Student Teachers' Perceptions of their Paired Practicum Placement Experiences

G. Michael Bowen
Lakehead University
and
Wolff-Michael Roth
University of Victoria

Abstract

In this paper, we report our efforts to improve upon the difficulties traditionally experienced by preservice teachers while they are in their first field experience, such as resolving the gap between methodological approaches discussed in their "methods" class and the practicalities of the particular classroom setting they are teaching in (often referred to as the theory-practice gap). Drawing on our interviews with preservice teachers who taught in pairs, we report on the experience that such an environment for learning to teach provides to newcomers to the teaching profession. We theorize the experiences by drawing on two related theoretical frames that were developed to explain co-teaching and practical knowledge, respectively.

Introduction

There can be considerable variation in the presentation of undergraduate education programs in North America, but one commonality required for certification in most, and probably all, jurisdictions is the engagement of these students in a "practical" experience in actual classrooms where they actually teach K-12 students for a short period, usually lasting between six weeks and four months depending on the program. This experience is commonly known as the "practicum."

Practicum placements of student teachers often follow a time-honoured formula. Firstly, they follow a period of university-based classroom instruction where the student teachers are introduced to current theories of education, and in

G. Michael Bowen is an assistant professor of science education in the Faculty of Education, Lakehead University

Wolff-Michael Roth is a Lansdowne professor of applied cognitive science at the University of Victoria

some places may be schooled in detailed methods of how to engage students in their classes during their first practicum. The prospective teachers are then assigned to a school and into individual classrooms where they first observe the master teacher (i.e., the supervisor of their practicum) for a few days (perhaps as she or he is finishing off a unit) and occasionally act as a teaching assistant. During this time they prepare lesson or unit plans for their upcoming teaching experience; the master teacher normally critiques the plan, offering advice for its structure and sequence. After a few days of observation, the preservice teacher begins to teach, frequently involving a complete transfer of responsibility for curriculum content from the master teacher to the preservice teacher.

Sometimes the master teacher leaves the classroom quite early in the practicum experience, so the preservice teacher experiences their practicum as a "sink or swim" activity. Usually the master teacher observes the classroom from the back or side of the classroom for a few days and even weeks, intervening only when there is a behavioural problem. At the end of each day the master teacher sits with the student teacher and offers a critique of the day's lesson. On the following day the same sequence occurs. After a time, the master teacher withdraws more or less completely from the classroom and the student teacher manages the class completely on his or her own. The master and student teacher may subsequently engage in a periodic debriefing. Five, six, even ten weeks pass. University supervisors may visit the classroom once or twice during this time and will quietly observe a lesson, and will subsequently debrief the student teacher. Usually, the master teacher is debriefed separately. After the required time the student teacher completes a unit, designs a test for the students which she or he marks, and ends the practicum association with the students and the school returning to the university. Back in the university classroom, tales of woe, horror, and success will be shared amongst the student teachers when the university classes recommence or at graduation ceremonies. The practicum experience is complete, although perhaps unsatisfactory.

Stories of this or similar nature are all too typical of the practicum experience (Roth & Tobin, in press). It does not, in our experience, reflect an effective trajectory of experience from "student," a role in which preservice teachers usually have been successful, to "teacher," a role in which they have little or no formal experience. Unlike many professions, which have a gradual and scaffolded progression from "newcomer" to "practitioner" (see Lave & Wenger, 1991), entry to the teaching profession can be abrupt, somewhat akin to "cannonballing" into the deep-end of a pool instead of wading in from the shallow end. How might the progression be conducted to more effectively enculturate the new teacher? Modelled on a successful science teacher education program, where preservice teachers teach alongside one or more others (Roth & Tobin, 2002), our students at Lakehead University were placed in pairs with the same master teacher. We hoped that the paired placement, because of the opportunities for collective experiences, would provide a better induction to the profession. In this article, we provide an analysis of this way of arranging the practicum experience for preservice science teachers.

