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ABSTRACT

A report is given of findings from a study of beginning teachers' development of "knowledge-in-action," Schon's (1983) term for knowledge that is apparent in a professional's day-to-day actions. Participants were observed and interviewed frequently during their practice teaching placements. Transcripts of lessons and interviews were prepared for analysis, providing a data base for comparisons over time and across participants. One subject was followed through a 14-week internship as a student teacher and through the first six months of her first year of teaching. Another was followed through six weeks of practice teaching and the first two months of his first year of teaching. Focus was upon what novice teachers were learning to do in the classroom, rather than what they had been taught in the classroom of their teacher education program. The report begins with extracts from selected literature on the process of learning to teach and goes on to discuss the perspectives of several of the participants, using excerpts from transcribed interviews to illustrate how they view the process of developing personal professional knowledge of teaching. (JD)

BEGINNING TEACHERS' DEVELOPMENT OF KNOWLEDGE-IN-ACTION

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What DO we know about how novices learn to teach? Teacher education is organized on patterns and assumptions quite similar to other professions such as law, medicine, and business: Professional courses and practicum experiences precede full-time responsibility. We seem comfortable and confident in assuming that (1) professional knowledge can be conveyed meaningfully in a classroom setting and (2) practicum experiences supervised by an experienced professional are useful preparation for full-time responsibility. While each profession has its debates about ways to make improvements, the basic scheme for developing professional knowledge seems quite stable. But have we framed the process in the most productive way?

This paper reports preliminary findings from a study of beginning teachers' development of "knowledge-in-action," Schön's (1983) term for the knowledge that is apparent in a professional's day-to-day actions. The study involved candidates in a Bachelor of Education program at Queen's University, Kingston, Ontario. Participants in the study were observed and interviewed at frequent intervals during their practice teaching placements. Transcriptions of lessons and interviews were prepared for analysis, providing a data base for comparisons over time and across participants.

One candidate has been followed through a 14-week internship as a student teacher and the first six months of her first year of teaching. Another candidate was followed through six weeks of practice teaching and the first two months of his first year of teaching. However, most of the data relates to candidates' experiences during their preservice training. The focus has been on what novice teachers were learning to DO in the classroom, with very little direct concern for what they had been "taught" in the classrooms of their teacher education program. Of particular interest is the distinction between professional knowledge that we can express in words and the professional knowledge that is expressed in actions. Often, words are inadequate to the task of conveying or representing knowledge-in-action, and a central purpose of the study is to assist people in seeing their progress at the level of actions in classrooms. The participants' stories speak to the complexity of the learning process when a novice steps into a stranger's classroom and "takes over" for a specified period of time.

This report begins with extracts from selected literature on the process of learning to teach. The focus is on the contribution of the practicum experiences of beginning teachers. Attention then shifts to the arguments of Schön (1983) in The Reflective Practitioner: How Professionals Think in Action, as the central theoretical perspective of the study is drawn from Schön's work. The final portion of the report discusses the perspectives of several of

the participants, using excerpts from transcribed interviews to illustrate how they view the process of developing personal professional knowledge of teaching.

Learning to Teach

Numerous studies of preservice teacher education programs have not led to an accumulating professional knowledge base for teacher education. Individual programs have significant contextual variations but significant innovations seem restricted to the sites where they were developed and the individuals who developed them. Teacher education is frequently criticized by the society that supports it, but research seems not to produce an increasing sense that "we know what we are doing and why." There is little agreement, for example, about appropriate methods for supervising beginning teachers during their practicum assignments.

What we do know with some degree of confidence about the process of educating beginning teachers is indicated by Griffin et al. (1983), who summarized a major study of preservice teacher education conducted at the Research and Development Center for Teacher Education at Austin, Texas. A list of selected findings paints an intriguing picture.

* Differences between school settings are not a major influence (p. 323).

* The cooperating teacher dominates the supervisory conference (pp. 324-325).

* Supervisory conferences focus on the specific and immediate, not on alternative interpretations of what happens in classrooms (p. 325).

* Cooperating teachers vary in their approaches, tending to emphasize either direct modeling of their teaching by the student teacher or, in sharp contrast, helping the student teacher find his or her way (p. 325).

* Student teachers approve of practice teaching and the role of the cooperating teacher (p. 326).

