

Learning as a Practical Achievement: An Interactional Perspective

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Abstract: Despite the definitional difficulties associated with learning and instruction, they evidently occur as social realities for those involved in the practical, day-to-day work of learning and instructing. In this paper we offer an interactional perspective of learning and instruction by relying on the commonsense recognizability of learning to investigate what participants themselves do to achieve and recognize learning's work.

Introduction

Learning as a cognitive process seems to be properly the domain of psychology, education and cognitive science - and so it is, but not exclusively so. Learning and other cognitive activities are also properly matters for investigation as phenomena of social interaction (Schegloff 2006, Heritage 2005, 1984, Coulter 1989, Suchman 1987). As such, learning is understood to be both a "social" and a "psychological" fact. In this essay, however, we leave the psychological facticity of learning to those who are best equipped to study it. We are concerned with learning as a social fact, as a phenomenon that is recognizable and doable in and through interaction. While it may seem odd, thinking of phenomena such as learning in social interactional terms can be a source of significant insight (cf. Schegloff 2006, Drew 2005, Heritage 2005, Coulter 1991). In particular, we recognize in commonsense usage and in actual practice that learning is constituted through the work of assessment. In other words, instructors or others constitute learning in and as the work of assessing certain kinds of observable and assessable actions of the "learner" (Mehan, 1979). Learners and instructors alike routinely treat learning as an esoteric phenomenon, something hidden from view, something attributable as an achievement of an actor based on the observed and observable performance of that actor but which, in itself, is treated as unobservable. This is a view aligned with traditional theories of learning that treat learning as a hidden and inferred process taking place exclusively "inside the learner" (Simon, 2001).

We treat learning as a post-hoc achievement, through and as the outcome of the process of its recognition. It is in the way that changes in cognitive states are performed *for assessment* that learning is achieved. While circumstances in which instruction occurs provide a focus for a set of activities associated with teachers and students, masters and apprentices, knowledge transfer and the like, learning is informally understood for the purposes of this paper as the work that actors do to achieve displayable, demonstrable and assessable competence. This involves both the practiced accomplishment of proper action and the demonstrable performance of proper action *for purposes of assessment* (whether self- or other-assessment). The demonstrable and assessable performance of proper actions only becomes recognizable as a learned achievement as a post hoc outcome of the assessment transaction.

The CSCL Context

The data for this analysis derives from logs and recordings of online synchronous chat interactions among students working as peers to collaboratively address and solve mathematics problems. These data were acquired over a three year period as part of the Virtual Math Teams (VMT) project at Drexel University (Stahl, 2009). They represent a mix of various online chat technologies including AOL's Instant Messenger™ and VMT Chat, an online system developed in collaboration with Fraunhofer Institute IPSI in Germany with both chat and whiteboard capabilities (Mühlpfordt & Stahl, 2007). This CSCL environment provided us a perspicuous setting in which learning is "made visible" (Stahl, 2002) as a practical achievement of learners that is "observably and accountably embedded in collaborative activity" (Koschmann, 2001, p. 19). In particular, our analysis focuses on excerpts obtained from the VMT corpus where participants reflexively display their orientation to learning as a members' matter through their situated actions (Garfinkel, 1967; Suchman, 1987).

Learning as a Practical Achievement

In a seminal CSCL study Roschelle (1992) characterized learning as an interactive process where incrementally developed understandings lead to convergent conceptual change. Although a distinguishing feature of CSCL research is its consideration of learning as a fundamentally social phenomenon, even the paradigmatic CSCL studies characterize learning in reference to changes in hidden structures and/or cognitive states (Koschmann, 2002). In interactional terms however, studying the particular ways in which changes in cognitive state are marked by participants can help analysts eliminate references to such hidden structures. In the context of joint activity not only change-of-state markers are used, but assessable actions are performed. In particular, these

actions are performed for the purposes of being assessed. To see this, we use methods of Conversation Analysis to describe in detail the interactional organization of the phenomena in which we are interested. One example of this is provided in Figure 1.

In Figure 1, Quicksilver uses ‘Oh.....’ at 7:27:01 as a change of state display token (Heritage, 2002) to inform other participants that the change in his cognitive state was relevant to the ongoing interaction. This is followed at 7:27:05 by a formulation of the achieved ‘understanding,’ produced as a text posting, for others to assess for its ‘correctness’ or adequacy: “so that is the bottom level”. Finally, Quicksilver self-assesses with “I get it” at 7:27:06. Prefacing the display of an achieved understanding with “so” also serves to indicate that it is derived from or is a consequence of a nominally unobserved cognitive process. Thus, Quicksilver (a) made available a change in cognitive state, (b) formulated an understanding for others to receipt and assess, (c) presented this effort as a private experience, and (d) offered a self-assessment as well.