Theoretical Background

The development of “practical knowledge” involves, on the part of a student teacher, the integration of experiential knowledge, formal knowledge, and personal beliefs as these are constructed in the context of their teaching work during their practicum experience (van Driel, Beijaard, & Verloop, 2001). According to these authors, practical knowledge has the following five aspects. First, practical knowledge is an action-oriented knowledge drawn from teachers’ past experiences that they use in teaching practice. Second, practical knowledge is person and context-bound. Third, it can be thought of as implicit or tacit knowledge known in an in-action sense rather than as an articulated one. Fourth, it integrates teachers’ formal and experiential knowledge. Fifth, beliefs (about teaching, epistemology, and subject content) articulated by the teacher (drawn from their broader lived-life experiences) are important in the development of practical knowledge. Practical knowledge can be thought of as “the core of a teacher’s professionalism” (van Driel et al., 2001). However, the practical knowledge that preservice teachers act upon as they enter their first practicum is centered on their experiential knowledge of being students rather than on their experiential knowledge of being teachers. Thus, the practicum experience is often considered to be an ideal place in which to develop understanding of teaching practice. However, the manner in which a practicum unfolds varies considerably across university and school settings. These variations are influenced by both formal and informal mechanisms. Firstly, there are formal differences in the requirements posed by faculties of education and governmental bodies. Secondly, there are informal differences between the locally accepted practices within a school as well as traditional approaches enacted by individual master teachers; these differences exist even in the case of a common formal structure. Recently, it has been suggested that co-teaching is a more effective approach to helping new teachers develop competency at effective classroom practices (e.g., Roth & Tobin, 2002).

In this paper, we draw on the literatures concerning co-teaching and practical knowledge to develop an understanding of the idea of “peer coaching” as an approach to use to improve the first practicum experience of preservice high school science teachers. Traditionally, “peer coaching” is discussed in terms of the continued professional development of practicing teachers (see van Driel et al., 2001), and problems can arise in its practice in part because teachers are “professionals in isolation” who rarely discuss their actual practices (Clandinin, 1986). There is some previous reported work on peer-coaching between preservice elementary teachers during their practicum. This work ranges from Hawkey (1994), who invited peers to observe each other teach and offer critique resulting in an increase in risk-taking in their teaching strategies, to McAllister and Neubert (1995), who had a formalized peer-coaching approach involving considerable training for evaluation and critique of their peers classroom practices which through these efforts related improvements in reflection on practice and classroom practices. Korthagen and Kessels (1999) also reported on their work training preservice teachers in supervision skills to use with their peers to both save evaluation time by institutional staff as well as providing the

foundation for inter-collegially supported learning. The reports by Hawkey (1994) and McAllister and Neubert (1995), as well as that by Clarke and Richardson (1986) and others suggest that it is difficult to get preservice teachers to effectively criticize the instructional practices of their peers, although the former found that this could be developed using specific training. What is not apparent in this literature however, is any indication that peer-coaching amongst pre-service teachers involves any aspect of joint responsibility for classroom practices, curriculum design, or, indeed, teaching itself. In contrast with the previous studies, our approach to peer coaching encourages just this sort of shared responsibility towards the learning environment.

Recently, Roth and Tobin have been problematizing and theorizing teaching and learning to teach by means of co-teaching (Roth & Tobin, 2001; Tobin & Roth, 2001). They define co-teaching as a setting in which all participants (master teachers, preservice teachers, supervisors, evaluators, researchers) are engaged in the effort of helping students to learn. In their work they focus on the notion of *being-in* and *being-with* to help develop a theoretical understanding of co-teaching as an enculturation practice (Roth, 2002). In this paper we draw on the themes of being in/with the world to make sense of the preservice teachers' experiences: *being in the world* and *being with another* suggests that phenomenological understandings of knowing and learning are premised on being-in-the-world as the fundamental condition of all knowing (e.g., Ricœur, 1991). This includes both the physical and social aspects of the world. Thus, knowing is also rooted in the social interactions of being with the world (e.g., Bourdieu, 1997).

The practice of co-teaching is such that it allows preservice student teachers to learn the tacit practices of competent old-timers. In this setting the preservice teachers can challenge and be able to redress their beliefs about teaching, epistemology and subject content. This occurs particularly by making beliefs part of the teaching and reflections on teaching which occur as a consequence of teaching in teams and having to support statements made as rationales for planned or enacted classroom activities. Roth and Tobin (2002) proposed *cogenerative dialoguing* as a forum where the theory-praxis mediation can occur. In this paper we conceptualize peer coaching as involving a level of equality in which each preservice teacher draws on her/his own personal strengths to collaborate with another on developing and improving each others' classroom practices in a cogenerative fashion.