* Supervisory conferences emphasize events in the classroom, with minimal attention to the experiences of being a student teacher (p. 326).

* Educational theory, systematic knowledge, and research findings play little or no role in the supervisory discussions during practice teaching (p. 332).

* There is a sharp contrast between what researchers have learned from recent studies of teaching and the manner in which cooperating teachers train novices (pp. 334-335).

We have long known that student teachers regard their practice teaching experiences as the most valuable component of their formal preservice teacher education program. Confirmation of this point is useful, as is the indication that school settings do not differ in ways that make a major difference. It is not surprising that the cooperating teacher dominates, given the benefits of greater

status and experience. The neglect of research and alternative interpretations of events is an enduring feature of the gap between "theory and practice." But the most significant finding is the implicit but unstated one: There is little to suggest that the process by which beginning teachers learn to do what is required in a classroom is well understood.

Debates about the conduct of teacher education are familiar and rarely resolved. Zeichner (1983) brought a welcome degree of coherence to these debates by identifying four quite different sets of assumptions and beliefs about teaching and how people learn to teach. A "behavioristic" paradigm focuses on specific skills thought to be required of effective teachers, while a "humanistic" paradigm focuses on the personal development of the beginning teacher. Practice teaching placements imply a "traditional-craft" paradigm, in which the novice learns from the experienced and respected master. A fourth paradigm, termed "inquiry-oriented," focuses on alternative interpretations of classroom events and stresses an individual's ability to analyze his or her own teaching.

This study of development of knowledge-in-action by beginning teachers is set within what Zeichner (1983) terms the inquiry-oriented paradigm of teacher education. This paradigm seems less in competition with other paradigms than a step removed from them, using them and other theoretical perspectives to make sense of the debates, the strengths, and the confusions that characterize formal teacher education. The inquiry-oriented paradigm is committed to reducing the gap between teachers and researchers, between theory and practice. Schön's (1983) perspective on how professionals develop knowledge-in-action has similar features but it is cast more broadly over a range of familiar professions.

The Nature of Professional Knowledge

In a variety of ways, professionals have been cast as society's "problem solvers." As Schön (1983) puts the situation in his discussion of the "model of Technical Rationality," the "dominant epistemology of practice" (in the culture generally and in the university particularly) assigns the highest value to basic knowledge, an intermediate value to applied knowledge, and the lowest value to practice. "The more basic and general the knowledge, the higher the status of its producer" (p. 24). "Professional activity consists in instrumental problem solving made rigorous by the application of scientific theory and technique" (p. 21).

This perspective applies in education generally as well as in teacher education. Those who study education from within the university have higher status than those who work in schools and also think carefully about the events of education. The educational research community has access to research funds that are not available to teachers, and teachers are frequently urged to take research findings seriously. Yet knowledge constructed by research seems cut off from practice, and this situation is met by creating space for those who write books or give presentations and workshops on the application of new knowledge to teaching practices. We persistently seek more effective ways of working within this "dominant epistemology of practice," but evidence of effectiveness in inservice teacher education activities continues to elude us.

From case studies of a number of professions, including architecture, management, psychotherapy, town planning, and the "science-based" professions, Schön has concluded that this hierarchical view of theory as superior to practice is misleading and inappropriate. A major limitation of Technical Rationality is its view of practice as "a process of problem solving." Schön argues that the practitioner is actively engaged in problem setting as well.

> When we set the problem, we select what we will treat as the "things" of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in what directions the situation needs to be changed. Problem setting is a process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them. (p. 40)

Where Technical Rationality ignores and even masks the problemsetting aspects of a professional's practice, Schön believes that professionals are increasingly recognizing that problem setting is not a technical problem and that problem setting is in fact at the core of their practical activities.

Reflection-in-action

"Reflection-in-action" is Schön's (1983) term for a category of professional activity illustrated in his case studies of "how professionals think in action." "A kind of knowledge is inherent in intelligent action" (p. 50) and this is termed "knowledge-in-action." While the practitioner cannot describe all that he or she knows, surprising or puzzling events often make us think about what we do and know. Reflecting on knowledge-in-action is termed reflection-in-action, and Schön attaches fundamental importance to the practitioner's ability to recognize and explore puzzling events that occur during action. "It is the entire process of reflection-in-action which is central to the 'art' by which practitioners sometimes deal well with situations of uncertainty, instability, uniqueness, and value conflict" (p. 50).

