

## CREATING A CLEAR SIGNAL AGAINST A NOISY BACKGROUND

*[Physics is] that class where you know you're not going to have to show up and do something trivial ... it's been sort of that place of refuge where we know we can go.... and focus on what I feel is important and of value. (David3, 7–9)*

In addition to the regular schedule of coursework, a 8-month teacher education program needs to deal with the challenge of finding the appropriate time to include the extra requirements of a professional certification program. In the Ontario context, these extra requirements include finding time for presentations by the teachers' unions and for the Ontario College of Teachers. In both cases, candidates are required to complete an application form to ensure they become certified Ontario teachers and are paid at the appropriate rate once they complete their degree. At Queen's, there are also many opportunities for candidates to engage in various workshops related to finding a job, including a popular recruiting fair for candidates interested in teaching overseas. Teacher candidates' thoughts naturally begin to drift to the job search and the possibility of teaching in their own classroom.

Unfortunately, the practical stress of finding a job can often coincide with the mid-point of a 8-month teacher education program. Teacher educators, particularly those who feel it is their responsibility to give candidates as many resources as possible in the name of preparation for the first year, might feel a new push to cover as much content as possible. There might be an increased pressure to complete assignments, particularly if candidates are about to embark on their final extended practicum. The previous chapter revealed that some participants felt that the November on-campus portion of the program did not do enough to help them resolve the existential tensions they arose during their first month of practicum. Candidates who participated in this research experienced themselves as "living contradictions" (Whitehead, 1993, p. 70) as a result of their practicum experiences. If these tensions were exacerbated during their second practicum, in December, then it is possible that candidates returned to the on-campus weeks in January feeling more unsettled than they did in November.

In short, there are a considerable number of distractions in a 8-month teacher education program, particularly at the mid-point when candidates are compelled to consider applying for jobs, possibly while coming to terms with increased requirements from course work and feelings of insecurity about their practicum experiences. These distractions may well add up to a considerable amount of noise in a program that might make it difficult to focus on the broader challenges of learning to teach. It becomes a major challenge, then, for teacher educators to send a clear signal against the noisy background of a busy teacher education program.

The first section of this chapter describes the major events that occurred during the physics course in this block of classes. The data obtained from the focus group and individual interviews are then analyzed to provide insight into how teacher candidates constructed professional knowledge from learning experiences in the physics course. Selected narratives of the candidates' practicum experiences are then presented in order to reveal many of the tensions associated with constructing professional knowledge during the practicum. The next section provides the perspective and voice of the teacher educator as I analyze the discussions Tom and I engaged in during January classes. Finally, the chapter concludes with a summary of the professional knowledge constructed and co-constructed by the teacher candidates and the teacher educators.

#### CONTEXTUAL FEATURES OF THE PHYSICS METHODS COURSE

Tom began this block of classes by engaging candidates in group work designed to help them set goals for their learning in January. At the end of the first class, he formalized the self-directed learning (SDL) assignment that would become the focus of the term. Candidates were asked to come to the second class prepared to form groups around common interests. These SDL groups would each be responsible for producing an "exemplary teaching resource" (Journal, January 7) to share with peers in the final class. The rest of the January classes alternated between two patterns. On Mondays, a guest speaker presented to teacher candidates for approximately half the class, and Tom used the other half of the class to both debrief the presentation and to guide candidates in processing the effects the program was having on their learning. Thursdays were designated as self-directed learning classes, where candidates were free to work on the projects on which their groups had decided. To emphasize the point, Tom stated that candidates need not attend class on Thursdays if their group's time could be spent more productively elsewhere. The physics courses concluded on Thursday at the end of January with 13 presentations of exemplary teaching resources from both groups and people who had chosen to work individually.

#### LEARNING EXPERIENCES IN THE PHYSICS CLASS: TEACHER CANDIDATES

The data provided by the participants during the focus group interview and the individual follow-up interviews were analyzed with a view toward understanding how the teacher candidates were constructing knowledge from learning experiences during their physics methods course. Four themes are explored in this section: Learning from the Program, Learning from Tensions, Learning from Tom, and Theorizing Teaching and Learning. The first theme focuses on how teacher candidates learned from the structure of the program, with particular emphasis on the transitions between the end of the extended fall practicum, the winter holiday break, and the return to Queen's in January. Unlike the previous two chapters, in which candidates spoke at length about how they learned from peers in both the physics classroom and the program, this set of data contributing to this chapter gave little mention of the effect that other teacher candidates had on participants' learning. Instead, the idea

of candidates' experiences as living contradictions is further revealed by the extent to which candidates articulate the tensions they experienced during the teacher education program. The ways in which participants learn from Tom's pedagogy are interpreted in the third theme. Finally, the last theme explores the theories about teaching and learning that participants constructed from their experiences.

### *Learning from the Program*

Teacher candidates who participated in this study indicated two major ways in which they learned from the program. First, the rhythm of the program continued to play an important role in their professional learning as they compared their experiences and expectations for learning on the practicum and at the Faculty. Second, candidates articulated a perceived lack of coherence in the teacher education program, largely due to their teacher educators' diverse pedagogical approaches and expectations, many of which contradicted their expectations of learning at the Faculty. This section interprets both aspects of how candidates learned from the program.

Teacher candidates returned to the Faculty of Education at Queen's after their December practicum and a 2-week winter holiday break. As James noted, "I would definitely rather come back [to the Faculty] than go back to the classroom. I needed that time to reflect and prepare for things like the job search" (James3, 30). Irene felt that coming back in January was "kind of relaxing because you have less hours, less responsibilities being a student again," adding that by the end of the final week of practicum, "it was just like trying to slog through marking and get things done, not a lot of critical reflection going on" (Irene3, 37). The space for analysis of experience provided by the return to campus was also mentioned by James: "Coming back here gives us the opportunity to reflect and really reminds us the importance of reflecting on our practice and thinking about how we teach and the theory behind it" (James3, 15). Paul also enjoyed the transition back to the Faculty, although his enthusiasm was more due to feeling that "going back for practicum has had a lot of negative parts" (Paul3, 5), many of which made him question his desire to enter the teaching profession. For Paul and David, the physics classroom acted as a kind of "safe haven" (David3, 6) from many of the external pressures and frustrations of the practicum; the transition to the Faculty was a welcome one for both of them. Max was unaffected by the transition: "Back to school, back to placement, no real difference to me" (Max3, 19).

The previous chapter explored how candidates' expectations of the program changed as a result of their first practicum experiences. Participants' experiences teaching in October taught them to be more critical of the kinds of teaching they experienced on their return to the Faculty in November. This result was magnified in the January data set; the teacher candidates who participated in the research were more critical of the pedagogical approaches of their teacher educators in January. In particular, candidates perceived a lack of coherence in the program. David perceived the pedagogies used by teacher educators as a dichotomy:

There's a camp that believes it should be a theoretical Faculty of Education, versus the other camp that believes it should be more practical and building

up a “toolbox of skills,” if you will, for students before they go into placements. (David3, 23)

The lack of coherence in teacher educators’ approaches to pedagogy made many candidates’ January learning experiences frustrating. Often, frustrations in one or two courses in the program led to a general sense of malaise. Paul said that his frustrations with some courses were the result of his perception that “no parts of it [the course] seem to match up” (Paul3, 27). He was also critical of the fact that some courses became too student-centred: “I just keep hearing the opinions of my classmates who have never been teachers before; it’s all just individual or group presentations for the entirety of the course” (Paul3, 27). Paul stated that he learned the most when teacher educators used a coherent approach to teaching: “The reason I’m liking certain classes is because the profs do what they mean, what they say we should do, so there’s no contradiction” (Paul3, 28).

Max felt that the sheer number of “silly workshops and fairs” (Max3, 17) was distracting and contributed to an overall lack of coherence in the program. Irene found the program confusing from a learner’s perspective: “I can never put in words what I feel like I’m learning [at the Faculty]” (FG3, 115). Returning to an idea that he articulated earlier in the year, James stated that while the program was somewhat incoherent, it was up to individual candidates to help shape the quality of their learning experiences:

I would tell students to really take advantage of the time spent at the Faculty of Education to learn about areas of teaching and learning that they want to learn about, and to try and gear all their assignments towards areas they’re interested in. (James3, 26)

At the same time, however, James was frustrated by the lack of time to pursue the elements of the program that were of interest to him:

I would like to have a bit less class time and more time to do individual work .... It seems like in a lot of classes, we’re told to ‘Go learn this or go do that, learn about what you think you need to learn about’ ... [but] pretty much our whole day is spent in class! (James 3, 27)

Again, teacher candidates’ learning was affected by the mixed messages they received from the program. By January, the teacher candidates had learned which elements of the program to focus their attention on and which elements of the program did not provide meaningful learning opportunities. For the teacher candidates who participated in this study, the meaningful opportunities for learning coincided with the parts of the program they perceived as the most coherent.

