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One teacher educator's strategies for encouraging reflective practice

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Teaching reflective practice to beginning teachers requires significant changes in a teacher educator's implicit assumptions about how individuals learn to teach. Teaching reflective practice also requires significant changes in a teacher educator's teaching practices. The familiar teach-them-theory-and-then-let-them-practice approach assumes that learning is complete before practice begins. In contrast, reflective practice in professions involves learning from firsthand experience and recognizes that the process of learning theory and research is incomplete before personal practice begins. Teaching reflective practice also requires recognizing that terms such as *reflect* and *reflection* are everyday words with multiple meanings and uses and little direct connection to *reflective practice*. The following argument, grounded in self-study methodology, describes indirect strategies for encouraging reflective practice. These strategies include an extended writing assignment focused on professional learning, teaching how to learn from personal experience, the unrecognized power of listening, and tickets out of class as listening and fostering metacognition. The argument closes with a summary of suggested strategies for encouraging reflective practice by those learning how to teach.

KEYWORDS

reflective practice, reflection-in-action, professional learning, metacognition, listening, learning from experience

Introduction

Reflection is a commonplace word that we probably hear every day; while it applies specifically to images and the behaviour of light, it is also used to refer to serious thinking or careful consideration. *Reflective practice* (Russell, 2005, 2013, 2014a) is a specialized term that entered professional conversations with Donald Schön's publication of *The Reflective Practitioner: How Professionals Think in Action* in 1983 and *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions* in 1987. Reflection became a familiar word in teacher education programs in the 1980s; sadly, to this day students at Queen's University seem to quickly become weary of being asked to write "reflective papers" (typically one or two pages) on topic after topic in their various courses. Somehow, asking for a *critically* reflective paper is intended to enrich the quality of reflection. To my knowledge, the faculty at Queen's has never met to discuss

either why students react as they do or what might be done about it. Nor has there been explanation and discussion of the concept of reflective practice and its potential relevance to helping people learn to teach and improve their teaching. The importance of *reflection* and *reflective practice* seems to be assumed, just as the two terms are assumed to be similar. Here I take the two terms to be profoundly different and am guided by Schön's perspectives on reflective practice. This article reviews and analyzes one teacher educator's strategies, developed over more than 30 years, to make the concept of reflective practice meaningful and productive for teacher candidates.

The significance of reflection-in-action

How many teacher educators have read and studied Schön's two books (1983, 1987) in an effort to determine their implications for the task of preparing individuals for a career in teaching? If teacher educators had explored how Schön connects the concept of reflection-in-action to learning from professional experience, it would be difficult to believe that reflection would be treated as it seems to be in many teacher education programs. How many teacher educators actually use the process that Schön described? How many teacher educators have developed personal teaching strategies that both model and encourage reflection-in-action? Please see [Munby \(1989\)](#) for an analysis of differences between reflection-in-action and reflection-on-action.

The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behavior. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation ([Schön, 1983](#), p: 68).

This quotation indicates that Schön uses the word *reflect* in a way that is quite different from its everyday uses. For Schön, reflection-in-action includes attention to the assumptions implicit in one's behaviour in the context of a new insight (reframing) into a situation and a change in behaviour to test the value of the new insight. This is not everyday reflection; this is professional reflection-in-action with important metacognitive elements.

I did not appreciate all that reflection-in-action entails when I first read about it, but I sensed that it implied something unique and particularly relevant to learning to teach or to improving one's teaching. Teacher candidates know a great deal about teaching after so many years of observing teachers teaching the classes they attended. They know the behaviours of teaching, but they know very little about how teachers think and why they teach in one way rather than another. Inevitably, like all students, in the absence of any explanations from their teachers, teacher candidates have made assumptions about why teachers teach as they do. Thus they

are far from being blank slates; they hold assumptions that are more implicit than explicit, but those assumptions serve as filters for their responses to every message offered in a teacher education program. [Lortie's \(1975\)](#) words describe the situation clearly:

Students ... are not privy to the teacher's private intentions and personal reflections on classroom events. Students rarely participate in selecting goals, making preparations or postmortem analysis. Thus they are not pressed to place the teacher's actions in a pedagogically oriented framework (p: 62).

