Learning on the Job: An Analysis of the Acquisition of a Teacher's Knowledge

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Abstract

This study analyzed the criteria used by an experienced teacher to acquire the knowledge necessary to teach. An interpretive analytic framework and case study methodology were used in this year-long project with a midcareer high school teacher. Data were collected using a variety of ethnographic techniques including: nonparticipant observations, artifact and document analysis, stimulated recall from videotapes, and formal and informal interviews. Data analysis followed the conventions described by Glaser and Strauss (1967). Five distinct knowledge categories were identified, each with unique selection criteria. These knowledge forms included: class organization and operation, teaching behavior, subject matter, pedagogical content knowledge (Shulman, 1986), and external conditions. In matters of class organization and operation, Bob (the teacher) looked to his experience for those things that worked (i.e., insured classroom order). The acquisition of instructional behavior came largely from observations of other teachers (e.g., cooperating teacher, peers) or from experience. Bob selected subject matter knowledge based upon previous knowledge, current personal interests, resource availability, and student interest. Pedagogical-content knowledge was comprised in three phases: demonstrations, drills and activities. External conditions were influences outside the classroom (e.g., laws, school policy). Years of occupational service have left Bob with a well developed set of criteria upon which he acquires the knowledge to teach.

A distinguishing characteristic of any profession is the body of knowledge for practicing that profession. Professionals are called into service because they bring a unique understanding and critical insight to a situation that is inaccessible to the uninitiated. It is the body of professional knowledge that explains what those in a particular occupation do and why (Schon, 1983). The body of knowledge currently used in a profession is, therefore, of major concern to those practicing the profession and preparing future practitioners.

Contemporary literature on teaching lacks substantive information on the knowledge base teachers use in their professional practice. As Shulman (1986) noted, important questions such as "Where do teacher explanations come from? How do teachers decide what to teach, how to represent it and how to deal with problems of misunderstanding?" (p. 8) have gone unanswered. There has been a growing recognition in teacher education that the understanding of the knowledge used by teachers will lead to a better understanding of pedagogical practice.

Within the last decade, educational researchers have studied rules and principles used in teacher thinking (Elbaz, 1983), teachers' classroom images (Clandinin, 1985), the experience of classroom cycles and rhythms (Clandinin & Connelly, 1986), subject matter expertise (Leinhardt, & Smith, 1985), and pedagogical-content knowledge (Grossman, 1989; Gudmundsdottir & Kristjansdottir, 1989). These studies, and other similar work, represent the start of a growing trend in research into what teachers know and how they use that knowledge in their classrooms. This study continues that line of inquiry by offering a glimpse into the world of an experienced high school teacher. Specifically, this case study examines the criteria one teacher employed in acquiring the knowledge he found necessary for his professional practice.

**Method**

**Teacher**

Robert Halstop has taught high school physical education for the past 14 years at Hillcrest High School (HHS). Over those years, Bob has coached many sports and been involved in numerous school clubs, groups, and projects. At the time of this study, he was coaching the girls’ varsity basketball team. Besides teaching and coaching, he performed normal student counseling activities and other school duties assigned by the administrators. Bob worked at a local lumber mill during the summers, but did not work outside the school during the academic year. Bob's school day officially began at 7:30 a.m. and ended at 3:30 p.m., but he was usually in school much earlier and it was common for him to stay later. There were seven instructional periods in the day. Bob was assigned six classes, one planning period, and had a 30 minute lunch break. Bob was presented with an initial draft of this report for his review and comment. His comments were incorporated into subsequent drafts and used to validate the accuracy of the events and quotes reported.

