A Qualitative Study of Resident Learning in Ambulatory Clinic

The Importance of Exposure to ‘Breakdown’ in Settings that Support Effective Response

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Abstract. Qualitative analysis of a large ethnographic database from observations of a resident teaching clinic revealed three important findings. The first finding was that breakdown, a situation where an 'active' (such as a person or the group) is not achieving expected effectiveness, was the most important category because of its frequency and explanatory power. The next finding was that exposure to breakdown was a necessary ingredient for effective learning. The final finding was that effective response to breakdown requires six factors to be present: the patient is engaged directly; responsibility is matched to authority; tools are matched to tasks; information resources are matched to need; values are matched between co-participants; and expectations are matched with capacity. These findings have implications for planning, improvements and further studies in ambulatory teaching clinics.

Key words: ambulatory care, education, medical, experiential learning

Teaching clinics have two broad missions – patient care and trainee education. This creates a complex environment where it is difficult to assess educational programs. An recent review of the literature on teaching in ambulatory settings concludes that there is a strong need for outcomes research in teaching clinics (Irby, 1995). However, it has not been clear how such studies should be conducted.

An important first step is to describe teaching clinics in some detail in order to model how learning occurs there. From these models, we may then be able to identify and test important intermediate variables for learning. We report here on an observational study whose goals are:

- To better understand the relationships between experience, concepts, contextual variables, and learner behavior in a teaching clinic.
- To establish a new framework from which to explore outcomes of teaching and learning in the complex ambulatory environment.

Our conceptual framework for understanding education in the teaching clinics is to adopt an experiential learning model (Kolb, 1984; Jarvis, 1995; Smith & Irby).
Table 1. Demographics of the three study populations.

<table>
<thead>
<tr>
<th></th>
<th>Faculty (n = 12)</th>
<th>Residents (n = 13)</th>
<th>Patients (many)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age average (range)</td>
<td>47.2 (39–55)</td>
<td>30.0 (27–37)</td>
<td>64 (30–99)</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>70%</td>
<td>23%</td>
<td>92%</td>
</tr>
<tr>
<td>Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>83%</td>
<td>69%</td>
<td>Majority</td>
</tr>
<tr>
<td>African American</td>
<td>0%</td>
<td>0%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Native American</td>
<td>8%</td>
<td>0%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>0%</td>
<td>23%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>8%</td>
<td>&lt;5%</td>
</tr>
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1997). This model asserts that learning takes place through the interaction between persons and their concrete experiences. A successful learner will respond positively to concrete experiences by attending to situational feedback, conceptualizing, testing new concepts, and changing behavior (Kolb, 1984). An unsuccessful learner will not.

**Methods**

**CONTEXT**

The University of Washington human subjects division and the institution’s research and development committee approved this study. The study was carried out at the VA Medical Center in Boise, Idaho. This is the site of the PGY2 training year for ten residents in a primary care track of the University of Washington. These residents spend their first and third years at the University of Washington in Seattle. They participate in academic medical continuity clinics twice weekly on one of four outpatient ‘firm’ teams (Smith, 1995) with individual panels of approximately 150 patients each. They are supervised by staff at the VA that are also faculty of the University of Washington. In addition to these trainees, the site hosts six preliminary year medicine interns, interns from a local family medicine training program, third and fourth year medical students doing rotations in medicine, surgery, psychiatry and medical sub-specialties, and fellows in pulmonary-critical care. The demographics of the patient, resident, and faculty populations studied are seen in Table 1.

**ETHNOGRAPHY**

Two trained observers collected data in the academic medical clinics of this Veterans Affairs medical center over the course of two years. Observations were
structured to describe clinic activity from the point of view of patients, residents, and faculty. The study proceeded from broad, general ethnographic observations to more targeted, specific observations.