### *Learning from Tensions*

The tensions that candidates expressed in the data fell into two categories: tensions experienced as a result of lack of coherence in the program and tensions created as a result of looking ahead to the February practicum. The tensions associated with candidates’ analyses of the experiences during the December practicum are explored

along with their narratives of experience in the second section of this chapter. In both cases, the tensions described by teacher candidates exacerbated their experiences as living contradictions. In most cases, the candidates lived contradictions as a tension between conflicting messages received from their teacher educators and associate teachers and their developing pedagogical vision.

Several candidates expressed frustration with the fact that learning experiences at the Faculty tended to magnify, rather than resolve, the tensions that had been developing over the course of the preservice year. Irene felt that each of her classes had a different emphasis, leading to her perception that “there are just too many most important things [in teaching]” (Irene3, 35). Max agreed, stating that every teacher educator has a “slightly different idea of what a teacher should be like” (Max3, 13). In particular, Irene and James framed the different emphases from teacher educators as a tension between teaching subject-specific curricula and teaching big picture issues such as inclusion, social justice, and literacy skills. As James said,

A conflicting message we’re getting here is that we’re told to teach to curriculum [and] at the same time teach certain skills like problem-solving skills and at the other end writing skills. But like I said, we’re told that we have to teach to the curriculum, so one of my big concerns is just how do we reconcile those two different areas? (FG3, 59)

Irene picked up on the same issue:

It seems like the curriculum classes focus on teaching the class as a whole ... but then other classes are really focused on the individual learner ... [but then] you have to incorporate social justice and do whatever you can to make everyone feel welcome culturally ... and then [there are] the exceptional learners .... In theory it’s all really important, but in practice I don’t see how I am ever going to manage to do it all. (Irene3, 28)

Even though candidates returned to the Faculty in January with significantly more teaching experience than in November, they continued to feel overwhelmed by the requirements of teaching in secondary schools. By emphasizing the importance of different elements of teaching, teacher educators apparently contributed to candidates’ sense of malaise.

David and Paul articulated the tensions they felt as a result of a perceived disconnect between how they were being taught at the Faculty and how they were expected to teach in the schools. David believed that “telling us [candidates] how to teach as a teacher but not doing that yourself [as a teacher educator] was the most obvious conflict [in the program]” (David3, 26). Paul took David’s concern one step further, stating that some teacher educators found it difficult to have a “balance” between teacher-centred and student-centred pedagogy, with the result that he had to “listen to student presentations for hours on end” (Paul3, 29). The result, according to Paul, is that some teacher educators were “not doing what they want us [candidates] to do very well” (Paul3, 29).

The most consistent and significant tension described by teacher candidates concerned the upcoming February practicum. Candidates’ experiences in the December

practicum, combined with the conflicting messages they perceived from the Faculty to create anxiety about their return to host schools in February. The candidates were concerned that the internal contradictions between the pedagogy they wished to enact and the pedagogy they felt they had to enact would become more pronounced in the upcoming practicum. The main source of the pedagogies they wished to enact continued to be the ideas with which they had identified at the Faculty of Education.

Irene believed that many of the ideas concerning active-learning pedagogy that she embraced were in direct conflict with the more traditional teaching advocated by her associate teacher, framing the challenge as one of “teaching for coverage versus teaching for learning” (Irene3, 18). This tension was particularly pronounced when she considered how well she was preparing her senior physics classes for university. Although Irene wanted to “focus on concepts,” she was concerned that the traditional lecture style her associate teacher used “would help students more [when they get to university]” (FG3, 63). Irene was frustrated by the disconnect between what she learned at the Faculty and the challenges of teaching secondary school students: “It feels like we can talk about having active-learning classrooms and really engaging students [at the Faculty] ... but then you just hope that [kind of teaching] transfers into skills for university” (Irene3, 5). She worried that if students “have a really good high school experience, then that will just really let them down in university” (Irene3, 7). The tension between the active-learning pedagogies advocated by the Faculty of Education and the traditional teaching style of her associate teacher caused Irene to feel like a living contradiction. She wanted to teach for conceptual understanding, yet she felt that she would leave her students unprepared for university if she made that choice. The messages that she received from the Faculty of Education in January did little to help her to resolve this tension.

Paul perceived himself as a living contradiction because he was restricted by his associate teachers during practicum: “I just felt like I was doing things as a part of what was required of me to get the teaching done or to please my associate teachers” (Paul3, 3). Although Paul was “passionate” about using active-learning pedagogies, he often felt, “I had to be somebody I didn’t want to be” (Paul3, 3). Paul believed that teaching in a way that did not suit his identity resulted in more resistance from his students, noting that “there was always the tension between what they [students] wanted to be doing and what you [as the teacher] were making them do” (Paul3, 22). Thus Paul had “bad associations with teaching” as a result of the limited freedom he experienced on practicum. Paul’s tension toward the February practicum was so significant that he stated: “I don’t even want to go” (FG3, 98).

David articulated feelings of tension toward the upcoming practicum because he perceived that he was not meeting his goals for implementing active-learning pedagogies. Although David readily admitted during the focus group that he had more freedom from his associate teacher than Paul had, he was quick to point out that “I don’t have the freedom I thought I would have, so I can’t just take the risk and then take the blame ... I just find myself not wanting to go back for that reason” (FG3, 102). He felt that his use of active-learning pedagogy would not progress much further with “someone watching over my shoulder the whole time” (FG3, 101).

David was also concerned about the tension associated with the expectation to teach a full course load during the third practicum: “If that’s where I am, just make it September, give me a class, let me go with it” (FG3, 101). David’s experience as a living contradiction arose largely from his belief that the kind of teaching he wanted to enact was restricted by the fact he was teaching someone else’s class during practicum, “however lenient they are” (FG3, 100).

Max’s experience as a living contradiction was a mixture of the identity concerns expressed by Paul and the concerns about teaching full-time expressed by David. Max admitted that, during his practicum, “I noticed that when I was out there doing my thing, I was not sure where I should draw the line of what of me I could put into [teaching], I guess I ended up being a little reserved because I wasn’t sure” (FG3, 95). A message from a guest speaker in Tom’s class helped Max to clarify one of the tensions he felt as he looked ahead to the February practicum:

He said for your first year of teaching what you want to do is get through so you still want to teach so it’s like survive so you still want to teach. But we’re going out doing, essentially, a first-year of teaching for the 5 weeks but we’re also doing other things [such as active-learning pedagogies]. If you’re not expected to do that during your first year, why would we be able to do it now? Why would you want us to do it now? (FG3, 104)

Max did not understand how he was supposed to enact the active-learning pedagogies he had embraced against the background of just trying to make it through a full-time teaching load. The experience of being a living contradiction helped him to call into question the taken-for-granted assumptions surrounding teacher candidates’ learning.

### *Learning from Tom*

The teacher candidates who participated in the research continued to explore how they were learning from Tom’s pedagogy during the January focus group and individual interviews. Significantly, comments about Tom’s pedagogy were the most frequently coded items in the January data set. Although candidates continued to comment on the nature of Tom’s relationship with the class, they focused their attention on trying to name *what* they learned from Tom’s class while theorizing about the big picture of Tom’s pedagogy.

The issues of naming the content of Tom’s class proved challenging for candidates, particularly because the focus of the physics classes in January alternated between guest speakers and self-directed learning. If anything, Tom was up in front of the class *less* often than he was during either the September or November on-campus weeks. As Irene noted, “It’s hard to say [what I’ve learned from physics] just because we’ve had a weird month ... we haven’t had a Thursday class in a little while [because of self-directed learning time]” (Irene3, 23). David also found it hard to articulate the content of the physics course:

My perception is that because there’s little, or seemingly little ... physics content covered in that course, that I have the sense that we’re not doing too much. But at the same time I recognize that a different approach is being

taken there and I think the payoffs are coming in other classes. So that's why I'm, sort of, having a difficulty answering with respect to physics. I've certainly taken from this course the idea of self-directed learning and focusing on what I feel is important and of value. And I guess what I'm doing is I'm taking that idea and extending it to other classes. (David3, 8)

Interestingly, David's idea of course content is *physics* content, not his new-found focus on self-directed learning that was reinforced by experiences in physics class. During the January focus group, the candidates had the following discussion (FG3, 31–35) about the role of physics content in the physics class:

*David:* To make a point, and this isn't a negative although it may come across that way, .... Based on what I've observed in that class, I couldn't provide evidence that he necessarily knows much more than a layperson about physics and that's not a bad thing.