Context of Practicum Placement in this Study

At the beginning of the year students in two sections of an Intermediate/Senior (7-12) year-long professional development post-baccalaureate education biology and general science "methods" course were offered the opportunity to be placed in their first practicum experience (at this university a six-week placement following nine weeks of university classes) in a paired placement. When a list of those interested in a paired practicum placement was obtained, the faculty placement administrator solicited volunteers from the list of supervisory master teachers who had already decided to supervise students on placement that year

and these were matched with pairs of students. All participants in this study participated voluntarily in the paired placement program.

It is important, however, to recognize part of the motivation of the participants in participating in this endeavour. Those who have taught the preservice teachers have all heard stories of how substantially nervous student teachers are about their placement. Students are often confident about their ability to succeed in the university-based course component, for this is the area in which they have excelled as students, but the classroom practicum component is foreign to most, and is therefore threatening. On top of this, the traditional placement approach is truly a disempowering one for preservice teachers. Many are placed in schools where they do not know anybody else, in which they have few or no peers, and few teaching resources to draw on that are not under the control of the established teachers. The student teachers face many disempowering contradictions between their university learning and the reality of their classroom setting during their practicum. By offering them the option of paired placement they were presented an opportunity to have some control over their own destiny they chose to be placed in pairs or not, and if they did choose this option they knew at least one other person in their placement school. As a consequence, they also had access to more material resources and to a sounding board for their ideas.

The opportunity is also empowering in the sense that when doing their practicum they have an *equal* other, a peer, with whom to broach ideas about which they are tentative, someone with whom they can develop a curricular idea from tentative conception to actual practice. Although they can do this with their master teacher (or with their faculty advisor), doing so also carries an implicit risk in that those individuals are also assessing the performance of the student teacher. How is the student teacher to know if an experienced educator might dismiss their budding ideas for an activity? How is he or she to know whether such a dismissed activity will negatively affect their performance assessment? By choosing to engage in their practicum experience in a pair, student teachers were taking some implicit and explicit control of their placement experience such that they now could take budding ideas and synergistically develop them into a cohesive classroom plan to present to their master teacher. A paired placement was attractive to many students for just these reasons.

For the supervisory master teachers the paired placements were attractive for another reason. The placement administrator persuaded these individuals to participate based on the idea that it would give them more freedom because they would not have to supervise the class as closely. In balance, although accepting a pair of students meant writing two supervision reports, it also meant that there were two pairs of eyes to supervise the science classroom when the regular teacher was not there so that there was more support for students working on assignments and a safer environment during laboratory investigations. Additionally, it was pointed out to the master teachers that their wards could rely on one another for developing curricular ideas and would therefore be asking the supervisor fewer questions.

Finally, the placement officer supported the idea of paired placement, and therefore endeavoured persuading master teachers to participate because a paired placement meant that fewer overall placement locations needed to be found. Thus, for her, paired placements addressed a very real issue that she had to face in a university where the number of students needing to be placed kept increasing beyond the capacity of the local school systems.

“Methods” Classroom Context

During the first nine weeks students engaged in a methods course in which they read academic journal and book excerpts about inquiry science and related issues, participated in short-term (two-hour) and extended (four-month) inquiry activities, and learned about and used in the context of those activities numerous practical classroom tools (such as concept mapping and vee-mapping [Novak & Gowin, 1984]). The open-ended inquiry and project work was presented as an effective method for engaging students in conceptual material when reinforced by discussions, presentations, and writing position papers and (reflective) journaling. Readings and discussions in the course were also aimed at helping students develop a more nuanced understanding of the practices of science research and the construction of knowledge claims (based on contemporary understandings from sociology of science studies). Students were often placed in the position of presenting their ideas to their peers (in pairs, small groups, and whole-class) where they were subject to debate and critique.

Research Design

In the second university semester (after the first practicum placement), volunteers were solicited to participate in the research project from among those who had engaged in a paired placement. These volunteers were interviewed about their placement experience. They also read an article on co-teaching (Roth & Tobin, 2001) and wrote reflections on that article in light of their experience. We included in the data set the students' written reflections on inquiry science articles drawn from the literature and segments of their required professional portfolios. A total of ten students volunteered to be interviewed.

In this paper, we focus on two pairs of individuals, each pair placed with a single master teacher in a secondary science classroom, in their first practicum experience in their final year. Both pairs were members of the same science methods class but they were different with respect to background and teaching interests (see Table 1). These two pairs were chosen because they exemplify differences in personal beliefs, formal knowledge (of their subject discipline), and experiential knowledge of teaching (from their own experience as high school students). Therefore, we expected that their interactions about teaching would offer the optimum opportunity for the benefits and problems of paired practicum placements to emerge as they challenged one another's perceptions and preconceptions about the classroom activities and their role in them. Our analyses are grounded in a reflexive hermeneutic phenomenology that emphasizes the dialectic of understanding and explanation: understanding is a prerequisite for explaining (theorizing) but only explaining develops under-

standing (Ricoeur, 1991). We shared the available texts, drew initial claims, and then collaboratively compared these claims providing evidences from the text for each claim. These were discussed and revised until all members of the research team were satisfied with the claims being made.