We know very little about how the processes of reflectionin-action are initiated and sustained. As Schön (1983) suggests, the dominant epistemology of practice has deflected attention from that aspect of practice, whether by a novice or an experienced teacher. Those who have worked with a number of teachers will be aware that teachers vary in the extent to which they are puzzled by, and hence willing to reflect upon, particular teaching events and characteristics of their classrooms. As Zeichner (1983) suggests, one persistent strand in teacher education seeks to foster the individual's ability to inquire into personal practice. At the same time, we hear concerns about the "burned-out" teacher, and Schön's (1983) characterization of the burned-out practitioner is at once a novel and relevant way of stating a condition many teachers struggle to avoid.

> And if he learns, as often happens, to be selectively inattentive to phenomena that do not fit the categories of his knowing-in-action, then he may suffer from boredom or "burn-out" and afflict his clients with the consequences of his narrowness and rigidity. When this happens, the practitioner has "overlearned" what he knows. (p. 61)

Schön (1983) goes on to outline the structure of reflectionin-action, developing the idea of an "experiment in practice" and arguing that the model of Technical Rationality implies a limited view of experimentation, inadequate for interpreting the thought processes of the practitioner. Within reflection-in-action he identifies thr e types of experimentation: (1) exploratory experimentation, in which one probes the setting of practice, simply "messing about"; (2) move-testing experimentation, assessing the intended and unintended consequences of a deliberate action; and (3) hypothesis-testing experimentation, in which one uses the familiar logic of experimental research. (pp. 145-147)

A central feature of this study of reflection-in-action by beginning teachers is an analysis of those identifiable periods in which a beginning teacher, in conversation with a cooperating teacher or researcher, attempts to set problem situations or reflect upon puzzling events in the teaching situation. The three categories of experimentation are available to assist in the interpretation of reflection-in-action, with a focus on articulating the nature and significance of the novice's reflective process. The overall goal is to explore the experience of learning to do the actions of teaching and to interpret the events of teaching. Details of individual experiences are provided in the following section. Time and time again, the participants have told us that reflection does not come easily in the classroom setting. Each participant clearly understood the voluntary nature of the study, but none has withdrawn and all have made extra time available to us. We are deeply impressed by the extent to which beginning teachers are eager to talk to someone with an understanding and sympathetic ear.

Beginners' Reflections on Learning to Teach

As we listened to a number of beginning teachers over extended periods of time, we found ourselves sorting their comments into a number of broad categories indicative of aspects of teaching that were the focus of their attention. Some of the categories are familiar in the literature of teacher education; others relate more obviously to our interest in the process of reflection.

Uncertain what to do	Sure of what to do
Friend of students	Teacher of students
How teachers teach	How students learn
Managerial confusion	Managerial routines
Reaction	Reflection
Content as presented lessons	Content as material learned
Lacking confidence	Confident
Student	Colleague
Immune to surprises	Puzzled by some events

Four separate accounts follow. The data for each beginning teacher are but a small fraction of the total data base. Each individual has been observed and interviewed on five separate occasions; some were seen many more than five times. The data have been selected to illustrate one of the major themes that emerged from our analysis of that individual's teaching and talk about learning to teach. John, Carol, and Jerry are student teachers; Barbara is a first-year teacher who joined the project as a student teacher.

John

John has studied at the graduate level in life sciences and thereby gained experience as a teaching assistant working with undergraduates in their weekly laboratory activities. His knowledge of subject matter is strong and secure, established over years of "hard work" in high school and university science courses. Indeed, "knowing one's subject" seems to be John's basic characteristic of good teaching. He is personable and wants to be liked, yet being liked is important to him because it helps him maintain order and control and carry on with his teaching. He relies almost exclusively on his ability to present material clearly and methodically, in a subdued tone of voice that commands attention and respect. As a student teacher working for a short period of time in someone else's classes, John seems reluctant to discipline students, believing such actions to be inappropriate to his role. He projects selfconfidence, he values orderly routines, and he gains his knowledge of students through and in terms of the subject matter he teaches them.