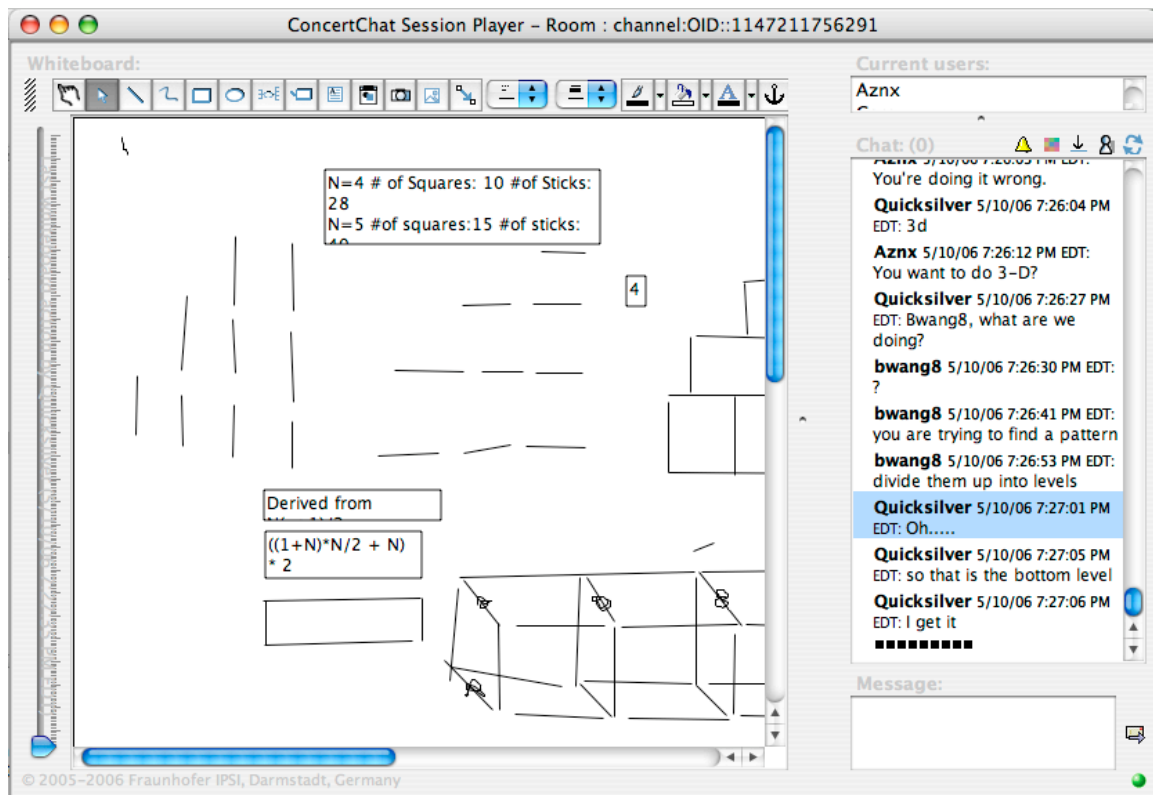


Figure 1

In the next example (Figure 2), we see how a member’s timely contribution to a sequentially unfolding display of reasoning is treated as a demonstration of competence and cognitive achievement by the other member through a post-hoc assessment.

Line	Handle	Posting	Time
26	davidcyl	the nth pattern has n more squares than the (n-1)th pattern Basically it's 1+2+...+(n-1)+n for the number of squares in	18:27:32
27	davidcyl	the nth pattern	18:27:55
28	137	so $n(n+1)/2$ and we can use the Gaussian sum to determine the sum:	18:28:16
29	davidcyl	$n(1+n)/2$	18:28:24
30	davidcyl	137 got it	18:28:36