Table 1: Experiences prior to their final year in education and their major practicum experiences

	Pair 1 (Graham & Greta)	Pair 2 (Franco & Francie)
Teaching Preference	Second teachable was biology (Graham's first teachable was geography, Greta's first teachable was English)	First teachable was biology (both were biology majors, Franco had an MSc)
Attitude to high school	Graham disliked high school, was a disruptive student, and was frequently in trouble. Greta liked high school, and was a good student who participated positively.	Both Franco and Francie liked high school and were good students who participated positively
Presentation of self	Graham presents a somewhat "non-traditional" slightly rebellious image (clothing, haircut, moustache). Talks in a relaxed, casual, informal fashion. Greta presents a "traditional" clean-cut professional image. Talks with a professional formal demeanor.	Both Franco and Francie present a clean-cut professional image and talk with a formal demeanor. Franco's earring is non-obvious, nonetheless he removed it during his practicum.
Science Teaching Experience	Both taught a few classes at the grade 7/8 level in their previous year.	Franco has taught undergraduate science labs as a TA. Francie has taught about animals & ecology at a day camp.

Enacting Paired Placements

Students were sent to their practicum experience with a broad range of possibilities as to how a paired placement could be enacted, thereby allowing each pair, in conjunction with their master teacher, to develop an approach to working together that best fit their needs (Roth & Tobin, in press). During the initial presentation of the placement opportunity, before soliciting volunteers, the following scenario was presented. "(You can) share all of the classes, jointly plan them, and then when one person teaches, the other can observe and work as another set of eyes, essentially as a teaching assistant helping students with

problems and as someone who can help the lead teacher deal with the behavioural issues in the class. Or, you could do tag-team teaching where you swap responsibility back and forth within a class for teaching different parts." In addition, the volunteer master teachers were free to implement their vision of how to best engage their pre-service wards in the paired placement (preferably through negotiated agreement). This strategy was deliberate. Enforcing a specific paired-placement approach may have led to a decreased interest in participation on the part of the master teachers. We were sensitive to the reaction of teachers to top-down dictates about what they must do and did not want to be seen as ivory-tower academics telling master teachers what they should or must do while they were supervising the preservice teachers on their practicum.

This approach was also taken because we wanted the opportunity to understand the different variants of implementation that would occur with these loose boundaries. In essence, the lack of direction was to address the empirical questions: What models of implementing paired-placements arose? How well did they work from the perspective of the different participants? Information from the complete pool of ten interviews (and student comments from those not interviewed) suggested several models of implementation occurred (Table 2).

Table 2: Ways in which paired practicum placements were enacted

Class Distribution	Planning of Classes	Distributed Teaching Roles	Interactions with Peer
All classrooms shared	Joint planning	Teaching roles shifted in each class	Some/much peer debriefing
All classrooms shared	Some joint planning	Teaching roles stable in each class	Some peer debriefing
Some classes shared	Some joint planning, some individual	Teaching roles shifted in shared class(es)	Some peer debriefing
No shared classes	Some joint planning or voicing critique	Teacher role stable in classes (some act as TA), for some classes were switched	Some peer debriefing

Student Views of Paired Placement

Co-teaching may, depending on the pairings, lead to quite varied experiences, particularly when the period of exposure to the respective other is rather short (Roth & Tobin, 2002). This was the case in the present study where the practicum was only six weeks long rather than the twelve months in the Roth and Tobin study. In general, the paired placement aspect of the practicum was positive for most students. Six of the interviewed students found the paired placement experience to be a positive one (although not necessarily their practicum experience). Two of the respondents found the paired placement to be a negative experience (characterized as resulting from personality clashes or disparate teaching styles, one of these said she would feel positive about doing the activity with a different partner) and another two were ambiguous about the

experience (characterizing it as having negatives and positives, one of whom attributed the negatives to a clash between the master teacher and the preservice teacher). In this paper we focus on two cases. The first pair of students reported back positive experience with both the practicum and the paired relationship. In the second pair, one student had a positive practicum experience but was ambiguous towards the pairing; the other student was negative about the practicum experience (specifically the master teacher) but saw more positives than negatives regarding having a practicum partner.