It is improbable that many students learn to see teaching in an ends-means frame or that they normally take an analytic stance toward it. Students are undoubtedly impressed by some teacher actions and not by others, but one would not expect them to view the differences in a pedagogical, explanatory way. What students learn about teaching, then, is *intuitive and imitative rather than explicit and analytical*; it is based on individual personalities rather than pedagogical principles (p: 62, emphasis added).

In the discussion of personal experiences that follows, I attempt to describe the gradual development of my own skills at fostering reflective practice as I personally learned from experience by attempting to identify my own implicit assumptions and by testing new actions.

Reflection-in-action in professional practice

[Schön \(1983\)](#) argues that the epistemology familiar to academics and embedded in our universities masks innovation and artistry in the world of professional practice. He argues for an alternative epistemology that he terms *reflection-in-action*. The following passage indicates the direction of his thinking:

When someone reflects-in-action, he becomes a researcher in the practice context. He is not dependent on the categories of established theory and technique, but constructs a new theory of the unique case. His inquiry is not limited to a deliberation about means which depends on a prior agreement about ends. He does not keep means and ends separate, but defines them interactively as he frames a problematic situation. He does not separate thinking from doing ([Schön, 1983](#), p: 68).

[Schön \(1987\)](#) offered the following idealized account of reflection-in-action, which is more straightforward than his account in 1983. Central to reflection-in-action is reframing of unexpected situations, with awareness of one's initial assumptions leading to new assumptions about situations of professional practice.

- There is, to begin with, a situation of action to which we bring spontaneous, routinized responses...

- Routine responses produce a surprise—an unexpected outcome, pleasant or unpleasant, that does not fit the categories of our knowing-in-action. Inherent in a surprise is the fact that it gets our attention... .
- Surprise leads to reflection within an action-present. Reflection is at least in some measure conscious, although it need not occur in the medium of words... .
- Reflection-in-action has a critical function, questioning the assumptional structure of knowing-in-action. We think critically about the thinking that got us into this fix or this opportunity; and we may, in the process, restructure strategies of action, understandings of phenomena, or ways of framing problems... .
- Reflection gives rise to on-the-spot experiment. We think up and try out new actions intended to explore the newly observed phenomena, test our tentative understandings of them, or affirm the moves we have invented to change things for the better (Schön, 1987, p: 28)

Finally, the following words provide a concise summary of professional learning from experience:

The process of reflection-in-action begins when a spontaneous performance is interrupted by surprise. Surprise triggers reflection directed both to the surprising outcome and to the knowing-in-action that led to it. It is as though the performer asked himself, “What is this?” and at the same time “What understandings and strategies of mine have led me to produce this?” The performer restructures his understanding of the situation ... It is what a good teacher does as she tries to make sense of a pupil’s puzzling question, seeking to discover, in the midst of classroom discussion, just how the pupil understands the problem at hand (Schön, 1995, p: 30).

With these points as introduction to the perspective on reflection that caught my attention in the 1980s, I turn to my efforts to develop reflective practice in my teacher education classes. By definition, this involved rethinking my assumptions about how I was teaching new teachers.

Exploring the significance of reflection-in-action

The academic year 1985–1986 seems to have been my first serious effort to call attention to the potential of reflection for teachers’ learning from their own professional experiences. My science methods class that year was particularly congenial and cohesive, including individuals who remained in contact through much of their teaching careers. My clearest memory of that class involves my arrival at my office door on April 1, 1986, a few weeks before the end of the program. My office door was completely covered with shiny aluminum foil; obviously, they had sensed that I thought reflection was important. They may also have been

wondering why I took it so seriously. In our last class, they presented me with a gift that came home with me on retirement—a framed mirror bearing the caption “May you always reflect!” Obviously, I still had a lot to learn about teaching reflective practice.