Observers would pre-specify an amount of time (usually 1–2 hours) and location (public areas such as the waiting room or the nurses station) for the initial observations. During an observation, they would make brief reminder notes to establish sequence and specifics. Immediately following the observation, they would retire to a private area and use their notes to create an in-depth field report on a laptop computer. They were asked to note and record anything in the field context that seemed relevant using an even mix of ‘primary process’ and ‘key thread’ styles in their reports. We defined primary process style as describing the flow of what was actually happening in real time (example 1 below) and key thread style as exploring the reasons behind interesting observations (example 2 below). This mix gave an excellent picture of both the complexity (primary process) and structure (key thread) of activities in the clinic.

As the analysis became more focused, the observers were guided to make more specific observations including: shadow an entire patient’s visit (10 of these), observe an entire half day of clinic for four (31%) of the residents and four (33%) of the faculty, find out more about the financial screening process (interviews of check in clerks and business office personnel), and find out more about the check in process (interviews of clerks, nurses, and patients).

This ethnography totaled more than 130 hours of observations and interviews summarized in 17 detailed field reports, and resulting in the data set of 2919 paragraphs of text.

ANALYSIS

Analysis evolved in three phases: (i) identification of significant categories, (ii) clarification of the most important category, breakdown (which is defined in results), and (iii) identification of factors leading to an ineffective response to breakdown. It proved important that one analyst was an ‘insider’ in this clinic (able to ground confusing observations in the political and historical context) and the other was an ‘outsider’ (able to question things that the first analyst took for granted).

Phase I focused on the identification and definition of salient categories in the ethnographic data. Activity theory was used as a structuring framework (Engström, 1999). This theory holds that the objectives of shared activity are significantly determined by the local culture and historical factors. Two analysts (not the data collectors) used a mix of free coding, themes that emerged from the data, and template coding, an outline of likely-to-be-important categories (Crabtree & Miller, 1992). Our coding templates contained categories from Engström’s (1987) widely accepted activity theoretical model (e.g., rules, tools/artifacts, division of labor).
Data were analyzed using Non-numerical, Unstructured Data Indexing, Searching and Theorizing software (NUD*IST Vivo 1.0, Scolari, Sage Publications Software, Thousand Oaks, CA). The two analysts met weekly to review data and adjudicate categories and examples. Proposed new categories required a 'necessary and sufficient' definition as well as at least three examples to ensure relevance to the data. If both analysts agreed to the new category, it was used in the next round of analysis. Further use of the category often elicited examples that required modification of the definition. In this way, both the definition of the category and the set of examples became more robust with ongoing analysis. Analysis continued until there was substantial agreement between coders (goal was Cohen’s $\kappa \geq 0.75$) and no significant new insights were being discovered from the data. This required approximately 30 sessions totaling 100 hours.

Phase II of the analysis focused on the category 'breakdown'. It became evident that this category, one of the new free coded categories, was the most significant coded category in explaining the data for two reasons. First, it was the most frequently coded category. Second, it was the only coded category that was conceptually broad enough to include all other categories as subsets, giving it a more powerful descriptive quality and greater explanatory power. For this phase, we wanted to examine several concrete, factual breakdown situations from the original data set. We had categorized the original breakdowns into several preliminary types (i.e., equipment, communication, norms) and multiple examples were selected randomly from each group. These ethnographic observations were transcribed into 156 vignettes for analysis and exposition.

During this phase, we explored the effect of breakdowns and compared our concept of breakdown to similar concepts in the literature. These comparisons increased our appreciation of the importance of exposure to breakdowns in order to facilitate experiential learning. During this phase we also refined the category definition.

Phase III of the analysis explored the difference between effective responses to breakdown, where there was containment or resolution, and ineffective responses. Again, the 156 breakdown vignettes were used. The two analysts now coded reasons for ineffective response to breakdown. Once again, a proposed new reason for ineffective response had to be grounded in the data with three examples. Analysis continued until there was substantial agreement between coders (goal Cohen’s $\kappa \geq 0.75$) and no significant new insights were being discovered from the vignettes.