*Paul:* About physics. Yeah, that's weird.

*David:* About physics. And that's not a bad thing necessarily. Instead of focusing the course on physics content, which we all know and, if we don't, it's in our heads and we'll refresh ourselves with it when we get there. He's focused on theories and practices in education. But if you think about it, some of the demos he's done he could have rehearsed or just read up a little bit and a lot of the answers come from us anyways. He hasn't once stood up there and taught a physics lesson.

*Paul:* He almost never wants to get into it.

*David:* Yeah. I mean I'm not saying he doesn't know his stuff, I'm sure he does. But just think about it. There's no evidence from that class or the interactions that I've had that would necessarily show that he knows anything more about physics than someone off the street.

*Irene:* What about POEs?

*James:* I agree with you but I think he knows a lot about teaching and learning.

*David:* Absolutely.

This excerpt from the focus group shows how the teacher candidates who participated in this research understood the role of physics in the physics curriculum course. Later in the focus group, Paul noted that there was probably a reason that Tom shifted the content of the course away from physics: "I feel like Tom does everything so deliberately in this class ... for some reason I can't figure out, [he] is really trying to never tell us anything about physics" (FG3, 53). Although candidates acknowledged that the POEs required physics knowledge, they felt that the physics course was more about big issues in teaching and learning, and they acknowledged the thought that Tom put into issues of teaching and learning.

Ironically, one of candidates' complaints about the content of the physics class is the fact that Tom rarely made his opinion explicit. The following exchange



(FG3, 35–36) took place in the January focus group almost immediately following the preceding discussion:

*James:* I wish he would sometimes talk a bit more about his experiences in [teaching physics]

*Irene:* Yeah. I agree.

*David:* Oh, I find myself wishing that too. Not that he'd lecture but when he makes those firm statements because ... I think there's a real trust there and he isn't forcing ideas on us, he's sort of providing them; if we want to agree we can. So I think when it comes around to time when he does make a strong statement, that might be some of the reason why I'm more inclined to want to hear that and say, "You know what, I bet what he has to say is important." And he does it so infrequently that it sort of means something as opposed to saying "This is how it is" or "What I believe is" every day.

Tom's tendency to carefully pick when he makes a "strong statement" to the class made candidates more likely to attend to his comments about teaching and learning. The candidates decided on the reason why Tom chose to keep his opinions about teaching and learning to himself in the next section (FG3, 40–50) of the January focus group interview:

*Paul:* But the way that he's teaching is just doing it.

*Irene:* Yeah.

*James:* Um-hmm.

*Paul:* As opposed to saying "This is what I'm doing" and you know "Now I'm going to do this and watch."

*David:* So the way we teach is the method?

*Paul:* Yeah. He actually does that, you know. It's shocking but he does. And that's what I've found so impressive about it is that he hasn't ever once told me what to do and yet I've learned so much from him.

*Max:* I think one of the things is we all know teaching is impossible to perfect so even if someone who is an amazing teacher is coming out and telling us, "These are amazing things that work, and you can just do these and you'll be a great teacher." But how are you going to get better if you are just told what a great way is?

*Paul:* Yeah. And he said himself that that won't work. He said that we can do as many workshops as we want with great ideas and it won't work.

Together, the candidates came to the conclusion that *how Tom teaches is the content of the physics course*. They also realized that Tom's message of the importance of active-learning pedagogies would be ineffective if he simply told candidates to use active-learning pedagogies.

The discussions about Tom's pedagogy that occurred during the focus group provided a framework for candidates to theorize about the overarching theme of Tom's pedagogy. James emphasized the importance of relationships in Tom's pedagogy:

Tom is a great role model. He cares a lot for his students, just by showing how much he values our opinion and how the course is run and how the program here at Queen's is run and that's a thing I have learned, or I value very much as a teacher, caring for students. Tom shows that it's definitely effective. He stresses POEs a lot and active learning. I've tried to incorporate that in my classroom as much as I could ... I think it's had a positive effect on the students' learning. They seem interested in things like POEs and demonstrations and hands-on learning as opposed to just me up there, for instance, talking or writing notes on the board. (James3, 1)

James' comments suggest that he was encouraged to try active-learning pedagogies based on his experiences as a learner in Tom's class. David also picked up on the importance of relationships in Tom's class, arguing that the relationships formed a platform from which Tom could introduce a variety of concepts:

My take on how Tom's running things is that he's sort of throwing things out, many things during a class ... everyone isn't going to pick up on exactly what he's doing each time but if you pick up on a good idea, you can sort of run with it or create a new repertoire or put it in the vault for later use. Just in modelling how he shows genuine concern for us and ... the course and the program, how ... [he] takes what we want to look at and what we want to learn and tries to incorporate that. (FG3, 15)

In his individual interview, Max also commented on the variety of ideas that Tom presented in the class:

The main thing is just the way we run the class and how we go about learning just by kind of doing whatever we find appropriate and finding interesting things that Tom thinks or we think will help us learn, and just looking at them and seeing what's good about them ... more the ideas and getting them into us, so eventually I'll be able to pick up these ideas, hopefully, and bring them in [to my teaching], but not really forced to [incorporate them right away]. (Max3, 1)

Paul picked up on David's and Max's ideas, commenting on the subtlety of the way he learned from Tom's modelling of good teaching practices: "Some stuff [teaching strategies] you pick up from him and you don't know you're picking up ... that he's been doing the whole time [during the preservice year]" (FG3, 16). Paul also suggested that it takes time to recognize Tom's subtle style:

After the two blocks [of classes], I liked the course. I thought, "This is going well" but I couldn't really think of anything I'd learned in that class. POEs, and that's about it. I couldn't really think of anything else I'd learned. Then I went to teach and I found myself getting it, I found myself getting everything he'd been trying to teach us. I could articulate "Tom's philosophy of

teaching physics.” I had this conversation with my friend the other day. She asked, “Well, so what do you think about teaching physics?” I just talked to her for 15 minutes and I said, “Basically these are my physics professor’s ideas.” (FG3, 43)

For Paul, Tom’s implicit and explicit modelling of pedagogy became clearer after he had both time to consider what he learned and teaching experiences on which to anchor his developing ideas.

The teacher candidates who participated in this research devoted a considerable amount of time to analyzing and interpreting the way they were being taught in the physics course. At first, it was difficult for candidates to name features of Tom’s pedagogy beyond the obvious value he placed on the relationships he had with candidates in the course. During the focus group, however, teacher candidates came to the conclusion that the content of the physics course was the pedagogy that Tom used to teach the course. Importantly, Tom gave the candidates’ space to process their learning and resisted lecturing the class about physics concepts or issues in teaching and learning. How he taught was the message.

### *Theorizing Teaching and Learning*

Overall, participants’ comments were much more delineated between theorizing about teaching and learning during the practicum and theorizing about teaching and learning at the Faculty of Education than in September or November. Candidates’ theories about the nature of learning focused on how students in their host schools learn curricular content rather than how teacher candidates learn to teach.

During his practicum, Max noticed that students in his classes did not all learn in identical ways:

One thing I’ve really noticed is how different all the students are. In my math class, there’s some people you’d explain them a concept and they go, “Oh,” and then others, you’d draw it a couple of times and find some sort of manipulative for them to hold and look at that has to do with it, and that will get them to figure it out. And then other ones you have to approach in a completely different way. It was always a bit of a surprise for me, since, just tell me something and I’ll generally figure it out. And I guess I’m always surprised how little students get out of a class most of the time. (Max3, 4)

Like many teacher candidates, Max’s experiences learning his subject matter were quite different from the experiences of the majority of students he taught. Because he was someone who could “figure out” mathematics with minimal instruction, it was surprising for him to learn that most of his students were leaving mathematics class feeling confused. Max said that he wanted to learn “different techniques and strategies for dealing with an applied [level] class, how you want to teach them, and how you can assess them” because he had “never known many people who went in the applied stream” (Max3, 15).