Before Schön’s (1983) book appeared, it was common in our program to ask teacher candidates to write in journals about their progress through the program; I often heard students complain about having to write multiple journals for their different courses. As the term *reflection* moved into the program, students’ journals were replaced by reflective papers, and students’ complaints continued with a new target—reflection. In the period 1984–2000, colleague Hugh Munby and I collaborated in a series of research projects focused on teacher candidates’ professional learning from the perspectives of metaphor and reflective practice (Russell, 1988; Munby et al., 2001). That work led us to conclusions such as the following:

For teacher education and teacher education research, the irony of teaching is at first epistemological. To the uninitiated, teaching unfolds as sets of skills but, to the initiated, teaching depends on, is grounded in, and constitutes knowledge. The character of this knowledge poses the irony for teacher education: the knowledge is, in part, practical, and that part can only be learned in practice, the very setting over which teacher educators have little direct control (Munby et al., 2001, pp: 895–896).

My efforts to introduce reflection and reflective practice in meaningful ways interacted with and were influenced in a variety of ways by this research activity (Russell and Martin, 2017a,b).

Two statements by Labaree (2000) provide additional background to my approach to helping people develop the skills and insights that could guide their professional practices as teachers:

The profession of teaching is generally seen to be relatively easy. And this perception is not simply characteristic of the untutored public; it is also endemic among teacher candidates (p: 231).

Teacher educators are in the business of demystifying teaching, giving away their own expertise to empower the prospective teacher to carry on the practice of teaching without need for continuous consultation and chronic dependency (p: 233).

These two statements remind us that the novelty and complexity of reflective practice make its introduction quite challenging in teacher educator programs that are expected to be easy. Over time, as I learned from experience (Russell 2007, 2009, 2016) my deeper understanding of reflective practice and its potential in teacher education generated a range of strategies that are the focus of this article. I begin by describing the value I found in a written assignment focused on recording

professional learning in practicum experiences. Next I turn to the process of learning to learn from professional experience of teaching and then to the power and importance of listening, before illustrating the listening potential of brief written responses (“exit tickets”) at the end of every class. Each strategy seeks to set the stage for and encourage reflective practice. I also briefly refer to self-study as a methodology for understanding one’s teaching practices and describe the challenges that can arise when trying to restructure a program to encourage reflective practice. Throughout, the reader will find a theme of minimizing explicit use of the terms *reflection* and *reflective practice* to avoid their everyday connotations. Such an indirect approach has worked well, personally; at the end of each course, I take the metacognitive step of explaining how and why I adopted indirect approaches to encouraging reflective practice. The argument closes with a summary of recommended strategies for encouraging reflective practice.

A five-part written assignment focused on professional learning

As I focused on how professionals learn from experience, I developed a written assignment that might avoid the complaints and the duplication associated with other written work. I titled the assignment “The Story of my Year Learning to Teach” and requested five installments at significant points in what was then an eight-month, postgraduate program. The directions for the assignment included these statements:

1. One purpose is to provide you with a record of this B.Ed. year. Perspectives develop very quickly during the year, and this file will help you see that. This file will also let you return to the B.Ed. experience when you are well into your teaching career.
2. After many years of preservice teacher education, I find it increasingly important to encourage you to take responsibility for your own professional learning. (Most of your time in school and university has involved someone else telling you what to learn and what pace to learn it.) Please use this file as a place to record your own exploration of self-directed learning.
3. Many future science teachers begin the B.Ed. with a distaste for writing (“If I wanted to write, I would have studied English instead of science!”). Year after year, the people who do make an effort to write tell me it was one of the best assignments they completed during the year. I hope you will feel the same way.

The following statements illustrate the types of questions asked in the assignment. Each installment was sent as a three-column table with directions such as these in the first column, space for candidates’ responses in the second, and space for my subsequent comments in the third:

Before the first practicum: Summarize how your classes did and did not match your expectations for this September period of preparing to teach.

After four weeks of teaching: Summarize how your classes did and did not match your expectations developed in the September period of preparing to teach.

After another five weeks of teaching: What issues seem most in need of attention during classes in January and February?

After an extended period of classes: What new goals and insights have classes in Jan-Feb provided for your development as a teacher?

At the end of the program: In what specific ways could we improve the contribution of theory to practice? As you look back over this story, to what extent has it helped you understand your early development as a teacher? How would you improve this assignment?