When invited and encouraged to look back on aspects of his teaching, subject matter was the most frequent reference point for John. Here he indicates that his initial concern about managing younger students became the focus of what he learned in his first practice teaching placement:

> How to deal with high school students. I didn't know if I was going to be able to cope with that--Grade 9. How am I going to handle the Grade 9s? I'm not worried about subject matter at all, so it was more or less discipline and being able to handle a classroom. And it's probably the major thing I've learned.

Flexibility and responsiveness were set in the context of good organization and knowledge of subject matter:

> You can afford to be flexible. You have to change. You have to be organized but you also have to be able to change, so you have to know your subject matter. . . . I was able to be flexible but at the same time I was organized.

Because John was entering a new teaching situation, he was reluctant to assume his knowledge would be adequate, but he quickly realized that it would be.

> When I first came in I was concerned about content. Was I going to be sufficiently knowledgeable about the material to just assume, to carry on from where the cooperating teacher left off? And I found that, yes, that wasn't going to be a problem at all. It was going to be handling the classroom. That just came out foremost the second day.

At the end of his first practicum assignment, John summarized his experience with reference to confidence, knowing his subject, and teaching so as to minimize surprises. The subject continues to take priority over responses by and variations among students.

> You have to build up your confidence in yourself to know the material and once you do that, you're going to have to concentrate on making sure the

> class is running smoothly and making sure they're absorbing the material the way that you want them to

A different picture emerged during John's second practice teaching assignment. The references to subject matter persist, but there is a reflective element as he looks back on what he did and what he was thinking about as he taught.

> There were a lot of questions like "What do we do now?" or 'I'm not sure." Again, I think it relates to the fact that the material's very difficult for them to do, to work with. It's hard to understand. There may be some sort of reluctance to do their own work on that area.

An interview shortly after an observed lesson gave John an opportunity to explore his images of how students learn. He relates what he did to his own prior learning and teaching experiences.

> I feel . . . that it's easier for students to sit down and go through it and try to learn it on their own. Then I can reinforce what they've learned afterwards by giving them a presentation. That's really why I did it this way, which works quite effectively at the university level. It may not work here because their background obviously isn't as good.

Later he reported that he expressed this view of learning to the students as a way of responding to their inquiries, questions that he may not have expected.

> I wanted them to really try with this exercise. That's what I mainly said when I walked around. When they asked me, "Why are we doing this?" or "How do we do this?", I said, "For me to stand up at the front of the class and tell you about it will mean nothing when it comes down to learning this material because you'll just copy it down and that's it. I want you to try figuring it out on your own. Try going through the exercise and we'll see what happens. Then we can play with it."

The following excerpt from a post-lesson interview shows John working very hard to interrelate the nature of the subject matter and the strategy by which he teaches it. He refers to the short time he is in the classroom with these students as a problem in its own right. We were intrigued by his debate with himself about whether he would or would not "lecture" to the students.

> It's a difficult exercise; it's not too terribly exciting and that's the problem with it. It's more of a matter of trying to come up with ways to get students doing things in the area of meiosis and mitosis. That's always a problem. Now my coming in here for two weeks obviously is a problem in itself, trying to teach this material. The way I would have taught it would be to actually have them section some plant material, get them doing it, spend a couple of days on it and try to find out what's going on. I think really what it boils down to is getting away from the traditional lecture style type of lesson which this material warrants really. It really does warrant you standing up there talking about it, posing questions to the students, getting responses, feedback, and then elaborating on what they've said. And I think that has to be done but you also need an activity. That's one

> of the reasons, on a short-term notice, I thought that would be a suitable way of doing it. I mean I could have easily just stood up there and talked about it and got it over in two periods but I don't think that's the best way to do it.

An apparently simple question about his awareness of the passage of time, raised by an observer's noticing his several glances at the clock, produced rich material about assessing alternatives and judging what students are making of an activity. As a "stranger" staying for only a short time, it is perhaps not surprising that John did not decide, in mid-lesson, to attempt something he had not planned.

> I guess I was wondering whether I could possibly do something else with the class time. Those kinds of things go through my mind. Sometimes you feel that the class time isn't being spent the way you thought it would work out, which is really what happened. So I was just kind of thinking about it and that's why I was looking at the clock. Are they really using the time or are they keeping busy? Could I start something? Then I thought, no, I'll just let them go, let them relax.

Here we see the makings of a potential "reflective conversation with the materials of the situation" (Schön, 1983) but in this instance, John did not reframe the problem and experiment-in-action. We wonder if he would have, had it been his own classroom.