Positive Experiences

Overall, Franco and Francie both indicated that they found the experience of working with another preservice teacher to be a positive experience. This may be due to how their paired placement was structured. Franco and Francie's master teacher decided to have both of them placed in the same classes over the entire practicum and then allowed them to decide together how they were going to implement that responsibility. Francie describes this part of her experience in this way:

My associate teacher [i.e., how students referred to the master teacher] allowed us both a week to observe and then it was up to us to decide how we wanted to teach the class. We decided on a system where we would each be responsible for alternate day's lessons. For example if I taught the grade 11 classes on Monday, Wednesday and Friday, then I taught the Senior Biology class on Tuesday and Thursday, and my co-teacher vice versa (he taught the classes on opposite days). By structuring the class in this way we were free to plan independently of each other (at our own pace) but could ask for help, advice, etc. if needed. Most days once the formal lesson had been completed we would both circulate in the classroom assisting students with their work. So although only one teacher planned each day's lesson, the class was still managed by both of us.

The description suggests that although they planned curriculum separately for each day, they had to coordinate with each other where each class was going overall and what they were going to do to accomplish those goals. The presence of each of them in the other's lessons offered the opportunity for them to engage in considerable peer-coaching and they took advantage of this opportunity at the urging of their master teacher.

However at the end of each day she would encourage us to reflect on what had gone well and what hadn't, to receive compliments and criticism from each other, and from her. This was extremely helpful, especially during the first few weeks of teaching. (Francie)

This, of course, was not co-teaching in the manner discussed by Roth and Tobin (2001), which would have required both teachers to take part in collective responsibility for student learning all of the time. Francie recognized this difference and saw both strengths and weaknesses in the approach.

To relate this to *Learning to Teach Science as Practice* [Roth & Tobin, 2001], it was only myself and the other new teacher [her partner] who were truly "team teaching." My associate was present, but participated as the so-called "expert on the side," rather than co-teaching along with us. Nor did any methods instructors, new teachers, nor [university] supervisors (i.e., Liaison) participate in this team teaching experience. I can understand how co-teaching along with the associate could be beneficial; she is the expert and is an excellent teacher. I learned a great deal from her, and I'm sure I could have only benefited more by teaching alongside her... For someone like myself, if I were placed in a scenario where I was not solely responsible for the class I think I would be inclined to back off and be deferential to the associate teacher (after all she is the expert). When I am "in-charge," however, I am able to fill that role and be assertive. I think even having the class time structured as mentioned in the article would have been restrictive for me.

This initial skepticism Francie felt was not unlike that of co-teaching participants in the studies by Roth and Tobin (2002). One of their co-teaching preservice teachers suggested that she "began [her] co-teaching experience with some reluctance and skepticism" (Beers, 2002, p. 16) but under the guidance of her supervising coteacher began to participate enthusiastically in the endeavour as he successfully scaffolded her along the trajectory towards fuller participation as a classroom teacher. It requires a skilled coteacher to effectively engage in the practices that would alleviate the types of concerns Francie expressed.

We are then left with the question of whether the engagement of students in paired practicum placements such as that of Francie and Franco provide at least some progression along the trajectory towards the strengths of co-teaching described by Roth and Tobin (2002). Even in this instance, the successes of the paired placement of Francie and Franco have originated from "a positive experience about [team teaching] from the [master teachers] own experience." This is why, according to Francie, the master teacher was open to taking a paired placement in the first place. She encouraged the student teachers to comment on and critique each other's teaching and to offer suggestions for improvement. This, too, is reminiscent of team-teaching experiences and probably stems from her experience with that approach. Franco relates how they provided feedback to each other over their teaching approaches:

We were always present. So if Francie, the other student teacher, was up at the front I would be sitting at the back, and I'd actually take notes and I was also instructed by my associate [i.e., master teacher] to write down any improvements that she might make and vice versa. And that actually did help, because we kind of saw, okay, this person is doing something really great and I might want to incorporate that into my next lesson. Or, there was

something, 'maybe you should have done this.' So it worked out quite well.