James articulated similar thoughts, stating that the fact that “there are a lot of different learning styles” has “been hammered home pretty much throughout the

whole year in both practicum and during the time spent here” (James3, 6). During his individual interview, James spoke at length about the importance of using a variety of teaching approaches to engage the different learners in his classes:

You’ve really got to continually change your approach to teaching ... based on your class. So an important thing is, before you just start teaching ... find out as much as you can about the students you’re teaching and try to adjust your teaching styles according to who you’re teaching and what you find out. And that’s hard of course because these days if you can have three classes with almost 30 students, it’s hard to find out exactly the interests and learning styles, for instance, of each student in your class. (James3, 9)

For James, the importance of thinking about the different ways in which people learn was one of the strongest messages of the program.

The five teacher candidates emphasized the importance of building relationships to the quality of students’ learning. Irene stated that “a good relationship really helps” (Irene3, 13) in the teaching profession. Max offered: “If, as a whole, the class gets along and enjoys each other, then they’ll be OK to say things they might not say elsewhere” (Max3, 6). Max linked the importance of relationships on practicum to his own experiences as a learner: “I’ve noticed that the teachers I actually learn from are normally the ones that I’d stop and talk to outside of class .... You pay more attention to someone you’d want to actually talk to” (Max3, 5). Irene was quick to point out that developing relationships with students can take time, citing her recent experiences on practicum: “At the end of December ... they [students] were more engaged [compared to October]” (Irene3, 15). She characterized her relationships with students as a critical feature of her practicum: “To become a good teacher, I’ve really got to know all my students and be able to connect with them, because without that I’m just a student teacher who comes in every so often and talks ... and I don’t want that” (Irene3, 30). James agreed: “Getting to know my students as much as possible is a big issue [on practicum] ... the last two practica I didn’t spend enough time trying to address the special needs of certain students” (James3, 21). David found that the importance of building good rapport with his students was emphasized in the December practicum: “I would have told you before the course started that it would be important to establish a good relationship with all the students ... as a classroom management strategy ... [The last two practica] reinforced what I probably could have said already” (David3, 13).

Teacher candidates made more comments theorizing the nature of teaching than they did theorizing the nature of learning. During this January phase of data collection, the candidates discussed both how they thought about teaching and what it means to be a part of the teaching profession. James offered that “teaching is incredibly difficult” (James3, 5) and “there are definitely ways of teaching that are effective but there is no right way to teach; it depends on a lot of circumstances” (James3, 8). For James, the idea that there is not *one* right way to teach was “an eye-opener” (James3, 8). The idea of multiple ways of teaching closely aligns with James’ earlier comments about the importance of teaching students in a variety of ways. When asked to give advice to future teacher candidates, James acknowledged

the time that it took to become a teacher: “It’s going to take a while to become the teacher you want to be, and by ‘a while’ I mean several years ... so take it one step at a time” (James3, 25). Irene echoed James’ sentiment, warning future teacher candidates “not to expect too much out of the teaching practica” because “the more you teach the more you realize you’re really just starting out learning something” (Irene3, 31).

James, Irene, and Max felt that establishing good relationships with other teachers was an important part of the teaching profession. James said: “I’ve learned that [establishing] relationships with colleagues is very important ... it’s probably the best way to go about getting advice” (James3, 10). Irene made a similar comment: “If I didn’t have a supportive department, I would have had a lot of trouble ... they were really friendly and really helpful. If I was all on my own it would have been tough” because other teachers provide “insights” (Irene3, 16). Max noticed that significant differences in pedagogical approaches might exist even if relationships between teachers are cordial: “On my practicum, most of the teachers got along ... but there would still be things they’d argue pretty heatedly about” (Max3, 7). The candidates agreed that it was important to interact with other teachers, for both pedagogical and moral support.

Paul took a different approach to thinking about the nature of the teaching profession. Although he was quick to say that “doing the actual teaching was a lot of fun” (Paul3, 1), Paul felt that there were elements of the profession that were unappealing. Paul related the lifestyle of a teacher to character acting:

So I love teaching. I really do. There’s a lot of what I like. The lifestyle isn’t what I’m looking for right now. The sort of character of the teacher, I just don’t like playing that character every day. I don’t like telling people what, I don’t go through my everyday life telling people what to do, so I don’t know why I go and do that every day at school. I don’t know what’s best; I’m still trying to figure that out myself. (FG3, 107)

Paul’s experience of himself as a living contradiction reached a peak in January, to the point where he questioned whether or not he should enter the teaching profession: “I just don’t want to be in a school in Ontario next year” (FG3, 7). When prompted by another participant in the focus group about whether or not he wanted to enter the teaching profession in general, Paul responded: “I don’t know. I don’t feel great about it” (FG3, 9). He was concerned about the effects the lifestyle of being a teacher might have on him: “I just picture myself as being an actual teacher next year and there’s a lot of stuff I don’t like about it: the lifestyle and what it does to you” (Paul3, 4). Despite his misgivings, Paul believed that “it’s not impossible” (Paul3, 4) to think of himself going into teaching next year. Looking ahead, he stated that he believed the final February practicum could change his mind: “Maybe it will make me want to be a teacher again” (FG3, 108).

The participants continued to theorize about the nature of both teaching and learning during this round of interviews. Their theories about how students learned from them continued to develop as a result of the extended fall practicum experience. Candidates’ theories about teaching tended to focus on how they fit into their

conceptions of the teaching profession, rather than on articulating visions of the kinds of teachers they wanted to be. Overall, candidates' comments reflected more careful thinking about the nature of teaching and learning, as a result of the December practicum and more time to process how they learned to teach at the midpoint of the teacher education program. The next section examines in greater detail how teacher candidates learned from practicum experiences.

#### LEARNING FROM PRACTICUM EXPERIENCES

The narratives that teacher candidates began about their practicum experiences during the November data collection were continued during the interviews held in January. Given that January was the midpoint of the teacher education program, teacher candidates were in a unique position to analyze their experiences during the fall practica while looking ahead to the final practicum in February. The previous section noted some of the tensions that candidates felt as they considered their next practicum placements; this section of the chapter focuses on what candidates learned from looking back and considering the fall practicum experiences. The candidates' narratives of experience during practicum were much more personal during this round of interviews. Perhaps a reason for the more personal nature of candidates' narratives is that relatively little was said about the practicum during the third focus group interview. When the practicum was discussed during the focus group, it was usually in the context of looking ahead to experiences in February. The focus group also had a feeling of shared resignation to the inevitability of the February practicum. Candidates were more forthcoming with their analysis of practicum experiences during the individual interviews. For this reason, the narratives of each of the participants in the research are considered in turn. Each participant's section describes and interprets major events during the fall practica, the relationship between associate teacher and teacher candidate, and tensions that the candidate felt as a result of prior practicum experiences.

##### *James' Narrative of Fall Practicum Experiences*

James was enthusiastic about his fall practicum experiences, but admitted that by the end of his December practicum he was "getting stressed out because [he] had three lessons to prepare and [he] had to learn the material" (FG3, 93). James also stated that he "was feeling tired" (James3, 29) by the end of December. At the same time, however, James felt that his teaching had improved considerably by the time he finished his December placement:

I was becoming more organized and more confident in the classroom, but at the same I was teaching two different classes as opposed to – well three classes, two courses – so the workload was greater but I was able to handle it better because I had that much more experience, even if it was just an extra month. But I realized that there were certain things I thought I did pretty well, classroom management, for instance. (James3, 29)

James felt that it was important for him to “not take [the practicum] so seriously” in February because he wanted to “go and just try to have fun teaching” (FG3, 93). His major goal for improving his practice in February was to explore the question “What can I do to engage my students in the courses I’m teaching?” (James3, 23). James believed that it would be easier for him to learn how to engage his students in February because the practicum coincided with the beginning of the second semester of high school. He looked forward to that chance to “start a new class with the associate teacher” rather than “stepping into a class that’s already been started” (James3, 21).

At the midpoint of the program, James characterized the relationship between the practicum and the on-campus weeks in the following manner:

I definitely learned the most at my practicum, because I think the best way you learn how to teach is to actually teach. But at the same time I think it’s important to step away from the classroom from time to time and learn about the theory of teaching, because although there’s definitely a difference between what you learn on the job and what you learn back here, it’s important to be reminded of the theory and stay on top of the theory, and try to apply the theory to your practice in the classroom. (James3, 12)

Overall, James’ narrative of his fall practicum experiences is a positive one. He believed that the practicum was a powerful learning experience and did not name any specific problems, other than concerns that he was not meeting the learning needs of all of the students in his classes. He did not make any comments about the nature of his relationship with his associate teacher. James looked forward to his February practicum as an opportunity to explore some of his questions about teaching and learning, but at the same time he wanted to try to avoid feeling overwhelmed by responsibilities.