A teacher candidate in 2004–2005 offered these comments at the end of the fifth installment when asked for comments about the value of the assignment and ways to improve it:

This story has been an invaluable part of my learning throughout the year. It has made me focus my thoughts and articulate many things which I had been thinking and many times things that were not in the forefront. It has shown me the importance of taking time away from the class setting for development of me as an educator...as this time not marking/planning, etc. will further develop my skills.

I do not think there is anything to improve on this assignment... I really like the format. However, I would suggest, as hard as it is, that they get returned more quickly. For me, never a problem, we talk regularly... but I do know that your responses elicit more questions from me... and help me think critically, and that may be necessary to others who do not have the relationship we have developed over the year. (J.V.D., personal communication, April, 2005).

Two other comments, selected at random from the same year, begin to illustrate the range of responses, most of which were quite positive.

I feel like I may bore you when I repeat my answers from story to story. I am also terrible at returning things on time. I do really like these stories—writing things seems to either solidify them, or to make them not as true as you thought they were. I really appreciate the feedback from you. I know it must take forever to get through them all! (C.S., personal communication, April, 2005).

The story seems to be an excellent reflection piece. Sometimes I really did not have the time to reflect on the story as much as other times, but it really made me stop and think. The story made sure that you did not just put in time during the program. You really had to stop and think about what is happening around you and then try to answer why are we doing this. (D.G., personal communication, April, 2005).

The year 2004–2005 is the oldest data set still on my computer and I returned to that year to revisit the assignment from an historical perspective. I believe that the comments cited are evidence that the assignment was neither duplicated in other courses nor tedious. The goal was to increase students' awareness of their own evolving assumptions about what it means to teach and learn. Responding personally to many such assignments each year takes time, but it is a powerful way of listening to one's students with a view to understanding their professional learning and to improving both one's own classes and the program in which one is teaching.

As a final illustration of the potential of this assignment for encouraging reflective practice, consider the following excerpt from one candidate's fifth installment:

The time between my first and second field placements gave me an ample opportunity to reflect on my experiences and determine exactly what I had learned, if anything at all. I believe it was during this time that I began to develop a more sophisticated understanding of what it is to teach... The result was ultimately a radical shift in my thinking about teaching and learning by putting the needs of learners front and centre (Harrison, 2014, p: 3).

My professional development did not really commence until I understood that no one was going to tell me how to teach, and for that matter, it was not even possible to do so.... One avenue for improving practice is for teachers to monitor their own experiences and to use them as a source of knowledge about teaching. Munby and Russell (1994) point out that this "authority of experience" is something beginning teachers must learn to trust in order to develop as professionals (p: 5).

These comments suggest early stages of reflective practice—identifying personal habits and the underlying assumptions—without using the words *critical* or *reflect*. When we listen rather than tell, most students have tendencies to "reflect critically." Then, as a course concludes, there is time to emphasize the importance of evaluating how one is learning from experience and to put a name to reflective practice and reflection-in-action that, hopefully, a teacher educator has been modeling while teaching.

Learning to learn from teaching experiences

Virtually everyone becomes reasonably good at learning from everyday experience; we do not always learn correctly, but interactions with others help with corrections. Teacher candidates preparing to teach face a unique challenge: That they are so familiar with what teachers do may partially explain the brevity of teacher education programs compared to most professional programs; the familiarity of everyone with what teachers do continues to suggest that, like teaching itself, learning to teach is easy. There are important questions to ask that do not seem to receive much attention, including these:

- Do teacher education programs teach strategies for learning from experience?
- Have teacher educators themselves developed skills of learning from professional experience?

My personal view is that reflection-in-action, as presented by Schön (1983, 1987), represents an essential element of learning from professional experience. A former student provided me with an outstanding example of a teacher candidate's practicum experience that generated a powerful reframing of his practice. Importantly, the reframing was inspired by listening to a student who had a genuine question that most students would be unlikely to ask directly. This detailed account begins by describing the context.

It's Friday now in my Grade 10 science class, and *things have not significantly improved since Wednesday*. I've been trying to remember all the little things, but it's proving a lot *harder than expected to break out of my way of thinking*. I'm teaching ionic compound nomenclature, the driest of dry topics and difficult because it requires an explicit understanding of ionic charge. I'm still not feeling very confident in front of the class.. I'm teaching and the concepts remain confusing for the students; many cry out in protest. These details are not the point, only context for probably *the most critical incident of my entire practicum*.