**Results**

**Phase 1**

As mentioned above, two types of reports were collected during this phase. Primary process reports (example 1) were designed to explore the complexity of real time activities in the clinic environment. Everything was recorded in a stream of
consciousness' fashion. Key thread reports (example 2) were designed to explore structure and informant explanations for interesting observations. These often required direct questions of informants.

**Example 1. Portion of primary process observation.**
WWII era veteran with a cane walks up to another WWII era veteran. 'I'm just now seeing my doctor. Be sure to tell the driver, will you?'
Nurse comes out the door and calls out. 'Mr. W'
Overhead paging system asks a speech therapist to call extension XXXX.
In the distance, a telephone rings for a long time.

**Example 2. Portion of a key thread observation.**
I ask about the clinics taking place this day. The first nurse shows me how their team separates the workload between the two nurses. Each station covers one hallway of exam rooms. Clinic lists for the day are posted on the bulletin board beside each nursing station. A third nurse is [staffing] the phone image area. The nurse from one side is finishing ear irrigation in the treatment room. She explains that this was ordered by the nurse practitioner.

Phase I analysis showed that fifteen coded themes had relevance to the data (Table II). These included twelve new free codes and the three template codes from Engström listed in parentheses above. Accuracy was assessed in the final (thirtieth) session of analysis in which the coded categories were applied by both analysts to clean copies of the first months data (8% of the total data) with an inter-coder agreement of 0.88 by Cohen's k.

**Phase II**
Breakdown was the most frequently coded category from the phase I analysis, occurring in 43% of all text units. As we continued to explore and refine our definition in concert with those of others, the category’s conceptual richness became evident. The final definition of breakdown became 'an actor not achieving expected effectiveness'. We were concerned about the bias inherent in this 'God's Eye' definition. To address this, we identified an objective criterion for recognizing a breakdown – an interruption in the smooth flow of activity. Examples 3–5 below demonstrate the application and richness of the category.

**Example 3. No breakdown.**
Doctor: (to patient): "What is your current dose of lasix?"
Wife: "He was taking [60 mg]. Then he got worse, so I upped him to [120 mg]. I didn't know what else to do (pause), I don't know if I was doing the right thing?"
Doctor: "That seems like a reasonable thing to do. Are you still taking the isosorbide and hydralazine?"
Table II. The 15 categories from phase 1 analysis

ARTIFACT: Any physical object (including person-as-object), or something treated as though it were a physical object (e.g., blood pressure) whose purpose is structuring a task.

BREAKDOWN: a situation where an "actor" (such as a person or a computer) or the group is not achieving their expected effectiveness.

COOL: An unusual amount of distance, terseness or animosity in tone of interaction.

DIVISION of LABOR: A statement or expectation, with reference to a generic subject or group of subjects, about the apportionment and description of job tasks in order to achieve the community's objectives and goals.

INNOVATION: Any response to a breakdown or anticipated breakdown that explores new actions or goals.

INTERRUPTION: An interrupted break in the flow of the job due to verbal, telephone, computer or other modality, NOT due to lack of something at hand.

INSTRUCTION: Any overt transmission of information about facts, skills, rules or roles.

JARGON: Language apparently only understood from within the culture but not idiosyncratic to this particular observation.

MEDICATIONS: Having anything to do with effects, side effects, obtaining or communication about medications.

MORTALITY: Any explicit or tacit allusion to mortality or death by a participant (not observer)

PESSIMISM: Explicit expectation of any poor outcome (health, process, administrative)

OBSERVER INTERACTION: Explicit recognition or interaction with the observer.

OVERHEAR: Any conversation that can be heard by others which is confidential, meant to be private, or would embarrass most participants if they knew it was overheard.

RULES: A tacit or explicit use of cultural values, beliefs or norms to regulate the individuals behavior relative to the community.

WARM: An exemplary positive gesture, statement or intention-to-connect in tone of interaction.

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Example 4. Breakdown with an effective response.

Doctor: "So I don't think we need to continue checking the PSA since you've decided against treatment anyway." (stops in response to a quizzical look) "Do you want to ask me another question?"