#### *Max’s Narrative of Fall Practicum Experiences*

Max viewed his fall practicum experiences as an opportunity to practise “some of the basics of teaching” such as “maintaining control of the class” and “learning how much [information] the class can handle a certain day” (Max3, 8). He implicitly named the effects of the apprenticeship of observation on his pedagogy during the fall practica, “I guess in October and December [I was] still teaching like I’ve seen teaching all my life” (Max3, 8). Looking ahead to his February practicum, Max felt that he would continue “trying to get away from [the kind of teaching] I’ve seen my whole life,” although he acknowledged that it “was not really a goal [he] could perform in one practicum” (Max3, 14). Max also wanted to “survive [the February practicum] and come out like he still enjoys teaching” (Max3, 14).

Although Max did not refer specifically to the nature of his relationship with his associate teacher, he did say that “the practicum is always fun but it’s kind of awkward having that other person [the associate teacher] there sometimes and being in someone else’s class” (Max3, 18). Like James, Max looked forward to the prospect of starting a new semester with his associate so that he could “start out teaching a

different way [from traditional teaching] ... and be ready to try things [such as active-learning pedagogies]" (Max3, 9). Upon consideration of his development as a teacher at the midpoint of the program, Max characterized the fall practica as the place where he learned the basics of teaching and looked ahead to the February practicum as a space for him to enact active-learning pedagogies. He freely admitted that it was difficult to shake off the default teaching moves that he learned from his apprenticeship of observation. When prompted to comment on why it was hard to move beyond the basics, Max had this response:

I guess just making sure I know all the basics well enough to be like, "All right. So I can do all these other things." And I don't really have to worry about, you know, making sure the class is awake, and, you know, taking attendance and yelling at kids, and writing tests, and whatever else. Because one thing I noticed is, if I'm thinking a bit too hard on what question I'm going to ask next or what is coming next after I finish this one statement, I won't notice if someone, has their hand up or is asleep or punching the kid next to them, or whatever. So, you know, just being able to keep that level head while still paying attention to what I'm doing. (Max3, 9)

Max's narrative of practicum experiences was one of naming his default teaching moves, and struggling to move beyond them. He felt that he needed to master basic teaching behaviours, such as simultaneously attending to multiple classroom events, before he would be able to enact different pedagogies. Max was hopeful that his February practicum, which began at the start of a new semester, would allow him to try different teaching strategies right away.

### *Irene's Narrative of Practicum Experiences*

Irene experienced considerable tension during the December practicum because she was unable to enact active-learning pedagogies upon returning to her host school. Irene felt constrained by the curricular expectations set out by her associate teacher:

December was kind of frustrating for me. I had all these great plans for active learning classrooms. It was going to be great ... but then I got there and my teacher had just finished a unit and ... he wanted to do the lab portion of the test, or of the unit. That was just his way of teaching, do the stuff [theory] and then do the hands-on. I don't know if I agree with that but that was just the way it worked.... Then the labs took 2 weeks and that was kind of frustrating ... I didn't feel like I had a ton of ownership over what I was teaching for those first 2 weeks. Then [I taught] planetary mechanics [which] was a whole lot of history and stuff, which I found a lot of fun, but then I found like I was just making excuses for not trying new things like active learning. (Irene3, 18)

Irene stated that she always has "all these great ideas when [she] goes on practicum" yet they don't "really work out that way, just because ... [she] feels like [she] needs more practice" (Irene3, 18). For Irene, the gap between her pedagogical vision and her enacted practice was a powerful factor in her narrative of the fall practicum. Despite her frustrations, Irene described her practicum experience as "good" because



she “liked the length of it” and the rhythm of the program: “It helps to go back and forth [between the Faculty and the host school] to be able to see things from two different perspectives” (Irene3, 36). For Irene, the time spent at the Faculty was welcome because “it provides a different perspective and brings me back to the theory ... otherwise [she] could be quickly falling into learning the rote style of teaching” (Irene3, 19).

Irene had considerable respect for her associate teacher, describing him as “great” (Irene3, 14) even if he was “a bit disorganized” (Irene3, 20) when it came to assessment. One feature of his teaching that had a profound effect on her was the “lectures” (FG3, 62) he gave to his Grade 12 physics class. At first Irene “was scared” by the prospect of lecturing Grade 12 students, but she soon bought into the idea that “they need to be prepared for university” (FG3, 62). During the focus group interview, Max challenged her assertion: “I don’t think that an extra four months of getting lectured will help you at all when you get to university” (FG3, 65). Irene responded that a lecture-based Grade 12 physics class “might help to ease the transition [between high school and university] a bit” (FG3, 66). During her individual interview, Irene returned to the idea of lecturing grade 12 physics students and defended her associate teacher’s style, stating that students in his class know university physics “is going to be hard, and more what [classes] are going to be like in university” (FG3, 8).

Irene looked forward to her February practicum but, like James, she wanted to “find more balance” (FG3, 96) in her many responsibilities as a teacher candidate. She was “stressed” (FG3, 97) by the prospect of using active-learning pedagogies with her students during the February practicum, even though she was disappointed and frustrated when she was forced to teach using traditional methods in December. Irene wanted to “be more of an engaging teacher” but was concerned that she did not “have a lot of experience yet to be able to have a lot of good ideas for how to do active learning” (Irene3, 29). At the same time, Irene felt that excusing herself from trying active-learning pedagogies due to inexperience was inappropriate: “I keep saying, ‘Well, I don’t really know what I’m doing so I’ll worry about it when I’m teaching full time. Right now I’ll just get through this unit.’ And I don’t want to do that because it’s always going to be like that” (Irene3, 29).

Irene’s narrative of her fall practicum experience was filled with the tension between the kind of teacher she wanted be and the kind of teacher her associate teacher wanted her to be. Compounding the issue was her respect for her associate teacher’s pedagogy, even though it was contrary to the messages she was receiving from the physics course. Irene was trapped in a kind of vicious circle: She wanted to enact active-learning pedagogies during her practicum, but she felt that her inexperience prevented her from finding creative ways to engage the class, and subsequently she felt guilty about using inexperience as an excuse.

### *David’s Narrative of Practicum Experiences*

Of the teacher candidates who participated in the study, David was the only one who indicated that he had almost complete freedom during his fall practicum. Given that

many of the other candidates struggled with the fact that they had to teach within clear boundaries established by their associate teachers, it might be somewhat surprising to learn that David said he was “dreading going back [to practicum in February] and having to do the same things [he] was doing before” (FG3, 100). For David, the practicum meant he had to “work under someone else’s shadow,” which was a frustrating prospect for him, regardless of how “lenient” his associate teacher was (FG3, 100). During his individual interview, David was asked what he learned from his fall practicum experiences. He replied:

I don’t know that I’m learning a whole lot, because I’m not really able to do what I want to do, which is what was getting my frustration levels up. I don’t really want to go back to this next practicum, not because I don’t enjoy it, but because I just want it to be September already .... It was communicated up front that I could try whatever [teaching strategies] I want. At the time it’s nice to hear that, and I didn’t think too much about it, but I just knew that that was wrong.... You can’t really just do whatever you want. There are pressures of always knowing that you’re being evaluated and, sure, I can try whatever I want, but if I fall flat on my face and I’m not able to recover, well, it’s going to reflect in the assessment, which, as much as they say “Don’t worry about these [teaching assessments],” hiring [school] boards are clearly asking to see these. We come into a classroom that’s been set up already and ... we know full well that when we leave, we’re handing it back, so we can’t make the changes or operate really as we may want to. (David3, 18)

David believed that, no matter how much freedom he had during his practicum, there was a limit to what he could learn from the artificiality of teaching in *someone else’s* classroom. He pointed out that associate teachers implicitly create boundaries for teacher candidates out of necessity, because associate teachers are ultimately responsible for the course after the practicum is finished: “As much as he [the associate teacher] says ‘Try whatever you want, try this, try that,’ I realized, well, he’s still making me cover all of this [curricular material] and I don’t have the freedom that I thought I did” (FG3, 101).