Figure 2

In Figure 2, members are oriented to the task of finding a formula to summarize the number of squares in the n^{th} stage of a geometric pattern. Davidcyl describes how the number of squares changes between the $(n-1)^{\text{th}}$ and n^{th} stages at line 26. In the next line he expands his description by providing a sum of integers that accounts for the number of squares required to form the n^{th} stage. As Davidcyl composes a next posting, 137 posts a so-prefaced math expression at line 28, “So $n(n+1)/2$ ” that (a) shows 137 has been attending to the organization of Davidcyl’s ongoing exposition, (b) displays 137’s recognition of the next problem solving step projected by prior remarks, and (c) call on others to assess the relevance and validity of his claim. Davidcyl’s message at line 29 is a more elaborate statement that identifies how his prior statements, if treated as a Gaussian

sum, yielded the same expression 137 put forward at line 28 (viz. " $n(n+1)/2$ "). Given that 137 anticipated Davidcyl's Gaussian sum, Davidcyl announces in the very next posting that "137 got it," treating 137's production of the Gaussian sum as evidence that 137 had competently understood Davidcyl's exposition in lines 26 and 27.

In the next excerpt (Figure 3), a change of cognitive state is marked by the presentation of a self-assessment of a series of claims and whiteboard actions. In particular, self-assessment is used as a form of *repair* to mark a change in the cognitive state of the actor making the claims and the assessment.

The screenshot shows a 'ConcertChat Session Player' window. On the left is a 'Whiteboard' with a diagram of a square divided into four quadrants by dashed lines. Text boxes on the whiteboard state: 'N=4 # of Squares: 10 #of Sticks: 28' and 'N=5 #of squares:15 #of sticks:'. Below this is a formula: 'Derived from ((1+N)*N/2 + N) * 2'. At the bottom of the whiteboard is a table:

4	28	10
5	40	15

On the right is a 'Chat' window with a list of messages. Blue squares are placed next to several messages, and a left-pointing arrow indicates these correspond to drawing actions on the whiteboard.

Figure 3: Blue squares in the chat correspond to Quicksilver's drawing actions (marked with the left arrow)

The whiteboard activities performed by Quicksilver serve as a specific example of his post at 7:06:20 that provides for the relevance of his subsequent postings. What follows then is an extended sequence of postings produced by Quicksilver at 7:07:07 through 7:07:39. These postings present the sequential organization of reasoning provided in the first posting by making reference to a specific illustration on the whiteboard. When an actor produces an alternative version of a prior account (Cuff, 1993), the alternative version can be seen in certain circumstances as evidence of an alternative cognitive organization of the matter being described and an effort to effect a change in the cognitive state of recipients (including, possibly, the author of the alternative version). Then, at 7:09:09 and 7:09:25, Quicksilver produces a self-assessment in which he displays his recognition that there is a problem with his versions of a pattern of change. This admission of error is reminiscent of self-repair work in that the author of the "incorrect" account marks it as incorrect. This self-assessment also marks a change of cognitive state. That which was presented and treated as a possible solution is now rejected as incorrect in a way that implicates a change in Quicksilver's "thinking" about the matter. While it is interesting that no one offers an alternative version of a pattern of change at this point, the work done to put forward this initial version and its assessment by the author of the version provide evidence not only of changes in cognitive states but also of learning's work.

In the next excerpt (Figure 4), we will see an example of other-initiated repair where one group member offers a correction to a claim previously made by another member, and how the resolution of the difference in opinions produces a learning moment for one of the members.

Line	Handle	Posting	Time	Duration
192	AVR	for the 9 triangle it's about 7.79	8:42:45	0:00:06
193	AVR	and for the 12 it's 10.39	8:42:55	0:00:10
194	PIN	the height?	8:43:02	0:00:07

195	AVR	yes	8:43:06	0:00:04
196	AVR	now LET ME CALCULATE THE AREAS	8:43:18	0:00:12
197	PIN	for the 9	8:44:28	0:01:10
198	PIN	you did it wrong	8:44:30	0:00:02
199	PIN	its 8.352	8:44:36	0:00:06
200	AVR	no	8:45:13	0:00:37
201	PIN	ya	8:45:25	0:00:12
202	AVR	in the triangle a = 4.5	8:45:26	0:00:01
203	PIN	cuz look	8:45:27	0:00:01
204	PIN	ya	8:45:28	0:00:01
205	AVR	and b = 9	8:45:29	0:00:01
206	PIN	4.5 squared is 20.25	8:45:43	0:00:14
207	PIN	20.25 =X=81	8:45:53	0:00:10
208	PIN	20.25+X=81	8:46:06	0:00:13
209	AVR	yeah	8:46:08	0:00:02
210	AVR	right	8:46:16	0:00:08
211	PIN	X=60.75	8:46:24	0:00:08
212	AVR	exactly	8:46:27	0:00:03
213	PIN	the square toot of that is	8:46:30	0:00:03
214	PIN	7.794	8:46:40	0:00:10
215	PIN	oooppps	8:46:42	0:00:02
216	AVR	right...	8:46:43	0:00:01
217	PIN	my fault	8:46:44	0:00:01
218	AVR	MUAHHAHA	8:46:50	0:00:06
219	AVR	WHO PREVAILS NOW	8:46:53	0:00:03
220	AVR	no jk lol	8:46:56	0:00:03
221	PIN	me	8:46:57	0:00:01
222	AVR	sorry	8:46:57	0:00:00
223	PIN	jk	8:46:59	0:00:02
224	AVR	okay	8:47:05	0:00:06