Patient: "Yeah, about the new medicine you sent me [terazosin]."

Doctor: "That's for your blood pressure, but it shrinks the prostate too. Let me go over your medicines. You take three for blood pressure, naproxen and glucosamine for arthritis, and I give you some potassium because [hydrochlorothiazide] causes you to lose it. Have you been taking them?"

Patient: "Well, no. I wasn’t sure what it was for. I think I see how to do it now, thanks."
Table III. Six factors leading to ineffective responses to breakdown

- Failure to engage the patient
  - External constraint
  - Poor skills
- Responsibility is not matched to authority
- Tools are not matched to tasks
  - Design and use not matched
  - Poor training in tool use
- Information resources are not matched to need
- Values are not matched between co-participants
- Expectations are not matched with capacity

Example 5. Breakdown with an ineffective response.
Doctor: (trying to look up the latest hemoglobin A1C)
Patient: (thrusting magazine article about premixed insulin at the resident)
  “Have you ever seen anything like this?”
Doctor: “I’m not sure if our pharmacy carries this.”
Patient: “Well, if you haven’t heard of it, they probably don’t.”
Doctor: “I can send you to the pharmacy and they can tell you if we have it.”
Patient: “That always takes so long. Don’t bother.”
(the pharmacy does carry the mixture)

Reviewing the original data and the 156 breakdown vignettes revealed that non-breakdowns rarely resulted in learning or improvement. Ineffective responses to breakdown usually represented lost opportunities for learning and improvement, as well as frequent propagation of the breakdown to other personnel or departments. Learning and improvement seemed to be limited to the examples of breakdown with effective response. For this reason, phase III focused on the elements necessary to achieve an effective response.

Phase III

Review of the vignettes revealed an effective response in only 16% of breakdowns. Phase III analysis, focusing on the 84% of ineffective responses, identified six factors that led to ineffective response to breakdown. These are seen in Table III and discussed further below. Inter-coder agreement for these six factors in the 156 vignettes was 0.85 by Cohen’s $\kappa$. 
1. Failure to engage the patient

The patient is the focus of medical care and the resident’s tool for learning in a teaching clinic, and so it would seem self-evident that engaging the patient is mandatory. Examples six and seven below show that this is not always the case.

**Example 6. Failure to engage the patient (external constraint).**

Resident: (Typing and clicking on the computer)
Patient: (Begins to say something and then stops mid-word; notices the resident is dealing with the computer) “Excuse me.”
Resident: (Doesn’t notice the interruption)
Patient: (Flushes and looks irritated)

**Example 7. Failure to engage the patient (poor skill).**

Patient: (Talking to clinic observer before the visit) “She keeps pushing me to take more blood pressure pills [patient currently on a diuretic]. She just doesn’t listen! (getting louder)”

Recurrent failures to engage the patient occurred in the data due to external constraints or poor skills. If the failure was due to external constraints, the same structure, process or tool was repeatedly involved. If due to skill, the same person was involved. They both led to propagation or recurrence, where the same type of breakdown was seen over and over. Example six is one of multiple observations where the computerized medical record interfered with engagement and communication. Example seven is one of multiple examples of poor communication skills in a single trainee.

2. Responsibility is not matched to authority (or access to it)

One pernicious ingredient that we observed leading to dissatisfaction, ineffective response and recurrent breakdowns is to be the front line person fielding a problem or complaint, and not having the authority or access to the authority needed to deal with it. Example eight shows how balanced authority and responsibility work well in response to the unexpected to avert or contain a breakdown. Example nine is typical of an ineffective response due responsibility not being matched to authority.