One of my students, always vocal and gregarious, but frequently pushing the line when it came to respecting authority, beckoned me over after the lesson. He proceeded to declare that he, thanks to his observant nature, had noticed me habitually glancing over at my [mentor] teacher while I taught. He then asked me why I kept looking over and if I had even noticed what I'd been doing. I gave a polite response, but I was surprised that I had not been aware of all the faces watching me while I'd been doing it, *nor had I realized why I'd been doing it until that instant*.

Clearly, things weren't going as well as I wanted them to. I'd been looking over at Mr. J for some sort of look of reassurance

that what I was doing was all right, that I wasn't making a completely mockery of myself up there. But that insecurity, that tacit need for approval was noticeable and, I'd argue, detrimental to the students. As much as I wanted to care for their needs, my first instinct was to find a way for my own needs to be met.

This moment had a profound impact on me. I realized that if I wanted to gain control over the class, to teach for the students instead of myself, I had to shrug off my insecurities. I had to believe in myself as a teacher, and I had to tackle the class with more focus and purpose. I managed to do just that. I put myself aside, gave up on worrying about approval, and took steps to actually learn. That class turned around, and I've never felt more confident than when I was in front of that class by the end of week 4. The students, who I knew were just pushing to see how far they could cross a line, all learned to respect me and work with me. I developed a strong rapport with them even though it didn't come easily. I was able to implement new strategies and teach in a way that gave them opportunity for continual practice, which led to tangible improvements in their learning. (Courtin, 2017, emphasis added)

More recently, a teacher candidate qualifying to teach in Grades K-6 offered a unique suggestion that teacher education classrooms should be places where those learning to teach actually teach and observe their colleagues teaching.

My main concern with my experience of teacher education is that practical experience and theory have such a steep divide. The education building felt like a test-tube where all my variables were static and understood. My practicum experiences, on the other hand, felt like a street fight where all predictions were off. If I were in charge for a day, I would attempt to more closely simulate what teaching is by bringing the static and dynamic together—allowing student teachers to both prepare and present picture-perfect lessons while simultaneously pressuring them to teach from the seam of their pants. I can imagine 'pop teaching' activities where students have 5 minutes to prepare engaging lessons on random topics. All that is to say I believe that I could have benefited by being given more time to teach in my teacher education program. (S. Giffin, personal communication, May 2022)

Do teacher educators simply assume that teaching people how to teach should follow the same tell-and-test methods used in all other subjects? Isn't modeling far more important when teaching how to teach? Giffin suggests that teacher education classrooms are ideal places for beginners to teach and, by extension, to analyze teaching and to not only hear about but also see and feel strategies of reflective practice. Could teacher education classrooms become productive places for learning from experience? (Russell, 2014b, 2018).

A unique experience of reflective practice with a former student

In my 2007–2008 physics method class, I asked each student to set up a blog for recording teacher education program experiences; each gave me access to the blog so that I could make comments and suggestions. A few months after they completed their program and went in search of teaching positions, one of the blogs came to life again. What followed was a truly unique experience in my 42 years with beginning teachers. Liam Brown took a teaching position at a private school in Mexico and wrote in his blog frequently, virtually every day in the earliest months of his 2 years at the school. Those 2 years generated a massive file that provided data for a self-study of a beginning teacher's experiences, and my role was that of a critical friend. We reported that self-study in a book chapter (Brown and Russell, 2012) with three major themes: managing relationships in the classroom, lowering academic expectations of students, and developing a pedagogical approach. Although that chapter was not written from a reflective practice perspective, I can recommend that it be read from that perspective. Reframing and reflection-in-action occurred frequently as Liam worked his way into a cross-cultural teaching experience.

