoon baking soda
- 1 teaspoon baking powder
- 1/4 teaspoon salt
- 1 1/4 cups white sugar
- 2 eggs
- 1 teaspoon vanilla extract
- 2/3 cup sour cream
- 2 cups semisweet chocolate chips

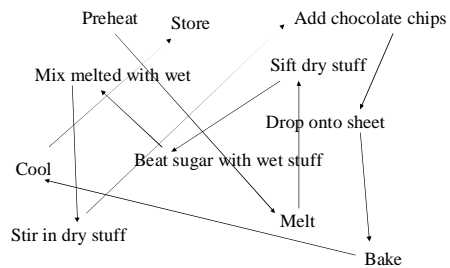
Directions

- .Preheat oven to 375 degrees F (190 degrees C).
- .In the microwave or over a double boiler, melt unsweetened chocolate and butter together, stirring occasionally until smooth.
- .Sift together flour, baking soda, baking powder, and salt; set aside.
- .In a medium bowl, beat sugar, eggs, and vanilla until light.
- .Mix in the chocolate mixture until well blended.
- .Stir in the sifted ingredients alternately with sour cream,
- .then mix in chocolate chips.
- .Drop by rounded tablespoonfuls onto ungreased cookie sheets.
- .Bake for 8 to 10 minutes in the preheated oven.
- .Allow cookies to cool on baking sheet for 5 minutes before transferring to a wire rack to cool completely.
- Store in an airtight container.

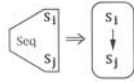
Condensed Directions

- .Preheat
- .Melt
- .Sift dry stuff
- .Beat sugar with wet stuff
- .Mix melted with wet
- .Stir in dry stuff
- .Add chocolate chips
- .Drop onto sheet
- .Bake
- .Cool
- .Store

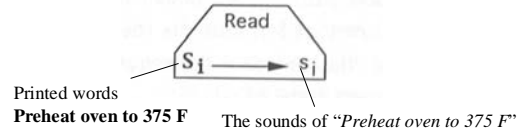
What did the directions say?



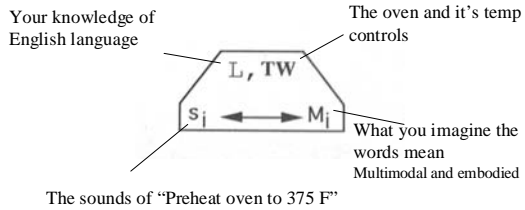
A sequential reading strategy (a cultural practice) applied to the spatial relations of the items produces a temporal sequence



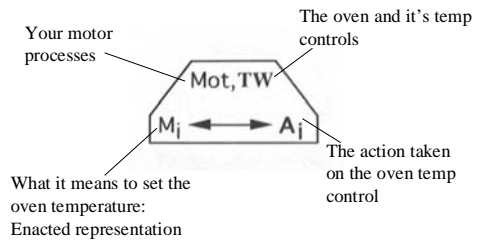
Reading skills applied to the written item produce an internal (auditory and/or visual) representation of the words



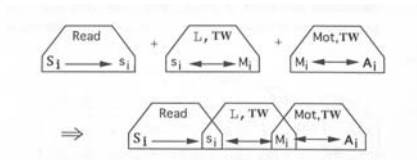
Deep language skills and the constraints of the task world are coordinated with the item to produce a meaning. Meaning and words are mutually constraining.



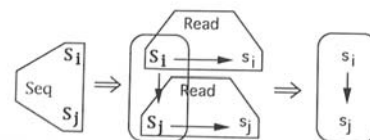
Motor processes in coordination with the meaning of the step and the physical constraints of the task world shape the action



With practice the skills are brought together in a smooth series from written representation to action.

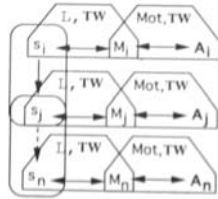


The sequence of interactions with the written medium produces a sequence of embodied internal experiences.

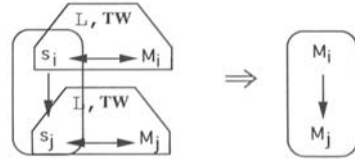


When learned, the sequence of experiences can be imagined (remembered).

The internal representation of what the steps say can be used to control the sequence of actions.

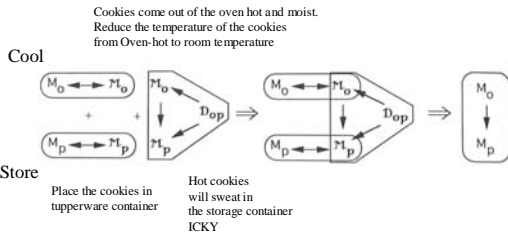


Once trained, the lexical medium can produce the sequence of meaning experiences corresponding to the steps of the procedure.

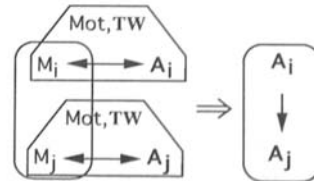


Again, once learned, the sequence of embodied meaning experiences can be imagined.

The sequence relationships among the steps may be mediated by knowledge of the conceptual dependencies among the steps.

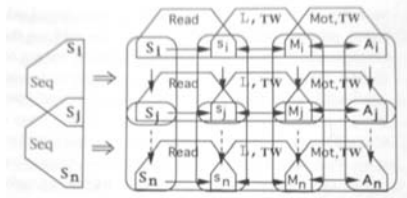


The semantic medium may come to be able to produce the sequence of actions without mediation of the names of the steps.



Once learned, the sequence of embodied actions can be executed

The assembled tissue of coordination.



This complex “representation” is

- Embodied: perception/action/imagination
- Multimodal: visual, auditory, motor, kinesthetic.
- Temporally extended: remembers the past, anticipates the future, lives in the present.

- The system operates by the propagation of embodied experience across media, and the media themselves acquire functional organization as a consequence of the repeated impositions of embodied experience upon them.

Lessons

- Soften the boundary of the person
- Examine coordination, entrainment, and resonance with the world

Lessons

- Learning as the gradual propagation of pattern or organization in a system
- What it means to “know” a procedure could have many descriptions (does the way we assess knowledge tap the right description?)
- Internalization does not involve bringing anything inside from outside. Rather it is learning patterns of experience that emerge in interactions of inside with outside.