**Setting**

Hillcrest is a small, rural community in the Pacific Northwest. Education was held in high esteem as evidenced by the town having one of the highest tax bases in the state. Hillcrest High School enrolled approximately 470 students. Two years before this study, HHS received an educational excellence award from the United States Department of Education. All first-year students were required to take physical education for one year and could elect physical education after that. The freshman physical education classes were separated by gender and were taught as a survey course to cover many subject areas. The other physical education classes were coeducational and defined by student interest (e.g., recreational sports, weight training). HHS had two physical education teachers; one for boys (Bob) and one for girls (Kathy).
Data Collection

Data were collected and analyzed using a variety of qualitative techniques. Among these techniques were participant observation, artifact and document analyses, stimulated recall using videotaped classes, and both formal and informal interviews. Besides Bob, Kathy and other school personnel (e.g., students, teachers, administrators) were also interviewed. Field notes were recorded during and after observations and a summary statement was made off site after each day of data collection. Data collection began 2 days before the start of school and officially ended just before the Christmas break. I was present in the school on a daily basis for the first month of the study and made field trips twice a week on average after that.

Data Analyses

Data analysis began on the first day of the study and ended approximately 1 year later. Concurrently collecting and analyzing data allowed me to develop data summary themes and check the emerging themes against recurring field activities. Analyzing data during the study also allowed data collection techniques to be tailored to gather data that were amenable to testing and understanding the emerging themes. Specific strategies employed to insure data trustworthiness included triangulation of methods, member checks (particularly the use of key informants and the constant use of follow-up interviews to check consistency of responses), disconfirming case analyses (the investigation of responses and/or occurrences that were incompatible with emerging themes), and cultivating reactions from the case-study teacher to the themes, categories and events to be included in the final report.

My key informant was Bob's teaching colleague, Kathy. At the time of this study, Kathy and Bob had been teaching physical education together at Hillcrest for 3 years. Kathy was particularly helpful in cross checking stories and events described by Bob. In cases where discrepant information occurred (e.g., differences between what Bob told me and what I observed) Kathy often provided valuable insights.

Data analysis involved summarizing data into themes and categories using procedures recommended by Miles and Huberman (1984), Goetz and LeCompte (1984) and Patton (1980). The construction of these categories was influenced by Shulman's (1987) theory of a knowledge base for teaching. He identified seven categories of teachers' knowledge: subject matter, general pedagogical, curriculum, pedagogical content, learners, contexts, and purposes. As themes emerged and clustered into categories, these categories were checked against Shulman's propositions. Four of Shulman's seven categories were ultimately used to describe the forms of knowledge Bob acquired in pursuit of his professional practice: subject matter, general pedagogical (renamed teaching behavior), pedagogical content, and context (renamed external conditions). Classroom organization and operation was a category constructed independent of Shulman's theory as it appeared to better describe a dominant form of Bob's knowledge.

The themes and categories identified forms Of knowledge as well as the criteria Bob used in acquiring pedagogical knowledge. The categories allowed the data to be summarized and reported in a succinct, yet accurate, manner. The first step was to review the collected data to determine tentative categories. Next, the data were coded using the tentative scheme. The category scheme underwent revisions until the data were able to be classified within the scheme
with no redundancy of categories. The constant comparison method of analysis (Glaser & Strauss, 1967) was used to identify these patterns and relationships.

The final step of the analytic procedure was to present a copy of the report to Bob for his comments and reactions. The findings were brought back to the case study teacher so that he could: (a) check the accuracy of the data (reliability), and (b) validate the findings of the report. This procedure was considered a critical component for establishing the validity and trustworthiness of the study's findings (Lather, 1986). Additional revisions were then made based on the responses and reactions from the teacher. Events contained in the report seen by Bob as either inaccurate or threatening to confidentiality were rechecked and eliminated where appropriate. Bob's comments and additional supporting evidence were incorporated into the final draft of the report to lend strength to the propositions put forth.

Findings

From years of contact with many sources of occupationally useful information, Bob had constructed a comfortable set of criteria for evaluating and selecting knowledge necessary for his day-to-day classroom operation. He seemed to have a clear sense of both the expectations others held for him, and his own purpose for being in the school. These criteria formed a Screen through which all potential pedagogical knowledge passed. Bob's knowledge acquisition represented an intersection between the demands of his day-to-day practice and the knowledge available to meet those demands. Thus, Bob appropriated knowledge based upon his perception of the power and quality of its source, and his perception of its potential to solve a recurring problem or improve a current practice.