Carol

The first practice teaching assignment of the year was a very short two-week placement in October. In November, Carol began a ten-week placement that lasted until the end of January. Shortly before she completed the placement, she was observed teaching a math lesson on "volume." Standing at the back of the classroom, she began by asking, "What is volume?" One student raised his hand and answered that it had something to do with sound, to which Carol replied, "No," and repeated her original question. A second student answered that volume was one of the knobs on a radio, and Carol again replied, "No." She then explained to the entire class that volume was a term applied to amounts of liquid. The main activity of her lesson involved pouring water from a small container into a larger one and asking the class if, after pouring, there was more or less water in the larger container. Carol's reactions were similar to the one she made to the unexpected responses to her initial question about volume; she seemed surprised that the children did not see that the volume of the water remained the same. In an interview immediately after the lesson, Carol was asked if it surprised her that the children did not know about the conservation of volume from one container to another.

> Well no, I knew that they wouldn't. Piaget tells you that that's true. It's just when they're real kids and they're saying that they think there's less, it's neat. I know that kids at this stage don't have a sense of conservation of volume and all those different things, because you read about those kinds of things. You know about the development of kids. But it's another thing to actually see the kids not know or to really believe that when you

> pour it into a bigger container that there really is less. It took a little convincing. Even the second time, there were some kids that were saying, "less, less." I got a kick out of that really.

This comment by Carol shows, perhaps more clearly than any other statement we have recorded, the nature of the distinction between "knowledge" and "knowledge-in-action." Carol "knew" that children in a Grade 1 class would not demonstrate "conservation," but when she planned and presented the lesson, she did not "know-in-action." Her reactions to the children's responses had much more to do with her own "learning-in-action" than with helping the children make sense of what they were seeing. One should not make too much of her statement, "It took a little convincing," but at face value the statement suggests that the children had been brought to 'conservation" rather quickly. As her "knowledge-in-action" develops, we assume she will move away from that interpretation.

Carol also provided an intriguing comparison of her experiences of getting to know children, first in a two-week placement and then in a ten-week placement. She summarized the limits of the shorter placement by suggesting that in such a short time, the children were more like "stuffed kids."

> Two weeks is a silly length of time to be in a classroom because it takes you until the end of the first week to learn the kids' names and you're just doing one-shot lessons. There's no continuity at all. And it takes you until the end of the second week to feel comfortable with the teacher and doing things and to have gotten over making terrible mistakes and then you're gone.
>
> If you're there for two weeks, you teach them as if they were "the kids." You come in and you prepare a lesson for "the kids" and if somebody doesn't get it, fine. If most of the kids get it, that's great; you've done well. But in a class for a long time, you can't just shelve the needs of the kids who don't get it the first time. You know you have a responsibility to get to them all. In that sense the job becomes more complicated and more worthwhile. If you're there for two weeks, especially at the beginning it's almost like teaching a class of <u>stuffed kids</u> or something. They have names and faces, but they don't have personalities. You just teach them as, "This is a group of Grade 1 children."

Carol has proved to be more articulate than many in making comparisons of this type. Her use of the term "stuffed kids" is, of course, an indication of her growing "knowledge-in-action." If she tries to describe this term to someone who has taught for two weeks but not for ten, she will probably fail to get her meaning across, because the person with limited experience lacks comparable "knowledge-in-action" and will be more likely to think of the much greater personal knowledge of children that was achieved in a second week in one classroom.

Jerry

The third illustration of project data includes brief excerpts from a transcription of a biology lesson. Jerry had a strong background of course work and related field experience in biology, and he seemed to enjoy opportunities to talk about his experiences of learning to teach. He gave us access to his teaching during a two-week assignment and, later, a four-week placement in biology. The following data are from the later and longer assignment. Jerry had come to rely on a lecture approach for the presentation of content. An example of his teaching comes from a grade 9 lesson in genetics. The lesson begins with the following statements.