Both Francie and Franco suggested that the comments from the other and reflections on how to comment on the teaching of the other provided a foundation for them to reflect on and refine their own practices. Similar to the benefits from reciprocal teaching among children learning science (Palincsar & Brown, 1984), the preservice teachers in this study learned a lot by reflecting on their partners practices as well as their own. Working together in this way generated a zone of proximal development (Engeström, 1987), which is defined by the difference between the outcome of individual actions and the outcomes of a more advanced, collectively achieved activity. Such benefits accrued not only to teaching approaches but also for classroom management issues. Responding to the question, "Do you think that watching each other influenced your style at all? Or made you think about your methods?"

I think so. Definitely classroom management types of things because when you're sitting at the back and the students can't see you, you can be aware of all the classroom dynamics that are going on. ... when you're up at the front teaching, you have so many things that you're trying to think about at the same time that maybe you don't see everything. (Francie)

Francie and Franco observed most of each other's teaching, participated within each other's classes, and collaborated on the planning of classroom units. Both highlighted the many advantages offered to their participating together in this way. These advantages included such things as not feeling "swamped" because the division of labour reduced the number of preparations, having someone else to help students answer questions, having a resource "in" the classroom who can help plan an activity to fill the last ten minutes of a class, having somebody else to ask question of so they did not have to "bug the associate" (i.e., master teacher) and, being exposed to a broader range of teaching approaches than just their (individual) own. These would also be the strengths of the full co-teaching model.

Contradictions and Negative Experiences

Greta and Graham enacted a division of labour that differed from that chosen by Francie and Franco. During the first three weeks, Graham taught two tenth-grade general science courses and Greta one eleventh-grade biology class. Subsequently, they switched. (Roth and Tobin's students always taught the same classes, being there at the same time.) They did not, therefore, see that they had any need to jointly prepare curriculum; their master teacher also did not encourage increased collaboration. Initially they did no planning together and only briefly talked about their units; after switching their respective classes, they discussed approaches that might benefit individual students in their classes. They visited each other's classes a few times (Greta visited Graham's class more often

than the reverse) but did not provide feedback to each other about their observations. The master teacher privately provided feedback to the preservice students after their individual classes, often after he had observed them for only a few minutes. Overall, the placement experience was negative for Graham and not for Greta; Graham was slightly positive about the paired-placement aspect and Greta did not find it productive.

Graham clearly chafed under the extant power relations with his master teachers in both an earlier (in the previous year of the BA/BE^d program) and this final-year practicum and found them to be unfair in how he was treated. Upon reading an article on co-teaching (Roth & Tobin, 2001) he recounted the following experience which occurred in his 3rd year practicum in the previous year:

My liaison [i.e., university supervisor] comes into my classroom while I am teaching. I have a cold that has lasted over a week, my throat is very sore and I can't speak very well as a result. I get through my little lecture and note on drugs and give them a little group assignment to work on. My liaison asks if she can talk to me. Class is not even over so I ask if my associate [i.e., master teacher] will take over for a little bit while I step out. I get out in the hall and my liaison says "You did well, but you really have to vary your voice a little more to keep them interested." I explain my situation to no avail, and promptly get marked down for not having a varied voice. I think about how crappy this whole process is and feel discouraged.

This situation is one that a paired placement could have resolved; in this, his fourth year, Graham indicated that he would have preferred being placed in classes *with* Greta. Yet, in his 4th year practicum it was Greta's preference that aligned with that of the master teacher; Graham's interest in sharing a classroom remained unfulfilled:

I was a bit nervous going into this teaching placement. . . . I also had a few apprehensions. I knew that my associate teacher had three classes and I wasn't sure how the classes were going to be divided. I did not want to team teach with anyone. This is a personal preference. I did not want to have to worry about planning lessons in the evening or making sure that we were on the same page and wanted to do the same thing. I find it much easier and less stressful to be the only one in control of the class.
(Greta)

Greta observed and commented on Graham's classes several times over the practicum; the reverse only occurred three times. They did not provide feedback to each other, participate in planning each other's classes, or participate with each other's class acting only as an observer in the times they were there. Each had a

view of how the paired placement should be done, and given that both were uncertain of their knowledge in biology in this situation one would suspect that jointly planning classes, even different ones, might have been productive. However, Greta's comments make it clear that this ran counter to her interests. Greta and Graham did sometimes discuss how their classes went after the fact in the science department office:

I learned a lot from talking [with Greta] between classes about how lessons went and what we could do in the future. I think we both could have benefited from an involved, experienced teacher and liaison that acted appropriately in a team environment. . . . I could have benefited during Greta's talks and mine from an experienced point of view. . . . From a classroom management perspective it would have been nice to see good techniques in action rather than the few after-the-fact negative comments I got. (Graham)