In analyzing the data, five knowledge categories emerged: (a) classroom organization and operation, (b) teaching behavior, (c) subject matter, (d) pedagogical-content knowledge, and (e) external conditions. Each category was unique in terms of the problems it addressed, the sources from which it came, and the criteria that determined knowledge selection and rejection.

Class Organization and Operation
Like many teachers (West, 1975; Yinger, 1980), classroom order and control were predominant concerns for Bob. The concern for classroom organization and controlled operation rose from Bob's belief that, if order was not established and the classroom not operated in the manner he needed little could be accomplished. In his own words,

I'm going to get across more to kids in a structured setting. Otherwise kids are pretty much allowed to go where they want to and pick and choose what they want to take and what they don't want to take... I have more kids working at a higher level than I would otherwise.

Although he had spent much time formulating, writing and explaining his operational policies and procedures, the complex and fluid nature of his classes required constant interpretation and reevaluation of the codes of operation and organization. The variety of students with varying levels of interest, responsibilities, motivations, and attitudes demanded adaptations in the
organization and management of the class. Similarly, different subject matter, teaching stations, or equipment would also signal a change in class organization and operation. Bob, like many teachers (Clandinin, 1985; Clandinin & Connelly, 1986), relied on practical rules and principles, routines, and habits to guide classroom operation rather than inflexible standards or absolute rules.

Bob perceived the ability to organize and operate a class to be a fundamental and critical responsibility of a teacher. When asked "What would you look for in a high school teacher to determine if they were a good teacher?" he responded with a list of criteria heavily skewed toward organizational and operational concerns. His list included: (a) the kids are paying attention; (b) gives directions clearly and the kids respond to directions showing that they heard; (c) what he said made good sense; (d) organized drills, organized calisthenics, lesson didn't get bogged down; (e) didn't let a few kids take over the lesson; and (f) didn't get distracted from where he wanted to go.

Bob relied upon few resources in deciding the organizational and operational patterns of his classes. It was, perhaps, the improvisational character of a classroom that forced Bob to look primarily to his experience and beliefs in crafting his operational procedures and organizational patterns (Doyle, 1986; Kelsay, 1991; Leinhart & Greeno, 1986). He explained that

There have been so many times I have had a structured program and then something comes at along and changes it at the last second .... So you just, I guess it is out of necessity or survival, you just make do. Some things work and some don't and you just throw out the things that don't and you go to something else.

The fundamental criterion for evaluating his class organization and operation knowledge was Bob's satisfaction with the results of the policy, rule, or procedure. If it worked all was well, for the problem had been solved. The level of evaluation did not go any further.

Outside influence over his operation and organization came on two fronts. The first influence was over his teaching stations. Other members of the school had a greater influence over Bob's teaching station than be. In my time with Bob, I observed the nurse usurp the gymnasium to conduct health screening exams, the custodians claim the football field so that they could mow it for that evening's contest, and the building Principal threaten to reallocate the all-purpose room Bob and Kathy used as a teaching station for a student lounge.

The second area of influence that held consequence for Bob's organization and class operation dealt with the consequences for student misconduct. He could set all of the rules he cared to set. There were no formal guidelines or recommendations. How he enforced those rules was another matter. Parents and administrators took a strong interest in the consequences Bob dealt students for misbehavior. Bob explained it this way:

You've gotta have the right administration, the administrator that is willing to go along with what you see as important, what your values me, a disciplined structured program, and back you up on that. Because if you don't...the kids are going to start complaining, which in turn, the
parents start complaining. Parents are going to the administration. If the administrator will support you and back you up, then you can.

Bob seemed unaware of an existence of a "shared technical culture" (Lortie, 1975) for matters of classroom operation and organization. The approval of others usually seemed unnecessary. For example, Bob's policy of required student showers was disliked by the students and Kathy alike. He believed that Kathy was entitled to her opinion, but his stunts conformed to his opinion. Bob accommodated opinions from parents and administers when he had no choice, but he did not see their views as more important than his own. As he was fond of telling his students "In this class, it's my way or the highway."