> Teacher: O.K., let's do a review on meiosis. Take out your sheet, the one I handed you last day on meiosis. O.K., let's just go over this sheet briefly. I'll do a review of it and then any questions that you have about anything to do with mitosis or meiosis, we'll cover that and then we'll have a bit of a quiz.
>
> O.K., number one--chromosomes shorten and thicken. Chromosomes double to form two chromatids. This is something that I found people were confused about. If you're wondering what these charts are over here, we're going to do that later in class. It's going to be a lot of fun. I hope you brought some money.
>
> O.K., when you have one chromosome, it's called a chromosome. It's just like that. When the chromosome doubles initially, when it doubles it doesn't completely separate. You've just got something like that. (Teacher draws.) It doubles but it remains attached in the middle. And this is called--the whole thing is called a chromosome, even though it's doubled and each of the individual parts are called chromatids. And it's not until these two separate that you call them chromosomes on their own right. So that's what happens in number one.

Jerry carries on with this presentation and explanation of material and then asks questions about numbers of chromosomes; the questions require one-word answers. The following excerpt is at the end of this short round of questioning:

> Teacher: O.K., these are separated and there's four originally so there's eight in each cell. Chromatids. Chromosomes, there's four. Terry was right. They line up at the center and they split again. So in number nine, how many chromosomes in each one? Melissa?
>
> Melissa: Four.
>
> Teacher: O.K., four in each one. And in number 10, obviously four in each one as well. The number of chromosomes is halved. O.K., Sean, is that perfectly clear? You've got it straight? Everybody got that all straight? You know meiosis?
>
> Sean: No.

Teacher: What do you mean "No"? Because you don't want to write the quiz? I know that. The question is do we know meiosis? Do you understand what is going on on the sheet? What don't you know?

Stude . The chromosomes, they stay four?

Teacher: They which?

Student: They stay four? O.K., so what happens if ' don't?

Teacher: They collect all sorts of proteins. That's one of the neat things about DNA. It has the ability to build another one of itself exactly the same way. So that happens in squ number one. So 've got eight written down there and they all double so they are then only 16 chromatids, but eight chromosomes because they are still ned. Right. But then in number three, they're pulled apart, the ulled apart as a whole chromosome. So then each cell still has eigl e bottom of number five. But 16 chromatids. Did you follow that? No? es? It doesn't matter. Don't be embarrassed if you don't understand it. It took me years to figure this stuff out.

The rest of the transcript is similar, with Jerry asking questions and answering them himself in extended periods of talk. From the students' questions, it is not clear whether they understand the concepts. Yet Jerry's only resource for determining what they know seems to be to ask, "Do you understand?" Perhaps the most telling example of just how difficult it is for Jerry to understand his student plight in trying sp difficult biological concepts comes when he states, "It took me years to learn this stuff." Students could take this as suggesting there is no point in trying now to understand what he is talking about. In fact, he does say, "Did you follow that? . . . It doesn't matter."

Throughout this transcript, one senses that Jerry's implicit objective for the exercise is to verbalize the correct answers to the questions he poses about the subject. This approach might be summarized by saying that Jerry's practice is shaped by a "how-teachers-teach" point of view (in contrast to a "how-students-learn" point of view), characterized by Jerry asking questions and students doing most of the answering. One interpretation of this situation is that Jerry's students lack a share in where they are going with the material they are trying to learn. The students in this genetics lesson do not seem to have an understanding of why they are doing what they are doing or what their teacher means by the various intellectual twists and turns he is making at the front of the class. Because Jerry is doing most of the talking, there is little opportunity for students to explore, conceptualize, formulate meaning, or internalize what is meant by the subject matter.

A major limitation of case-study research is the space required to report the large volume of data collected from each participant. The brief accounts of John, Carol, and Jerry illustrate one major feature of each person's experience of learning to teach in another's classroom; many relevant details could not be included. John saw events in terms of subject matter, Carc illustrated the contrast between what one has read or been told and wh one can do

("knowledge" vs. "knowledge-in-action"), and Jerry gave clues about the difficulties of shifting, in actions, from a focus on how teachers teach to one on how students learn. A final illustration speaks to the contrast between what is learned as a student teacher and what is learned in one's own classroom in the first year of teaching experience.

Barbara

During 15 weeks of practice teaching, Barbara's several cooperating teachers gave her opportunities to teach more or less on her own as well as opportunities to hear an experienced teacher's rules or "maxims" for dealing with a wide range of situations and dilemmas that she would encounter in her teaching career. Interviews revealed that Barbara paid particular attention to the experience of getting to know her students as individuals (as she moved beyond the "stuffed kids" stage discussed by Carol). Then, through Barbara's first semester of teaching experience, we watched with great interest as she seemed to ignore the maxims she had been given by one of her cooperating teacher. Over several months we came to understand that Barbara could tolerate a broad range of what many experienced teachers might call "chaotic situations." Through it all, Barbara seemed determined that her students would like her as an individual.