David’s dominant narrative of the practicum was his feeling that the practicum is an artificial learning environment. Problematically, David perceived that “the ante seems to go up” each practicum, with the result that he was going to be “swamped” with responsibilities during the final February practicum (David3, 30). Although David was quick to say, “I feel like I must be learning something [on practicum]” (David3, 18), he seemed to struggle with the whole concept of learning to teach from the practicum. David characterized the idea of learning from practicum in the following way:

You go to the practicum and you hope to be exposed to all of these different situations and as you go through a situation, you kind of tick it off and you’ve then, quote-unquote, “acquired” that skill for dealing with whatever it may be. There may or may not be a finite number of situations and once you’ve been through them all, you’re good to go. (David3, 29)

David's metaphor of ticking off learning experiences during practicum is telling. At this point in the program, David regarded the practicum as an experience to get through, rather than an experience from which he could learn productively.

David's narrative of his fall practicum experiences focused on the tension he felt because of the implicit restrictions of the practicum placement. Although he had freedom to try a variety of teaching strategies, he ultimately felt like he had to teach in a certain way in order to avoid falling "flat on his face" (David3, 18) and getting a poor assessment. David also believed that he was confined by the curricular constraints placed on him by his associate teacher. A recurring feature in his narrative was the realization that, although he had some freedom to try different pedagogies, he did not have freedom to truly experience what it is like to be a teacher because he did not have final authority over what happened in his classrooms.

### *Paul's Narrative of Practicum Experiences*

On his fall practicum, Paul experienced tension between two different sets of experiences working with two different associate teachers. His associate teacher for physics gave him "a lot of freedom" (Paul3, 16) to use a variety of teaching strategies, whereas his associate teacher for mathematics made him adopt her pedagogy, which according to Paul was "formulaic: taking up the homework, doing a lecture, and then having time to work on the homework" (Paul3, 17). When planning his mathematics course, Paul felt that he had "no freedom to do anything interesting" (Paul3, 17) with his students. The dramatic contrast concerning freedom that he had to plan and enact pedagogies resulted in two different sets of feelings for Paul. He elaborated on this point during his individual interview:

In the physics class it felt like everything that I was doing that was along the lines of what we've been talking about [in the physics curriculum course] felt really in tune with how the class was working. We would do this POE [Predict-Observe-Explain], for example, just a basic one, and it just sort of made sense [because] people wanted to be sort of talking, thinking, discussing, and then figuring out how they were wrong based on something they were seeing .... It was successful because it was in line with them, you know. It was in line with just people. Whereas in this math class, it felt like every time I was struggling or getting discipline issues or they were getting bored .... I mean, every second of that class was a struggle ... because in that class I was always specifically working against the grain. These crazy Grade 9 kids [in the math class] had all this energy and wanted to be out of their seats and talking to each other, whereas in physics class a lot of the time those activities were really built around just channelling that into more productive stuff .... In the math class, it always felt like you were ... making them sit and be quiet and work on homework, you know.... Even just having them sit there and listen to me talk, that just didn't feel like a natural thing, even for 10, 15 minutes, in math. (Paul3, 16).

Paul felt a tension between the active-learning pedagogies that he could enact during his physics class and the traditional, teacher-centred pedagogies he was required to

use during his mathematics class. He felt that active-learning pedagogies were “in line” with how students learned and he “could see the power of what [Tom] is trying to teach in [physics] class” (Paul3, 16). He also believed that the classroom management issues he encountered in math were a result of trying to control rather than teach students. “I could sort of be myself in that physics class, and in the math class there was always the tension between what they [students] wanted to be doing and what you were making them do” (Paul3, 23). The tension that Paul experienced between the physics and math classes showed him “the difference between doing the basic style [of teaching] ... and really thinking about what’s going to help the class learn” (Paul3, 21).

During both the focus group and individual interviews, Paul frequently mentioned that he had “bad associations with teaching” (Paul3, 9), largely due to “some really unpleasant teachers” (FG3, 105) at his associate school. The tipping point for Paul seemed to be a time during the fall practicum:

There was a stretch of 2 or 3 days when I heard every single teacher in my department, except for my two associate teachers, speak loudly enough for me to hear about how much student teachers suck ... about how student teachers aren’t how they used to be [and] when they [the experienced teachers] were student teachers, they would bend over backwards to please their associate teachers. (Paul3, 7)

This experience made Paul “dread” (Paul3, 6) the thought of having to share an office with the other teachers in his department, to the point where they “made [him] not want to go to school every day” (FG3, 105).

Paul’s narrative was filled with tension for two reasons. The first was the conflict he felt between teaching using active-learning pedagogies in his physics class and the lecture-based teaching of his mathematics class. As Paul noted, “In the physics class, when things were going well it just kind of happened” (Paul3, 23). He was given the space to teach in a way that aligned with his pedagogical vision in the physics class; the math class was frustrating because he was forced to teach in a way that felt unproductive for both his students and him. The second reason for Paul’s tension toward the practicum was the “negativity towards teacher candidates” (Paul3, 8) that he perceived from members of his host department. The net result of Paul’s narrative of fall practicum experiences was that he looked to the February practicum as something to “get through” (Paul3, 34) rather than to learn from.

### *Summary of Narratives of Fall Practicum Experiences*

The teacher candidates who participated in this research shared a variety of “secret stories” (Clandinin & Connelly, 1995, p. 5) during their individual interviews. Each candidate named and described tensions experienced during the fall practica. The tensions that James experienced during the fall practica were relatively benign; his experience seemed to be positive overall and the only issue that he raised was one of finding a balance in his workload upon returning to the February placement. Max experienced tension between his desire to master what he named “the basics” of teaching and his desire to move beyond the effects of his apprenticeship of

observation. Max looked to the February placement as an opportunity to try and enact unfamiliar active-learning pedagogies, although he acknowledged that changing his default pedagogy would be challenging. Irene found herself in a cycle of wanting to enact active-learning pedagogies, feeling confined by the requirements of both time and curriculum, and then feeling frustrated with her tendency to find excuses not to challenge her default teaching strategies. Although he seemingly had more freedom than any of the other participants, David experienced tensions during his practica as a result of his perception that the practicum is an artificial learning environment. He found it difficult to move beyond the idea that he was, ultimately, a stranger in someone else's classroom. Paul found himself questioning his place in the teaching profession for two reasons. First, he felt uncomfortable in one of his host classrooms because he had to teach in a way that contradicted his beliefs about how students learn. Second, he was discouraged by the negative attitude toward teacher candidates in his department.

#### LEARNING EXPERIENCES IN THE PHYSICS CLASS: TEACHER EDUCATORS

The perspective of the teacher educator during the January on-campus weeks is described and interpreted in this section, in a chronological format using quotations and observations taken from my research journal. Data include the notes I took during each physics class and the notes I kept during conversations with Tom over the month of January. In keeping with the requirements of the ethics board, my observations focused on features of Tom's teaching. The quotations listed in this section are based on transcriptions that I created in my journal and hence are cited as (Journal, January). Where appropriate, some of the comments from teacher candidates who participated in the research are included in order to provide additional insight into specific events in the physics methods course. In these cases, the citations follow previously established conventions.

The perspective of the teacher educator can again be represented by one overarching theme: creating a clear signal against a noisy background. During the eight classes of the January on-campus weeks, Tom revisited the mandate that he set at the end of the November block, namely, to ensure that his message came across as a signal for candidates to think carefully about their own learning rather than as more background noise. The previous section of this chapter interpreted the considerable evidence that the process of learning to teach is one filled with tensions and contradictions. Tom had long felt that January was the most important time in the program. His major goal was to create a productive learning environment, rather than one that faded into obscurity as candidates struggled to contend with the tensions carried over from the practicum and the new challenges posed by the emphasis on finding a job for September.

#### *Setting the Stage for Self-directed Learning*

Teacher candidates arrived to their first physics class of the winter term to find the physics units in the Ontario curriculum listed on the front board. Tom invited candidates to mix themselves up, as they had predictably returned to the same seats

they grew accustomed to during November's classes. He introduced the first activity in January in the following way:

My idea is to try to set up today for you figuring out what you want to spend your time doing over the next seven classes. Thursdays are going to be essentially your own days, and I have arranged for guest speakers to come in on Mondays. I want you to have the time between now and this Thursday's class for you to figure out what it is that you want to do. (Journal, January)

Tom then reminded candidates to get reacquainted with one another at their tables and distributed white boards so that the candidates could record salient features of their discussion. He repeatedly emphasized that the focus of the January classes would be up to the teacher candidates to pursue individually or in groups.