**Example 8. Effective response to breakdown in check in, with balanced responsibility/authority.**

Nurse: (Taking a patient’s vital signs and having trouble with the automatic blood pressure machine. She gets a manual BP, and then listens to his heart). “Have you ever had an irregular heart rhythm?”
Patient: “No”
Nurse: “Well you seem to have one now. I’m going to send you over for an EKG. I want you to get a copy of it and bring it back here to me.”
(the patient is found to be having bursts of ventricular tachycardia, is sent to the ER for further evaluation, and is admitted to the hospital).
Example 9. Responsibility without authority.
Clerk: (Coming back to the nurses station) “Mr. X is asking about his
prescription. He’s been waiting a long time, and all he needs is his
cimetidine and then he can get going.”
Nurse: “He needs all his meds reviewed, not just that one. I paged the doctor,
and that’s all I can do!” (she pages him again)

3. Tools (or training) are not matched to tasks
Effective tools were seen in the data to structure and aid in the performance of
a task. Of course any tool can suffer a malfunction, but the most frequent ‘tool’
problem leading to recurrent breakdown in our data was conflict between the design
and the use of the tool as demonstrated in examples ten and eleven below. Example
eleven may also reflect a lack of training.

Example 10. Tool not matched to task.
Clerk: (to observer) “The biggest problem with scheduling is the computer
program limitations. I can schedule daily or weekly, but not monthly. I
spent about 30 minutes doing two patients yesterday because I had to
enter each appointment and lab separately for the next twelve months!
When the patient calls to reschedule an appointment, I have to move
the appointment and the labs separately.”

Example 11. Poor training in tool use.
Nurse 1: (She has bandaged a patient’s hand that was caught in an automatic
door and is trying to enter the incident report) “This is what ticks me
off.”
Nurse 1: (to computer) “Yes I want the whole list!”
Nurse 1: (to nurse 2) “I put in ‘other’, then [the computer help desk] said to
hit ‘return’”
Nurse 2: “Did you put ice on it?”
Nurse 1: (ignoring the question) “Now it’s asking what shift I work.”
Nurse 1: (to observer) “This part really frustrates me. I don’t have a set
schedule, and it won’t allow me to enter correct information!”

4. Information resources are not matched to need
Ambulatory clinic is a fast-paced learning environment where new information
(either ‘facts’ or ‘how-we-do-things-here’) is often needed to provide optimal care.
If this was not easily available, the learner in our data usually defaulted to ‘minimal
care’, resulting in errors, significant delay or consultation. Example twelve below
demonstrates an effective response to breakdown utilizing accessible information
resources. It also hints at the complexity of interactions that occur between the
patient, learner, and faculty.
Example five (above) is a typical example of ineffective response due to lack of easily accessible information.

**Example 12. Effective response due to accessible information.**
Resident: “What do you do about disturbing moles? Do you send them to derm [atology]?”
Faculty: “It’s faster here to send them to the ‘lump and bump’ [surgery] clinic.”
Resident: “Thanks”
Faculty: (to observer) “He’s my preceptor. I leave him lots of notes and he doesn’t even gag. My last resident was very extroverted and was open about everything. This guy is very self contained. I’m not sure what his needs are. It’s hard to shift from one type of resident to another.”

5. *Values are not matched between co-participants*

Values are fundamental principles that had to be aligned between co-participants in our data if they were to achieve shared goals. If concordance existed, it provided the foundation for improving existing structure and/or process. If it did not, one group of participants was able to ‘find the loopholes’ in existing structure or process in order to avoid the expectations of another group. This is seen in example 13 below.

**Example 13. Unmatched values (training program and resident).**
Nurse: (after a ‘no-show’) “Dr. X, what did you do with all your patients?”
Resident: (laughing) “I told them not to come in!”
Nurse: “The way to do it is to schedule the ‘no-shows’ again in your clinic! Dr. Y used to do that until [the faculty supervisor] caught on!”

(much laughter from both)

6. *Expectations not matched to capacity*

Residents have several roles: ambulatory care provider, learner, teacher, manager, and hospitalist to mention a few. Expectations accrued, often independently, from each of these roles in our data. If overall coordination and control systems were not adequate, the resident experienced significant overload. This resulted in shortcuts, unmet responsibilities, or fragmented communication that predispose to ineffective response to breakdown.