As Barbara finished her first semester of teaching and began with new groups of students for a second time in her own classroom, a series of interviews over a three-week period provided a fascinating account of elements of being accountable only to one's self while learning the action-routines of teaching. Barbara acknowledged the value of her practice teaching experiences, but she tipped the scales in favor of what she had learned on her own.

> I think I've learned more in this past term just doing it on my own without having them (cooperating teachers) there, because then some days could be really bad days but it wasn't such a traumatic experience as far as somebody else seeing you have that bad day. But it's just something you could figure out on your own and work it out. I think I got more from doing it on my own and it also made it a little better between the kids and me. Maybe it's because I do feel they were my kids during those four months, and not just borrowing somebody else's to teach and I think that that was the main thing that really makes a difference in that it was just me and them and nobody else making comments. I think I was probably a little more willing to try some new and different things and to do it how I really wanted to, rather than how I thought I should be doing it. And then you find out if the way you want to do it is necessarily the right way or not.

We were particularly interested in Barbara's sense of how starting new courses in January was being influenced by her natural desire to improve on the way she had begun classes in September.

> I sort of changed my ideas about how much to expect and how much to push and so I think I started probably being a little more relaxed with them.

> I know now the things that I have in the back of my mind, that as soon as one thing happens, that the rule I've got to push at that point and to not let it get out of hand because I know what could happen down the road, seeing from last semester.

Learning what rules to set when and how firmly to adhere to them was a significant theme in her talk about her work. Here we see signs of a "move-testing experiment" (Schön, 1983), based on her first semester experiences. She includes an understandable expression of hope that being "a little too lax" did no harm.

> I think I've got to stick harder by the rules, like keeping test dates very firm. I'm going to try that, for one thing, and see if it makes a difference. I want to get that straightened out right at the first because it is something that I want to get a better grasp on and I think I was a little too lax about that last term, although nobody was harmed from it, I don't think.

When she indicates the value of her first semester of teaching, Barbara makes no reference to a sense of "reality" gained from her practice teaching, only from teaching in a situation that was her own.

> After one term of experience, it's a lot easier to look at it a little more practically than before. I think I was just excited about the new classes and all these great and wonderful things I was going to do. And now, when you've got a taste of reality to throw into that pot, it makes it a little bit more realistic and you can handle it a little bit more confidently because you know kind of what to expect.

She continues to express a fundamental theme in her approach to teaching: she wants her students to "feel good about coming," and this inevitably conflicts with setting and maintaining rules.

> I thought I'll try really hard especially with the ones that are supposedly problems, trying to make them feel good and feel good about coming and let them have a little bit of leeway and pat them on the back all the time. And so far I feel like there's a fairly good feeling in there.

Barbara is very clear about the advantage of knowing what to expect of students, but she admits that she is still learning the effects that various statements have on students. Her activities at this level could be part of "exploratory" experimentation (Schön, 1983).

> I think that could be part of why we are getting along better too is because I know my place a little better and I know what I should expect from them a little better because I've already gone through it once and I know. I think I'm on more solid ground and so I can afford to be a little more confident about it. Before I just wasn't quite sure exactly what all would work and how and so on. And I'm just starting to grasp the idea of what I need to say or the effect it will have. So I think I definitely do feel more confident about saying it (disciplinary comments).

Two final excerpts from interviews with Barbara summarize one beginning teacher's dilemma of assessing her impact on a group of individuals who respond differentially to her teaching moves. Students who do not respond leave her puzzled about how to interpret her impact as a teacher.

> There's a bunch of them that I know that I am reaching because they are asking questions and another bunch that I have to push and prod all the way through it and I wonder "How is my instruction getting across to them?" or "What is the problem there?" Is the problem with what I am trying to get through to them or a problem with them attitudinally?

It seems fitting to conclude a brief account of Barbara's early experiences of teaching with her own words. Concisely yet eloquently, she summarizes the dilemmas involved in "being nice," maintaining rules, and also maintaining her own confidence. She continues to struggle with the line between her responsibilities and those of her students, and she continues to reflect about the impact she has on students.