Teaching Behavior
A significant portion of Bob's everyday actions and activities were devoted to the task of instructing students. Knowledge for meeting these demands was classified by Shulman (1987) as general pedagogical knowledge, for this knowledge transcended a particular subject content. Much of Bob's teaching behavior was characterized by well rehearsed, time-worn rituals. Every class began with student-led exercises while Bob took attendance. Then Bob informed the students of the day's activities. A brief skill demonstration or explanation was followed by a drill. Most classes closed with a game or culminating activity. Sometimes, a game was played for the entire class period. The practices that defined Bob's teaching behavior were largely composed of comfortable habits and familiar routines. In crafting a teaching style, comfort does not appear to be an uncommon criterion among teachers (Lange & Burroughs-Lange, 1994; Russell & Johnston, 1988).

Bob did not actively pursue knowledge that directly affected his instructional practices. The roots of this perspective can be traced to his undergraduate days, "When I was going through college," he said, "They didn't have any methods classes. None. Zero." The fundamental criteria used to determine the success of a lesson was, therefore, not so much what students learned, but rather their level of enjoyment. During one interview Bob told me that "they really seem to enjoy it (the activity). They develop certain skills. The more skill they develop, the more they seem to enjoy it."

While he did not actively seek effective teaching strategies, Bob recognized its lacking in his repertoire of skills. He told me, "I hear in some cases, teachers drop the ball and let them play. You know, I'm guilty of a little bit of that too, at times, you know." He went on to say "That's one thing I could upgrade my program with, some more creative drill work that would teach the skills I want them to learn and at the same time give them some fun and enjoyment."

Bob's teaching behavior was a nonissue with almost everybody in the school. The structure of the school provided him with no feedback on his teaching behavior, nor was there visible encouragement for him to stimulate greater student achievement. Students, for example, appeared to have little regard for their learning in physical education. Upon seeing Bob before class, students would invariably ask "What are we gonna play?" "Do we have to dress down?" or "Are we gonna do anything today?" No student ever thanked Bob for something they learned or requested to learn a particular skill or concept.
Although student learning was a concern in Bob's occupational activity, it was not the driving force behind his pedagogical practices. He harbored a stronger concern for maintaining control over the collective social behavior of the students. He showed far greater frustration when there was a breach of order than when students failed to make significant learning gains. The concern for classroom control over educational substance has been a consistent finding in research on physical education teachers' conceptions of their occupational duties and responsibilities (Placek, 1983; Schempp, 1985, 1986).

The immediate and multiple demands placed on Bob's time in school often relegated the learning of his approximately 130 students to the back burner of his priorities. During one observation, Bob and I were in his office between classes and I remarked, "I can't believe all the things you have to attend to." His comment was

Yeah, there's a lot going on. Right now I'm trying to get a test set up, get the equipment I need for that, worry about the two kids who are on their way to the counselors office to drop the class, answer kids questions about what we're doing today, think about that indoor soccer ball for next period, I have two home counseling visits coming up, remember to read the announcements this period, and I have an executive school meeting.

He rose out of his chair, picked up his roster book, glanced over a tardy note pushed into his hand by a late student and was on his way to take roll and begin another class.

Time that could be used to evaluate and improve his instructional practices is consumed by the competing requirements of his coaching responsibilities and the many mundane activities he continually has to attend to (e.g., lost locks, attendance records, clean towel supply, field preparation, equipment maintenance). One morning every free moment before and between classes was used to locate a popcorn machine for the concessions that evening at the boys basketball game. His work environment conspired to inform Bob that the operation of the school as a system took precedent over student learning in a physical education class.

Additionally, there was little incentive for Bob to improve his teaching behavior to stimulate increases in student learning. Administrators held a greater concern for the operation of the school than they did for achievement of students in physical education. Parents were more concerned with how their children were treated than what they learned. Students wanted to play; not learn. Whether students learned in his class or not was a concern that was, from my observations, held only by Bob. And because of the lack of concern from others, it was often not even at the forefront of Bob's concerns. He received no rewards if learning was increased and there were no consequences for a lack of student achievement.

Subject Matter
The content of Bob's classes was described and detailed in a curriculum guide he had compiled. Objectives for each program were identified and the policies used to conduct the program were also described. The largest portion of the guide was composed of the specific subject-matter units. When asked about the resources used to complete the guide, Bob told me that most of the
units came from an undergraduate curriculum course assignment. He has added to the guide materials and resources gathered at in-service programs.