After about 30 minutes of discussion, each group of teacher candidates presented the results of its conversation. There was a diverse range of issues in teaching and learning presented. Tom wove together the large-group discussion by calling attention to the inherent complexities of teaching:

It seems to me that there wasn't a whole lot of overlap. Each of the groups could understand where everyone is coming from. It is important to point that out so that you realize why becoming a teacher feels like you have the world on your shoulders. You just get better at one thing, and you have 15 other things to worry about. (Journal, January)

Tom took the opportunity to call candidates' attention to a variety of resources (e.g., the PEEL website, the PSSC physics textbook, and Hewitt's textbooks) that they might wish to use in order to pursue some of the issues raised during the discussion. At the conclusion of the discussion, Tom provided more detail on the self-directed learning assignment for the month of January:

I am interested in you having a plan for how you want to spend your time in physics class. *That can include not coming to class.* That raises the temptation to work on all of the things where someone else is telling you what to do first. I would simply like you to have that experience. I would like you to come to class on Thursday so that different people can negotiate what they want to work on. I am not going to hit the beach for the next month; it's just that, particularly on Thursdays, I don't see myself as action central. I want to be here to jump in when you want me to. (Journal, January)

The teacher candidates in the physics course asked a variety of questions that suggested some disbelief about how little structure had been provided for the self-directed learning part of the physics course. Tom clarified that he had two requirements for self-directed learning: candidates were to come to Thursday's class prepared to form groups around common interests, and each group would be responsible for having something to share on the last Thursday in January.

### *Learning from Self-directed Learning*

At the beginning of the second class in January, the teacher candidates quickly organized themselves into groups around issues that they wanted to pursue during

their self-directed learning time. A few of the candidates chose to work individually. Tom reminded candidates that self-directed learning meant that they could choose to spend two consecutive Thursdays however they wished. Approximately 70% of the candidates turned up to work in class on the first Thursday; none came for the second Thursday. Tom was present for each of the SDL classes and had computers available for candidates to use.

The focus group interview and the individual follow-up interviews that I conducted with teacher candidates took place in the last week of January, in the middle of the time candidates were encouraged to pursue self-directed learning both inside and outside of the physics course. For this reason, the perspectives of the teacher candidates who participated in the research shed considerable light on the self-directed learning activity. As teacher educators, Tom and I had little idea of what to expect for the final class because most candidates had worked independently.

Comments about self-directed learning from the teacher candidates who participated in the research fell into two categories: observations about how Tom structured the self-directed learning time in the physics course and candidates' individual experiences using the self-directed learning time. The candidates unanimously commented on the fact that Tom had "taken [self-directed learning] to a new level" (FG3, 22) because "there are no guidelines" (FG3, 24). Paul stated, somewhat tongue-in-cheek, "Tom's basically removed every single restriction, I can't think of a single restriction he's placed on us at all. I feel like I could leave town and show up in April" (FG3, 26). James also brought up the freedom of self-directed learning, "We don't have to show up to a Thursday class, right? That's one unique thing" (FG3, 22). David theorized at length about the unique approach Tom took to self-directed learning:

Tom is actually giving us the time to do self-directed learning ... it seems like he's recognizing that we have all this work and everything else to do so he's also giving us time in which to tackle the self-directed learning, as opposed to just "Well, here's an open-ended assignment. Make sure it's due at the end of the week." In which case, sure it's open-ended but you do the first thing that comes to mind to get it done and move on, whereas here Tom is sort of trying to foster the desire to do something meaningful and substantial [with our time]. (FG3, 23)

For teacher candidates who participated in the research, the issue was not that Tom chose to make self-directed learning a part of the course because, as James noted, "self-directed learning is a theme here at the Faculty" (FG3, 22). The defining feature of self-directed learning in the physics class was that Tom provided class time for candidates to "focus on what they feel to be important" (FG3, 20).

Although the candidates were appreciative of the time provided for self-directed learning, they also felt, in retrospect, that they could have used their time more wisely. Irene summed up the group's feelings when she said, "I've learned that you don't always spend self-directed learning time wisely" (FG3, 55). In her individual interview, Irene admitted that she let "other courses take precedence" (Irene3, 3) during the self-directed time. Paul said he "hadn't worked hard enough on it" (Paul3, 14).

Max said that, at first, he was “a little apprehensive” about self-directed learning but “that it ended up being good because [there was] no pressure, just exploring” (Max3, 2). James agreed that it was “great to have the option of doing pretty much whatever we wanted” but felt that his choice of activity resulted in “not really learning a whole lot” (James3, 4).

By the time the deadline came, all the teacher candidates in the physics course seemed quite enthusiastic about sharing the results of their self-directed learning time. The final class did not begin until 15 minutes later than scheduled, because candidates were informally discussing the various resources that they had brought in for the occasion and Tom chose not to interrupt their discussions. Thirteen presentations later, Tom asked the candidates, “Did most of you find that surviving the program interfered with self-directed learning?” A few candidates in the class admitted that it was hard to focus their attention on self-directed learning with the stresses associated in light of the job search that had begun in earnest.

### *Learning from Guest Speakers*

The other major feature of Tom’s pedagogy during the month of January was the guest speakers that he invited into the physics classroom. The speakers were diverse: a first-year university student at Queen’s, a superintendent from the local school board, and a local science department head. After each speaker, Tom engaged the class in a discussion to process the issues raised by the presentation. The candidates who participated in the research appreciated the diverse perspectives offered by the guest speakers. David said that he “enjoyed the guest speakers who came in ... [because he] could compare their biases or beliefs [about teaching and learning]” (David3, 1). James said that he “took something different away from each speaker” (James3, 2).

The perspective of the first-year Queen’s student enrolled in a physics course was particularly interesting to the teacher candidates because he was able to draw comparisons between how he learned in high school and how he learned at university. James noted that it was “good to hear his perspective, as he was fresh out of high school” (James3, 3). Irene appreciated hearing from “a first-year student how much they felt they were prepared [by high school]” (FG3, 2).

The perspective of the department head of science from a local school was by far the one that resonated most strongly with the teacher candidates who participated in this research. For Paul, the department head’s talk was particularly powerful, “It seemed like hearing him talk somehow just ‘made the link’ I guess, is the only way to put it. You see how you can really just do actual things” (Paul3, 12). Paul went on to say that an earlier talk in November from the same teacher helped him to “crystallize a lot of what we’d been talking about in physics class” (Paul3, 10), because the teacher shared Tom’s commitment to using active-learning pedagogies in the physics classroom. The science teacher also made a strong impression on Max and James, both of whom mentioned his realistic advice about the first year of teaching: “What you want to do is get through so you still want to teach, so it’s like survive so you still want to teach” (FG3, 103).



*Processing January Classes*

At the conclusion of the January classes, Tom and I met to process the self-directed learning activity that was the central feature of his teaching in January. When I asked Tom for his reaction to the self-directed learning presentations that occurred during the final class, he replied:

I think the fact that it worked; that there was a product from everyone said something. I found myself pleased that it wasn't a month of students doing presentations to each other, which I've never really liked because it always seems like passing the teaching role over to the students, particularly when you tell them what to present on. If everybody just came away with a sense of what might be different about self-directed learning in terms of how it feels, I think that's the point of it. I think the difference from when I first started trying self-directed learning is that I've now accepted that it will work. I have to give it warning, lead up to it, and then just go ahead with it and not back off and change my mind at the last minute. (Journal, February)

I then asked Tom to comment on his conception of January as the lynchpin of the program. He replied:

Here in the building the program is its own worst enemy. It seemed fairly important to keep listening to them in terms of how they were experiencing the overall pressure. In a sense, while January may look like the lynchpin, in a sense the program makes it something other than that. (Journal, February)

Tom's comment reminded me of the tensions and pressures that candidates who participated in the research had articulated during both the focus group and individual interviews. In particular, I recalled David's comment that physics class served as a "safe haven" (David3, 6). I asked Tom if he was intentionally setting up the learning experiences of the physics class as a contrast to his perception of candidates' learning experiences in the program:

*Shawn:* Are you setting this environment up to be very different from the program they are experiencing? They are getting told a lot about, for example, job applications. There are many workshops to go to. Then, in physics, every other class is self-directed: Come if you want, stay at home if you want. Was that intentional?