**Example 14. Resident tied up.**
Clerk: (to nurse 1) “Hey, Mr. X [with cancer] is out here. He has blood in his urine and doesn’t look good.”
Nurse 1: (gets vital signs, pages resident) “Remember Mr. X? Well, his urine is full of blood and he’s sitting out in the waiting room.” “Well, because he doesn’t look good.” “OK” (then pages the oncology nurse practitioner).
Nurse 2: “What’s happening?”
Nurse 1: “He’s in attending rounds and doesn’t want to deal with this.”

Example 15. Resident interrupted.
Resident: “Your most recent cholesterol was up. Do you have any idea why?”
Patient: “I quit eating such fatty foods”
Resident: “Really?” (pager goes off) “Excuse me” (resident picks up the phone) “This is Dr. X”, “Uh-huh”, “Can you bolus him with 500?”, “Normal saline”, “Yeah, that would be better” (hangs up, back to clinic patient) “Now where were we?”

Discussion

This study identified fifteen broad themes from an ethnographic database of observations of an academic outpatient clinic. We then focused on one theme, breakdown, because it was the most frequently coded category and it was the only one that was conceptually broad enough to include all other categories as subsets. Our initial perspective was to examine breakdowns with the goal of developing methods for eliminating them. We found that this simplistic view of breakdowns was too limiting and restrictive to be useful. Much like the approaches to medical errors that are based on the experiences of high-reliability organizations, our goal had to shift from eliminating breakdowns to understanding, tolerating and containing them (Begian, 2002a,b).

Phase II of analysis revealed several vignettes where breakdowns were the stimulus for learning. This led us to a broader literature on the interactions between breakdown and learning (Koschmann et al., 1998). Heidegger, a German phenomenologist, described how routine activities generally do not require conscious awareness. Only when nonreflective practice is interrupted by breakdown do we become aware of the tools and instruments (including cognitive instruments) we are using to perform an activity, as the “transparency of equipment” is dispelled (Dreyfus, 1991). Dewey, the American educator, went beyond this. He posited that no behavior changes without breakdown and consequent disequilibration. The primitive response is to adjust behavior to disequilibration non-reflectively, based on prior experience. Humans can regress to primitive adjustment under stress, but also use symbolic reasoning to transform themselves and the environment to achieve a desirable, imagined future (Dewey, 1991). Dewey believed this process was critical to reflective learning. Breakdown, then, is important for focusing on the tools and instruments we use unconsciously every day, and for creating disequilibration that can drive reflective learning. This explains its power in the experiential learning model.

The remainder of our analysis focused on separating the vignettes into those breakdowns with effective responses (where the breakdown is resolved) and those with ineffective responses (where the breakdown is not resolved and may
propagate). We found six factors that impede the effective response to a breakdown, and diminish the power of breakdown as a stimulus for reflection and learning.

The limitations of this study include the fact that our interpretations are colored by the specific interactions we observed and our personal experience in the institution. We studied a small group of people at a single institution with very little diversity. Other conclusions might be reached at other training sites.

Conclusions

Thematic and structural analysis of over 130 hours of ethnographic observation was used to better understand the complex teaching clinic environment. The first finding was that breakdown, a situation where an 'actor' (a person or the group) is not achieving their expected effectiveness, was the most important category of observations because of its frequency and explanatory power. The next finding was that exposure to breakdown was necessary for important reflective learning. This agrees with predictions from experiential learning theory and the constructs of Heidegger and Dewey. The final finding was a list of the factors that undermine effective response to a breakdown. Turning these around, effective response to breakdown and successful reflective learning require six factors to be present: the patient is engaged directly; responsibility is matched to authority; tools are matched to tasks; information resources are matched to need; values are matched between co-participants; and expectations are matched with capacity.

These findings have implications for planning and improvements in ambulatory teaching clinics. They suggest that advanced learners will benefit by exposure to breakdown situations (such as complex multifaceted patients, urgent care problems, etc.) so long as the six factors necessary for effective responses are present. These findings should be further explored and characterized.

References


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