Although the guide was a 148-page document and included an outline of each subject taught, it was used sparingly. Over the course of my time with Bob, I observed him using the guide perhaps a half dozen times, mostly to review teaching points for an upcoming lesson or remind himself of game rules. The guide did not hold the majority of subject matter Bob taught, for experience has taught him that he must "keep most of the (subject matter) knowledge organized in my head and I can't write it down because everything is situation specific."

Bob acquired new subject-matter knowledge based upon these criteria: (a) perceptions of his own competence in teaching the subject, (b) personal interest in the subject matter, (c) perceptions of student interest, (d) actual student demand as demonstrated by elective class enrollments, (e) time investment necessary to teach or prepare to teach the subject, (f) the novelty of the subject, and (g) facility and equipment constraints.

Bob reported that gymnastics and outdoor education were two content areas recently dropped. Gymnastics was no longer offered because Bob did not like teaching it and had a concern for liability. Outdoor education was no longer part of the curriculum because the individual who taught the course had left the school and Bob did not want to give up his weekends for the activities. Weight training was a new subject added to the course offerings because of student demand, Bob's personal interest in teaching the subject, and the availability of an adequate facility. Personal understanding and meaning of subject matter plays an important role in Bob's acquisition and use of content knowledge. Teachers in other subject areas also appear to rely on Personal understanding in selecting content (Wilson & Wineburg, 1988).

By his own admission, Bob is not an expert in many of the areas he teaches. Rather, he knows enough to teach a 10-day unit in the selected subject. He would draw from the subject areas in which he had expertise to bolster areas that were unfamiliar. For example, soccer drills were structured very much like basketball drills. Bob was required to teach over 23 different units in any given year. It would be difficult for any teacher to be knowledgeable in so many different subjects.

Bob gave this example of how and why new subject knowledge was selected:
I had never heard of pickleball until last year. I happened to be looking through a magazine and it looked like a neat game. So I wrote to them and I cheated a bit. It said, "We'll give you some free materials if you order a program." And I wrote to them and said we didn't receive our teaching sheets and they sent me one. Once I saw what it was all about, I wanted to implement it in our program. I wrote back and got the equipment.

The company supplied both the equipment necessary for instruction as well as the content to be taught. Bob was able to incorporate the content immediately into his program with no prior knowledge of the subject. Because the game strongly resembled tennis, a subject he had taught for many years, Bob used the same drills and skill demonstrations he used in his tennis unit.
Thus, the combination of his previous experience and information from an equipment manufacturer supplied all the content knowledge necessary for a new instructional unit.

Perhaps it was the lack of expertise in subject matter that provided the flexibility that allowed Bob to change content so readily and amenably. It is also the lack of expert knowledge in these areas that forces Bob to use noneducational rational in selecting subject matter for his classes. They got some enjoyment out of it....They wanted to keep playing it (pickleball) forever, but I said "Hey, we gotta stop and go on to something else...but that was a success."

**Pedagogical-Content Knowledge**

Shulman (1986) defines pedagogical-content knowledge as content knowledge "which goes beyond knowledge of subject matter per se to the dimension of subject matter for teaching" (p. 9). Years of experience have forged a mode of operation, a routine, which frames the knowledge Bob imparts to his students. Bob seeks curricular content that fits his teaching style. In pedagogical practice, he teaches an activity in terms of its essential skills by giving brief explanations and sometimes demonstrations, then has students practice these skills through drills, and after varying amounts of practice the students are then given the rules and play the game. These procedures have been used for years by Bob with all varieties of subject matter. He is, therefore, more inclined to select new activities that fit his mode of operation than he is to look for new ways to teach old subject matter. Further, Bob was less likely to teach subject matter in depth and more likely to teach many activities at the introductory level. The more new information conveniently fit into familiar routines, the more likely it would be incorporated.