> I'm getting better, I think, at the idea that I tell them what I have to say and then switch back into trying to be nice again and don't keep that grudge for the whole class. Yesterday I gave them a talk, quite a down-to-earth talk. I wondered afterwards if I should have said some of those things the way I did with the Grade 10s. But I was a little more confident this time in what I was saying, about whose responsibility it is for getting all the information and if they don't want to take the responsibility, then they should do some hard thinking about whether they should be in the class or not.

Learning the Knowledge of Teaching

The search for reflection-in-action by novice teachers has been encouraging and informative. The data collected and interpreted to date are rich in suggestions about the potential of Schön's (1983) categories of knowledge- and reflection-in-action as an analytic framework; MacKinnon (1985) provides further support for and illustration of this approach. The case-study approach has paid rich dividends as we study a few individuals over time and contrast their attitudes and experiences. John sees his teaching in terms of subject matter, while Carol is fascinated by her growing understanding of young children. Jerry struggles to convey the subject he loves, while Barbara is guided by her goal of being liked by her students and making them like coming to her classroom.

The contrast between practice teaching and the first year of teaching has been even more interesting than anticipated. Overall, the practice teaching setting seems to restrict opportunities for "reflection-in-action" and to curtail natural tendencies to reflection. Some practicum situations seem to require not reflection but reaction--reaction to the routines and suggestions of the cooperating teacher, who is not only guiding the novice's progress but also evaluating it. Similar conclusions about the restrictive nature of the practicum were reached by Tardif (1985) who, using sociological perspectives, found student teachers "accepting the definitions imposed by others" and "renouncing parts of their personal selves while acting as a teacher in the school setting"

(p. 146). Student teachers were seen to "focus on meeting deficiency needs, . . . unable to focus on growth needs" (p. 147). Schön's (1983) attention to the "epistemology of practice" is valuable in extending our understanding of such conclusions.

As Zeichner (1983) notes, there is within teacher education an "inquiry-oriented" paradigm that would develop the ability of the novice to analyze his or her own teaching. At a fundamental level, this paradigm conflicts with the "traditional-craft" paradigm of the practice teaching placement. The potential for conflicting messages to those learning to teach appears significant and deserving of careful investigation by the teacher education community. As Griffin et al. (1983) reported, the cooperating teacher dominates conferences that tend to focus on specific events; neglected are alternative interpretations of events and attention to the experience of being a student teacher, features that seem central to fostering reflection-in-action.

Feiman-Nemser and Buchmann (1985) have recently raised issues similar to ones noted here in a discussion of three "pitfalls of experience" in teacher preparation. With brief vignettes, they illustrate a "familiarity" pitfall (classrooms are not strange to beginning teachers), a "two-worlds" pitfall (what one learns in books contrasts sharply with classroom events), and a "cross-purposes" pitfall (classrooms are not arranged to foster learning to teach). We are impressed by the power of Schön's (19833) analysis to extend and give detail to our understanding of these pitfalls of experience. It appears that we may be asking the impossible of the student teaching experience, and then neglecting the considerable potential of the first year of experience to resolve such pitfalls. If one does become a professional who performs artistically at times, it is in spite of school's countervailing pressures that restrict reflection and reframing. As we continue to document and analyze Barbara's first year of teaching, we see the untapped potential for progress by the beginning teacher who, rather than being overwhelmed by experience, is assisted in making sense of it. As more attention is given to the "induction" phase of a teaching career, focus on developing knowledge-in-action seems promising.

As we continue to explore the potential of Schön's (1983) framework for analyzing the data from lessons and interviews, we are confident that it has a significant contribution to make in extending an inquiry-oriented perspective on the education of beginning teachers. As illustrated by Carol's experience teaching "volume" to young children, the gap between "knowledge" and "knowledge-in-action" can be very real to the novice. John, Carol, and Jerry showed moments of reflection during their practice teaching assignments, but there was little to indicate that reflection was a major theme. Barbara's interviews reveal both explicitly and implicitly the far greater potential for reflection in and on action during the first year of teaching. Yet were she not participating in the research project, there would be no resources available to her to encourage the reframing of experience or to help her realize the progress she is making in developing knowledge-in-action, learning the knowledge of teaching.

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