Graham was frustrated by the experience: he was put into a classroom by himself from the first day of placement, was observed for only a few minutes once or twice a week, and mainly received negative feedback. He did not find that he could rely on the master teacher as a resource, and his practicum partner was uninterested in jointly planning lessons. There may be other reasons for this, but our analysis suggests that one reason may have been that Greta received considerable input from the master teacher and others in the science department in a manner that Graham did not. This may have occurred because for the first three weeks Graham taught in the first two periods and Greta had them as preparatory periods and did not teach until after the lunch period. As a consequence, she did not need to discuss her ideas with Graham as they were developed in concert with the master teacher:

My associate was in the room with me for the first week, making sure that the students were in-line, that I was giving the right information etc.. After every class he would give me an evaluation of my teaching, basically just things that I did well and things I could improve on. Because [in the first three weeks] my class was the last period of the day, he asked if we could discuss the class after school. That was no problem and each day he would discuss the evaluations after class with me. I really appreciated the extra time that he was taking as well as the evaluations. Quite a lot of the time we really didn't discuss the class because it had gone really well, and we just talked about the new curriculum and how to teach different concepts. Just spending the extra half-hour talking to my associate after school really gave me a lot of great ideas that I could use in the future. He was a great resource and I took full advantage of his experiences in teaching. (Greta)

This pattern of discussion after school between Greta and the master teacher continued even after the class loads were reversed and it was Graham who was teaching in the last session of the day. Overall, the practicum experience ended up being a positive one for Greta, and a generally negative one for Graham. Given the above, where Greta received substantial guidance, advice and feedback and Graham received the opposite this is hardly surprising. Even when Graham was teaching the single eleventh-grade biology class, which he did not do until 1:30 p.m., there is no indication that he received any guidance from the master teacher on lesson preparation and, at those times, could not discuss them with Greta earlier in the day because she was in her own classes (and by her own account receiving considerable support from the master teacher during those times). Clearly, an implementation of paired placement where one student is neglected is undesirable, and it suggests that having an open implementation policy can result in ineffective placement experiences.

Analysis

How can we understand these varied experiences? Graham and Greta's master teacher had already developed a classroom dynamic with his students that reflected his personality and teaching interests. This can be considered the action-oriented knowledge characteristic of a teacher's practical knowledge. Yet, this can be *tacit* knowledge that is difficult to articulate and pass on to others. Here we find a master teacher, with considerable classroom experience, who spends considerable time with one of his charges and much less with the other. Why might this be? It is clear from the interviews that Greta's worldview regarding teaching aligned closely with that of the master teacher (as described by both Graham and Greta) whereas Graham's orientation towards students (epistemologically, authoritatively, etc.) was quite different. Greta and Graham's master teacher had constructed a view of teaching that was an individualistic one: "I am in charge. I am responsible. I am the central authority. I am God. I am in charge of your life" (Graham, about his master teacher). His approach to organizing the student teaching experience also reflected this attitude as he placed the student teachers individually with classes and acted as an arbitrary authority over them. His differing treatment of the two interns is understandable if one takes the perspective that Greta reaffirmed the master teacher's practical knowledge by her comments and actions, while Graham's teaching acted as an implicit criticism of these practices calling into question the master teachers beliefs about teaching, epistemology, and so forth. Greta related how she attempted to match in her own classroom practices those enacted or described by her master teacher. By doing this, she drew implicitly on the dispositions (for engaging in learning activities, disciplinary practices, etc.) already negotiated with the students for their participation in the classes and did not need to renegotiate these with the students herself. Her practices became indistinguishable from those of the master teacher as both he and the students molded her towards those practices; that is, she moved quickly into this established classroom community and became a legitimate peripheral participant

(Lave & Wenger, 1991) in the dynamic of this class that had been pre-structured by the master teacher.

Graham interacted with his students quite differently. In his class the students' dispositions (i.e., tendencies to act) were confronted with a set of alien practices (i.e., those enacted by Graham) and he often had to renegotiate with the students the manner in which his class was to operate. This is not to say that his approach was ineffective; in fact he perceived his class as effective and enjoyed his relationship with his students. But he found it difficult orienting his students towards the activity-oriented lessons that he preferred rather than the lecture-oriented lessons that his master teacher and Greta implemented. Graham did not, however, mind the lack of feedback and interaction with the master teacher as he did not "get along with" him, nor did he find his interaction with Greta to be useful to his development as a teacher.