Bob's content knowledge appeared to not only influence what he teaches, but how he teaches. Activities, particularly skill drills, were borrowed from better-known subject lessons and adapted and applied in lesser-known subject areas. In concept explanations, metaphors and images were drawn from parallel concepts in better-known subjects and used to help explain subject concepts that he did not know well. Bob does not appear unique in this regard. Teachers of mathematics (Leinhart & Smith, 1985; Marks, 1990), social studies (Gudmundsdottior & Shulman, 1987), and English (Grossman, 1989, 1990; Gudmundsdottior, 1991) all seem to follow this process in acquiring and developing pedagogical content knowledge.

As Bob screened new content knowledge for his pedagogical practice, he used the term *practical* to identify acceptable pedagogical-content knowledge. For example, in explaining why he takes few university courses, he stated he had "a great deal of difficulty finding coursework of relevance for a teacher in my situation. A lot of philosophy, theory, etc., but not many practical, time-proven methods which I can use in my class." Another time, he identified coaching clinics as more worthwhile than teaching workshops because the clinics "offer practical information that can be directly implemented into our program." Content that could be incorporated into the existing classroom routines and rituals was highly valued. Previous research reveals that Bob is not alone in his regard for knowledge that is easily imported into existing classroom practices (Alexander, Muir, & Chant, 1992; Elbaz, 1983).

**External Conditions**
Conditions originating outside the classroom, and removed from Bob's immediate control, came to bear on several pedagogical decisions. These conditions include local regulations and requirements that were imposed by the administration and school board as well as regulations and laws handed down from state and federal agencies. Therefore, the wishes and demands of administrators, students, parents, and state agencies factored into Bob's procurement of knowledge. The influence of administrators, parents, and students on Bob's knowledge was discussed above. School and state regulations also influenced him, but to a far lesser degree.

Bob passively resisted school and state imperatives that ran counter to his personal beliefs and his interpretation of the community moral standards. For example, in discussing coed classes, he reported that:

We used to (have coed classes) but it was a hassle....We had a lot of nondressers and got a lot of complaints from parents. It just wasn't worth it. So we have boys and girls separate the first year and together after that. We got a little pressure from the state about Title IX, but I think we're in compliance.

When he and I discussed the new state curricular guidelines, Bob expressed frustration that change seems to negate previous work. To him, it was not so much that the new ideas were better or worse than old ones, but that all his previous work on curriculum development was for naught. He felt frustrated that the amount of work that had gone into developing his curriculum was ignored by those in state agencies. "Hillcrest has always prided themselves on being a leader. Now we'll have to throw them (present guidelines) out for no apparent reason or justification." As he had in the past, he would continue as before making only token modifications to existing practice. External conditions were only a minor consideration in Bob's acquisition of knowledge.

Conclusion

After years of service, Bob had a well developed set of criteria to guide his acquisition of occupational knowledge. These criteria allowed Bob to identify gaps in his knowledge and to assess new knowledge in light of its potential contribution to his teaching. Contrary to the belief of many students, administrators, and colleagues, Bob continually reviewed and screened new information and then made attempts to integrate this knowledge into his professional practice. Because the criteria used in acquiring new knowledge were primarily comprised of experiences, interests, values, beliefs, and orientations. Bob's professional knowledge appeared personal and idiosyncratic (Carter, 1990; Zeichner, Tabachnick, & Densmore, 1987). Bob was, by his own admission, set in his ways. Therefore, the changes and alterations he did make were neither dramatic nor overtly visible. In short, little changed in the observable practices of Bob's day-to-day activities as a teacher and he became fairly predictable in his course of action.

Classroom order and operation held the highest priority in Bob's pedagogical knowledge. Subject matter that fit his personal interests, workplace conditions, and would result in student enjoyment had the greatest chance of penetrating the curriculum. New knowledge that
conformed to his well-worn classroom practices passed Bob's test of valued professional knowledge. He acknowledged a lack of information regarding effective-teaching behavior, and given his workplace conditions, this situation appears to have little chance to change. Will Bob ever change? He is, in fact, always changing as new information comes to him and is incorporated into his professional knowledge base. In the final analysis, however, Bob's time in service has made him well aware of who he is, what he does, why it does it, and what knowledge is required for him to meet the demands of teaching in a public school.

References


