

## Episode 19

((This episode immediately follows episode 18, overlaps here in transcript.)) ((Pictures 068.jpeg and following.))

- 01            Okay, when we go back, we are gonna like start,  
02            really putting things together so  
              (7.72)



- 03    L:    Okay, Bella this is good  
04            (8.86)  
05            Now we have to glue this together \*  
06    B:    Why?  
07    L:    Because we want it long, I want it long  
08    B:    But it will hit the floor  
09            () ((They wrestle for the roll))



- 10            Hold on, hold on it will hit this floor \*, but then  
              we have to get the other part. ((IH moves out and  
              further to the left, like a continuation; gaze moves  
              up to look at Leanne.))



- 11    L:    Well then just use this \* chute



- 12    B:    Yeah, and then put a \* board here  
13    L:    We actually [I have to nail it on  
              [1((rH moves forward to top where tube and  
              board join, then moves index finger on the edge  
              of tube))  
14            ()  
15            Glue it on, try gluing first



In this episode, the design further materialized, unfolded, and transformed. Initially, Bella held a piece of tube to the board for the elevator part (Figure 1.a). Holding the configuration with her read hand, she then brought the short piece of board that they had earlier cut to the top, materializing a particular configuration (Figure 1.b). At the same time, Leanne finished cutting another tube from the cardboard roll. When she was done, she picked up the end of Bella's tube and inserted one end of her own tube. At this point, she proposed to glue these pieces together (line 05). Bella questioned why (line 06). At first, Bella suggested that the new configuration would "hit the floor" (), and then takes up the point again proposing that once it hit the floor, the could make a link to the next part that they had envisioned for their ultimate design (line 10). But Leanne now proposed to take the part that she had just produced as chute (line 11). Bella agreed with it and, consistent with the design envisioned earlier and inscribed in the diagram, proposed to have a board as the piece following the chute (line 12).

Neither Bella nor Leanne addressed the apparent contradiction that they had just gone through the actions of cutting two pieces of tube from a longer raw material, only to glue it back together again to make it long or to bring it to the floor where it would join "the other part" (line 10). The also did not address the issue that the proposal was inconsistent with their earlier design, where the shoot was followed by a piece of board (see diagram).



Figure 1.

Here, a change in the design was proposed; it had emerged from arranging raw materials at hand rather than going back to the diagram. The constellation of the tube currently used by Bella as a way of envisioning the next step—how to attach the tube to the board—and the tube held by Leanne. The proximity of the two gave rise to an

opportunity to join the two to make it “long.” In fact, just after she finished cleaning the cut on her tube, Leanne moved her gaze to the right and toward the configuration held by Bella, then back to her own tube; then her hand moved out to grab the end of Bella’s tube before inserting into it her own piece. The rationale for the move lies in the possibility of joining two tubes, copresent as raw materials, lending themselves to an interesting configuration. The rationality of the proposal does not go beyond this situation, and therefore the question of contradiction does not pose itself. The proposal is a possibility, ephemeral, and dissipated as soon as Leanne pulled the two tubes apart again.

The possibility emerged with the perceptual salience of the two pieces; designing is envisioning, where the visual parts may come from the more ephemeral (mental) images ((subjectivity)) and the perceptual images of things in the environment.

While Leanne exchanged her own for Bella’s piece, the latter followed the actions; the design unfolded from their combined actions, Bella holding the board and Leanne bringing her own piece, which Bella then steadied to the wood with her right hand. Both were oriented toward the emerging configuration of the materials, which, together with their subjective perception, constituted the design.

The design differs for the two individuals, because of their subjectivity, but is also the same, because they agree that whatever configuration they had before them was what each wanted to have and accepted as basis for future actions.

As the episode unfolded, Leanne proposed to take the tube that she had just completed as the shoot to be attached. The particular form that this joint should take arose in the situation: at first, Leanne proposed to nail the tube to the board, then, after a brief pause, she suggested gluing the two pieces together.

L: Well then just use this chute

“Use this chute” allows the existence of another chute, the one that Bella had previously held to the board. She did not provide a rationale for having one tube rather than another, but her utterance implied the existence of two alternatives.

### **Signaling agreement, reaching intersubjectivity**

Following Bella’s objection, and despite Bella’s apparently slight revision of Leanne’s proposal, the latter now suggested a different design, one in which her tube would become the “chute.” Bella supported the proposal not only by uttering “Yeah,” but also by proposing a continuation of the design that explicitly built on the vision articulated by Leanne. She then added further to the same unfolding design by articulating first one then another means of joining the two pieces to become part of the design.

In line 10, right at the end of the proposed vision (gesture, material, utterances), Bella moved her gaze to face Leanne, a way of seeing her response/ reaction to the proposal.

### **Raw materials and gestures as part of envisioning**

Bella used a gesture to “extend” the artifact, thereby envisioning those parts not perceptually available in the configuration before them. Leanne not only communicated that the joint was to be made by nailing, then gluing, but also where the joint needed to be located, as her rH index finger moved to a particular spot while talking about the nailing and gluing.