Figure 4

In this excerpt the group members are oriented to the task of calculating the height of two equilateral triangles of length 9 and 12 respectively. At the beginning of the excerpt AVR presents her findings for each triangle. At 194, PIN asks whether the provided numbers correspond to the height values. PIN's question marks that AVR's results are somehow unexpected or problematic and provides AVR an opportunity to do self-repair. In line 195 AVR acknowledges that the numbers she provided are height values. Then in line 196 she announces that she is ready to move on to the next calculation. In 198, PIN explicitly disagrees, calling what AVR did "wrong". Then in line 199 he offers a repair for the problematic value. 37 seconds later AVR disagrees with PIN. The emergence of this conflict opens a sequence of exchanges where AVR and PIN step each other through the derivation of the height value for the first triangle. First, the side values relevant to this operation are offered by AVR in lines 202 and 205. Then, starting in line 206 both actors organize their exchange in such a way that as soon as PIN performs the next step of the calculation AVR provides an immediate assessment of that step. This exchange continues without any interruption until PIN carries out the last step of the computation in line 214, where he ends up with a value very close to what AVR proposed at the beginning. Line 215 indicates that a shift in PIN's cognitive state has occurred, and finally in line 217 he makes the self-assessment that he was mistaken. In other words, the work that PIN does to demonstrate his position and the recognition that his demonstration yielded an answer different than he initially proposed have produced a learning moment for him.

Discussion

While learning is often treated as a change of an individual's internal cognitive state, we take the position that learning is a social fact. In other words, learning is the full set of interactional procedures by which actors (a) assert, display and enact competencies and (b) allocate matters such as knowledge, understanding, etc., to each other. In this essay, we turned our attention to the work actors perform to display actions for assessment and the assessment work those actions solicit. In a preliminary way, our analysis has shown that interior/private change is attributed to actors based on simple claims of competence or observable displays and enactments of competence as methods of attributing learning's work to actors. When simple claims are made without any enactment of competence, the attribution of learning tends to be weaker and more susceptible to challenge than claims accompanied by enactments of competence (Pomerantz, 1984). When displays and enactments of competencies are presented, learning as achieved understandings and competencies can be more strongly attributed to actors. This is predicated on the notion that learning and understanding themselves are unobservable and only the demonstrable performance of competent action by actors who somehow "possess" that learning or understanding is available for public inspection.

When an actor posts a statement like "Eureka, I understand!" or "ok, I get it," he or she claims a change in cognitive state in a very public manner but does not demonstrate that change. For instance, the use of

the oh-preface in the very first excerpt demonstrates a method for presenting a claim as though it were the outcome of a private or unobservable process (Heritage, 2002). The claim of changed cognitive state may simply be accepted as adequate without the learner having to enact an actual competence. While we know that actors often attribute learning to actors who only make claims of changed cognitive state without any displays of competence, we have observed in our analysis that so- and oh-prefaced claims (a) make displays of competence interactionally relevant as expansions following the production of such markers of cognitive change, and (b) that such displays of competence provide and serve as stronger evidence of learning and understanding (Pomerantz, 1984). The critical feature here is that when an actor displays or enacts a competence for assessment (as we have seen above), he or she not only makes a stronger learning claim, but treats learning as a social matter to be ratified by other competent actors in the scene. Hence, assessable displays and enactments of competence are important constituents of learning's work. Of course, the other part of learning's work, as we have shown, is the assessment of these displays of a learner's competence. It is only upon the competent assessment and ratification of a learner's competence, either with or without an actual display of that competence, that learning is attributed to the learner. It is in this sense that we claim learning, as a social fact, is a post hoc achievement of learning's work.

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