*Tom:* It is not accidental. If I have the sense that the program is going berserk, and is violating a lot of the basic ideas that are across the front of the room up there [e.g., Explore First, Explain Later or How I Teach is the Message], then I want to do what I can to keep the experience of those ideas alive. So, yes, anything I can do to make my course look and feel better than the rest of the program, I will always try to do, because really I think that's what everybody in the building should be trying to do. I haven't thought of it this way before, but teaching in a school doesn't require you to think about what other teachers are doing. They are in a 4-year high school program, so to speak, but each

subject does stand more or less on its own. Whereas here, every student is a part of an 8-month program, all of which is supposed to focus on becoming the best teacher you can become. I guess I'd have to say that the program loses sight of that fact. (Journal, February)

From Tom's perspective, making self-directed learning the focus of January had two main pedagogical purposes. The first was to provide teacher candidates with the opportunity to have a learning experience that was different from both the potentially frantic pace of the program in January and their previous experiences as students. The second purpose was to step back and provide an opportunity for candidates to think about some of the main ideas of his teaching. As Tom said, "We're not going to come up with many more 'big ideas' for teaching, we've got a pretty rich list as it is. I think the self-directed learning is consistent with those ideas" (Journal, February).

Looking ahead to April, Tom thought aloud about the "best way to put a bow on whatever we've got so far [in the physics curriculum course]" (Journal, February). From his perspective, much of what candidates end up taking from the physics course depends on how they relate learning experiences in the physics course to "what they do in other pockets of the program" (Journal, February). Instead of "urging candidates to be super-teacher in their first year," Tom hoped that candidates were getting the message that the big ideas he was modelling and promoting are "ideas that you have to work your way into" (Journal, February). As he surmised at the end of the discussion, "Good teaching is rocket science, and you have to teach yourself that; no one can do it for you" (Journal, February).

#### CONSTRUCTING PROFESSIONAL KNOWLEDGE FROM TEACHING AND LEARNING EXPERIENCES

The professional knowledge constructed and co-constructed by the teacher candidates and teacher educators who participated in this study is discussed in this final section of the chapter. The themes in the data are synthesized with a view to making claims about how participants were theorizing teaching and learning during the third phase of data collection. The overarching theme is captured as a contrast between noise and signal. The tensions experienced by teacher candidates in their practicum experiences and the perceived incoherence of the teacher education program seemed to contribute to a sense of unfocused noise. The learning experiences provided by the physics course seemed to contribute a focused signal for their learning to teach.

During a meeting in late November, Tom characterized January as the "pivotal" (Journal, November) point in the program. Teacher candidates have completed 8 weeks of fall practicum experience and 7 weeks of coursework. The tensions described by teacher candidates in November are heightened at this point in the program. Without exception, the candidates who participated in this research looked forward to returning to the Faculty for classes in January. Feelings of relief quickly gave way to feelings of tension, however, as the contradictions they experienced in the fall term seemed to be magnified and compounded by experiences during the January on-campus weeks. Scientifically, noise may be defined as competition

between dissonant sounds. This definition is also an apt way to characterize the interactions between old and new tensions experienced by teacher candidates during the month of January.

The first instance of noise occurred upon candidates' return to the Faculty of Education. Although they welcomed the change, candidates quickly perceived a lack of coherence in the program. The major cause was the variety of pedagogical expectations espoused by teacher educators, a variety that David characterized as a competition between rival "camps" (David3, 23) at the Faculty. As Tom noted in our January wrap-up meeting, candidates are bound to perceive a program as incoherent when teacher educators are sending mixed signals in a program that is ostensibly supposed to have one goal, the preparation of future teachers. The perceived over-abundance of job-related fairs and workshops did little to assuage candidates' frustrations with the program.

Candidates did not expect teacher educators to use identical teaching strategies, only to recognize the competing demands placed on how they think about teaching and learning. The lack of coherence in the program was perceived both as "too many most important things" (Irene3, 35) and a tension between teaching subject-matter curricula and teaching big picture issues such as social justice and inclusion (FG3, 53). Perhaps most significantly, teacher candidates perceived a lack of program coherence when they were taught in ways that did not coincide with the ways in which they were encouraged to teach. How they were taught seemed to matter more than what they were taught.

The second instance of noise was the tension surrounding practicum experiences, both those already completed and those that were to happen in February and March. The teacher candidates said little about their fall practicum experiences during the third focus group interview in January. Their narratives seemed to become "secret stories" (Clandinin & Connelly, 1995, p. 5), told during individual interviews and underscoring the tensions that were magnified during the fall practicum experience. The secret stories of the fall practicum further reveal a major tension between candidates' pedagogical vision and enacted practice. For the most part, this tension remained unresolved. The implicit and explicit restrictions placed on candidates by their associate teachers were a primary source of this tension. Perhaps Paul felt this tension more strongly than the other candidates because he had two different associate teachers, one who allowed him to teach in a way that was in accord with his pedagogical vision, and one who did not. David raised the issue that, regardless of how flexible an associate teacher is, a practicum is ultimately an artificial learning environment because candidates are learning to teach in someone else's classroom. Looking forward to the February practicum, candidates expressed concern that their responsibilities would increase to that of a full-time teacher. They expressed concern with the idea that they were supposed to impress their associate teachers with the way they handled a full-time teaching schedule, yet first-year teachers may be expected to do little more than survive their first year of teaching.

Against this backdrop of noise in candidates' experiences, both on practicum and in classes, Tom's major pedagogical challenge was to become a signal that candidates could recognize and respond to, rather than another dissonant background sound.

By taking a step back from the front of the classroom and turning the physics course over to the self-directed learning project and guest speakers, Tom provided a space for candidates to think about their learning. During the third focus group interview, participants puzzled over several pedagogical issues in the physics course, such as the role of physics content in a physics curriculum course and Tom's tendency to avoid lecturing candidates on how to teach. Teacher candidates who participated in the research came to the conclusion that *how* Tom teaches is the essential content of the course. During the individual interviews, each candidate discussed ways in which they were thinking about teaching as a result of Tom's physics course. Paul felt that it required time to process how he learned from the physics course, an idea supported by the fact that most of the candidates' conversations about teaching and learning in the physics course revolved around course experiences in September and November, as opposed to January.

The perspective of the teacher educator reveals the pedagogical decision-making process behind a significant teaching move: Tom's decision to provide a space for candidates in the physics class to engage in self-directed learning. By this point in the year, Tom had introduced all of his big ideas about teaching and learning to the class, so stepping back and engaging candidates in self-directed learning was the biggest signal that he could send amidst the chaos and noise of January. Prior experience had made Tom consider the importance of listening to his students about the effects that the program is having on their learning, particularly during the month of January when their attention is divided between the upcoming final practicum and the pressure of the job search. In a way, providing candidates with more freedom and control over their own learning was a way for Tom to help them relieve the tensions associated with incoherence in the program and also encourage candidates to refocus themselves on issues that he saw as important. It would be far less effective to tell candidates to focus on the big picture of learning to teach. Instead, Tom showed them one way to focus on their own learning through self-directed learning.

Comments from the candidates revealed that it was particularly important for Tom to make self-directed learning classes optional. The degree of freedom given to the physics class around the self-directed learning activity was met initially with a certain degree of incredulity. Candidates felt trusted and appreciated the space they had to make decisions about their own learning, although in hindsight most felt that they would spend their time differently given another opportunity to engage in self-directed learning. From Tom's perspective, providing the experience so candidates could feel what it was like to direct their own learning was more important than any end product they may have created.

The participating teacher candidates continued to theorize about the nature of teaching and learning. The importance of developing productive relationships with both students and other teachers was a dominant theme in the data. For the teacher candidates, it was important to have freedom to form their own rapport with their students in order to learn how to best meet their needs as learners. Perhaps a part of their emphasis on the importance of relationship arose from their perceptions of teaching as a difficult and challenging profession. There was considerable evidence that the teacher candidates were beginning to think about the first year of teaching

and what their lifestyle would be as first-year teachers. They looked toward the February practicum with a certain amount of trepidation because of the requirement to take on a full teaching load. For some candidates, such a requirement underscored the artificiality of the practicum learning experience and made them wish they were beginning in their own classrooms, rather than in someone else's. At the conclusion of January, candidates left the Faculty of Education for two months of practicum experiences, one month in their host schools and one month they had arranged themselves in an alternative educational setting. Looking ahead to April, the challenges for Tom and the teacher candidates who participated in the research were significant. How would they name and interpret the knowledge they constructed and co-constructed over the course of the teacher education program?