**Reversible actions in designing, such as gesture and holding raw materials into a configuration, and actions more difficult to reverse, such as nailing and gluing things.**

### **Micro-analysis of envisioning, individually**

In the following episode (Figure 2), Bella worked on her own envisioning the design using raw materials. ((075.jpeg, 076.jpeg, 078.jpeg, 077.jpeg))



Figure 2. Bella designs part of the googolplex-o-saurus

After picking up the board and tube, she rotated the latter in her left hand to bring it into a configuration that had some family resemblance with the diagram. Her gaze followed the tube to its end, which was cut at a slant (Figure 2.a). Her gaze then returned to the upper part, while she brought her right hand into place to hold in place both the upright board and the tube on the incline (Figure 2.b). This freed up her left hand to pick up a short piece of board and, in turn, bring it close to the current configuration, above the location where the two existing pieces were currently joined. Initially, she held the piece such that it came close to the top of the existing piece of wood (Figure 2.c), where it came to be in front of the tube opening, then moved it up on the upper part of the tube, leaving the entrance open but no longer having a connection with the other board (Figure 2.d).

In this situation, we do not know what Bella perceived. But we can say that she probably did not see any possibilities of the enacted configurations for further development. If so, one might have expected her to communicate this to the others, to make salient and thereby articulate her vision for it to become the collective one.

### **Division of labor in the community**

((Notes07)) The instances where other students or teacher assist Leanne, Bella, and Amanda are instances of the division of labor, which mediated the relation between the designer (subject) and design (object) for one aspect of the transformation of raw materials to evolve the design.

**Ostracism of Amanda**

The other girls do not respond to her questions, comments; Amanda does not get to envision with materials... Ostracism is enacted, the result of the interactions that the three girls have in their collective work.

**Contradictions**

Contradictions within the activity system can heuristically be attributed to different locations (entities) or their relations, but they always affect the system as a whole.

Activity theory is a way of accounting for actions as they can be observed on the videotapes. Any presumed silent, personal, and subjective thinking is (a) inherently inaccessible and (b) always an “internalized” form of practical actions that the individual has previously accomplished in the material world. Thus, particular actions such as using then replacing a saw may be attributed to a dull saw blade, but the point of activity theory is to explain the actions rather than the dull blade independently of the actions.

**History**

It is important to understand the history of a particular system, because at any one point, coparticipants in the system may draw on memory traces of past situations as resources in their present communication.

**Communication**

Communication is part of designing in the sense that it is but one type of practical action that moves the activity systems further along the trajectory toward completion.

Communication has different functions, for example, establishing alignment, making entities salient, repairing misalignments, envisioning future courses of actions and material constellations. Communication is *for* designing rather than *about* designing; it is *in support of* material transformation rather than *about* material transformation; etc. It is part of the unfolding history of the project rather than about something.

Communication occurs at multiple levels, not just utterances; it includes gestures, body orientation, gaze, and things in the perceptual ground available to coparticipants.



Figure 3.

The girls had moved from the table for sawing, cutting, and drilling to another station where a heavy-duty glue gun had been set up. Leanne began putting glue to the top part of the board held by Amanda. Bella, who already held the board, then took over the tube from Amanda, ready to put the tube to the glue. But she did not do it directly but rather asked whether she could put it “like that” (Figure 3.a). Without saying a word, Leanne took the tube from Bella, turned it around (Figure 3.b) and set it on the board into the glue; Bella pushed the two pieces together (Figure 3.c). Leanne then projected, “Now I put some more, some more glue.” Amanda asked to do it (“Can I do it?”) and Leanne acceded, so that Amanda came to add glue around the existing joint (Figure 3.d).

In this situation, the angle between the tube and the board is at variance with (a) the diagram and (b) with the design envisioned immediately prior to this situation at the gluing station. None of the students takes note, which might mean that they do not perceive the contradiction with either of the two historical precedents. The particular configuration, now more permanently fixed, may have consequences—the fact that it is fixed may lead to resistance in taking it apart; if they want to get the ball rolling down, they have to somehow bend the tube downward, on an angle of less than 90 degrees with the board. Here a new design emerges from the practical action of gluing. Although there is an external contradiction, one between diachronic statements of how the design will look like.

In this situation again, the coherence is local rather than global—across the different statements that they had made about the nature of the design that they want to ultimately emerge from the design activity.

Why do they glue and then add more? There are some experiential precedents that make them engage in this rather than a different action?

Bella’s question “like that?” is an indication that the earlier public design conversation was not sufficient resource for deciding on the next step, that is, the orientation of the tube to be attached—the end cut at a 90 degree angle to the length or the other part cut on



an angle. That is, although their earlier discussion seemed to have ended in intersubjectivity, it has been put into question at this point. The fact that Leanne turned the tube around also shows a difference between the two positions—Bella's question allows the configuration enacted to be a possibility. Leanne's definite action of turning it about chooses between the implied possibilities, implied though Bella may not have envisioned ((subjectivity)) all possible states. She did not respond but contribute to the following actions, thereby accepting the current configuration.

She did not question the 90-degree angle between the materials, perhaps oriented to Leanne's statements as if they were definitive and covering the particular angle of the configuration. In this case, she would accept it rather than questioning the contradiction with earlier configurations that they appeared to have decided upon.