If one views the practicum experience as one during which the preservice teachers progress along the trajectory from "successful student" to "professional teacher" then the Graham/Greta experience suggests that for this progression to successfully occur there must already be an articulation in many of the aspects of practical knowledge between the master teacher and the student teachers on placement. That Graham's practicum experience was a negative one reflects a poor articulation between his predispositions, his own germinal practical knowledge, and those of the master teacher. On the other hand, there was considerable concordance between Greta's predispositions towards the classrooms and those enacted by their master teacher.

For Francie and Franco the student teaching experience was a considerably different one. Their master teacher's practical knowledge was such that it allowed room for her to incorporate two preservice teachers into her practices in such a way that both of them were able to fully participate as classroom teachers themselves. This reflected her past experiences with team teaching. Thus, given the opportunity to have a pair of preservice teachers for supervision she reconstructed her own team-teaching experience and developed an environment for them to work collaboratively with each other under her supervision. Even in that setting they could rely on her to "jump in" if problems arose. Thus, from the description provided by Franco and Francie, a close analogue to the scaffolding and classroom situation described by Beers (2002) in her own class developed on its own in a paired practicum placement, in other words a beginning co-teaching environment. From both of their descriptions of their practicum experience it is possible to conclude that there was considerable articulation in the beginning practical knowledge dispositions of these two preservice teachers with the mature orientation of their master teacher such that they could be supported along a trajectory to more competent classroom practices. Given that there were many similarities (both in personality and in teaching dispositions) between Graham and Franco, it is interesting to speculate how Graham might have fared with this master teacher if he had been given the opportunity.

Implications for Science Teacher Practicum Experiences

Assigning students on paired practicum placement does not work in some

situations. Students, such as Graham and Greta, attribute this to different "teaching styles." This explanation alone is insufficient; it is clear that the practical knowledge that teachers are to develop is guided in part by how their practicum experience is designed and that there is an interaction between their budding practical knowledge and that of their master teacher. This study suggests that if there is too much distance between their predispositions and practical knowledge and those of the master teacher then the discontinuity is such that there is a breakdown in the scaffolded progression along the trajectory from being a "student" to being a "teacher." Clearly, successful practicum placements require coordination between the practical knowledge of the master teacher and the developing practical knowledge in the preservice teacher(s). Although we suspect that the potential exists for paired placements to mediate between individuals with differing foundations of practical knowledge that clearly did not occur in this instance.

In her interview Greta suggested that the paired-practicum approach used by Franco and Francie might have been more productive for her and Graham, but that she was not comfortable with the "sharing" of power and control associated with having two peer-teachers in the same classroom. However, the evidence from this study suggests that paired practicum placement can offer several advantages, especially in a cogenerative sense of developing teaching and management practices within an environment that encourages reflection on the classroom environment. Clearly, the types of "practical knowledge" identified by van Driel et al. (2001) had an opportunity to develop in Franco and Francie's classroom in a manner that it did not in the classrooms of Graham and Greta. This might be related to the practical knowledge of the former's master teacher being such that a collaborative, inclusive arrangement was possible whereas the teacher master Greta and Graham did not have predispositions (towards knowledge, authority, etc.) that could allow for a sharing of experience to occur that would enhance their learning during their practicum. In the former instance, the paired practicum placement represented an effective experience along the trajectory from "student" to "classroom educator" for Francie and Franco who both expressed that they now wanted to experience a classroom without such peer-related scaffolds during their next placement.

One possible interpretation of the above is that the paired-placement enacted by Graham and Greta was of poor design, whereas that used by Franco and Francie was more effective. However, the data from other placements do not support this conclusion. The model experienced as problematic by Graham and Greta was used by other students on their paired placement to much greater effect, whereas other paired students had some difficulty with the approach used by Franco and Francie. Overall, we continue to be uncertain as to how to ensure that pairs of students decide upon an approach to the paired placement that best suits their academic strengths and personalities.

Finally, one must now question the role that faculties of education play in the placement process. As often enacted, faculties of education place preservice teachers with master teachers on the basis of subject and grade level compatibility alone. Yet this study suggests that coordination in the practical

knowledge (pre-) dispositions of the master teacher and the pre-service practicum teacher(s) are a necessary component for a successful practicum experience. It would appear incumbent on faculties of education to revisit the manner in which they decide to place particular students with a given master teacher.

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