The important role of practicum supervision

The practicum is always the element of a teacher education program most valued by those learning to teach. They have watched teachers teaching for many years but rarely done any of their own. While Giffin (2022) suggested the value of providing teaching experiences within education classes, the practicum will always come closest to the reality of teaching. Teacher candidates tend to have done well in school; they know how to learn from books and lectures. Learning from experience is familiar in everyday life, but learning from professional experience is a new game. Thus I argue that learning from experience needs to be addressed explicitly in teacher education, beginning with the powerful influence of the tacit and unexamined beliefs about teaching that have been acquired over so many years as students. Just ensuring that candidates understand that learning from professional experience is a new skill can be important, and their experiences developing that skill during practicum placements should be unpacked for analysis after each placement. It may be more productive to use the term *learning from experience* than to refer constantly to *reflective practice*, which is reminiscent of the simple term *reflection*. During placements, the practicum supervisor has an important role to play. In my own experiences as a supervisor, exploring the quality of the relationships with mentor teachers could be more important than making specific suggestions for improvement. Supervisors who understand their own reflective practice skills are in a much better position to help candidates develop the skills of reflective practice.

The next section focuses on listening, which I eventually realized is also an important part of practicum supervision. For many years, my visits to observe teacher candidates in action included discussion after a lesson and involved my calling attention to parts of the lesson that I thought deserved revisiting. As I gradually reframed my practices for listening, I left my notes on the lesson to be sent to the teacher candidate that evening. During discussion, I posed questions such as the following, in order to hear how the lesson was viewed by the person who taught it:

- What did you learn by teaching that lesson?
- Which student responses surprised or puzzled you?
- Were there any moments when you were unsure what to do next?
- What would you change if you were teaching that lesson again?
- What clues did you pick up about how well students understood the concepts?

Here again, reflective practice can be encouraged indirectly.

The secret power of listening and responding

One of the secrets of developing and encouraging reflective practice is listening. Rather than telling teacher candidates that they should reflect (whatever they might think that word means), listening to their experiences of practice and their experiences of observing their professors can provide insights into strategies for opening their eyes to the importance of reflective practice. By modeling the power of listening, one can indirectly (and at times directly in speech) teach the power and importance of listening to one's own students when teaching. Why is this power "secret" by virtue of being encountered so rarely in teachers' behaviour? Those who are learning to teach have observed their own teachers for years, and they have rarely observed teachers doing much listening. Decades ago, Amidon and Simon (1965) reviewed teacher-pupil interaction and reported results from classrooms in grades 7 and 8:

Perhaps these results are best summarized by Flanders' rule of two-thirds: in the average classroom someone is talking two-thirds of the time; two-thirds of this is teacher talk; and two-thirds of teacher talk consists of direct influence (lecture, direction giving, or criticism) (p. 132).

In other words, as we all know, teachers do most of the talking in classrooms and thus are not well known for listening. Subsequent research on the concept of teachers' wait time (Rowe, 1986) demonstrated that increased student participation is likely to occur when a teacher waits after asking a question. The typical teacher wait time has been shown to be on the order of half a

second; the recommended time is at least 3 s. There are two different moments when it can be powerful for a teacher to wait: (1) for a first response from a student and (2) for another student (rather than the teacher) to comment on the first student's response. Beginning teachers "know" intuitively that teachers tend to avoid short periods of silence; thus learning to extend wait time involves changing a deeply rooted habit. Making that effort is essential in learning to listen to one's students. For an excellent analysis of the value and importance of listening to students' perspectives, I recommend the article by Cook-Sather (2002).

Tickets out of class to listen and foster metacognition

In the late 1990s, a former graduate student wrote to me from the school where she was teaching in South America to share her experience using "tickets out of class" with her students. I began trying the technique as I understood it in my own classes and within 5 years the technique had become a powerful habit. My own practice now involves giving students a quarter-sheet of paper in the last 3 min of class and asking them to respond to one or both of two questions: "What is the most important idea you are taking from this class?" and "What did we discuss that you would like to understand more fully?" Students have no hesitation if this technique is introduced at the end of the very first class, particularly if their teacher asks that all responses be anonymous—an essential feature for honest responses. I eventually realized the importance of sharing all the responses with every student; with four tickets to a page on a scanner, it was quick and easy to create a PDF file that I could email to everyone.

Perhaps the most effective way to share the power of this technique (often called "exit tickets") is by giving examples from the class I taught in Fall 2018 (the first half of a course on teaching physics in the secondary school. Table 1 provides six examples from the first two-hour class. The tickets in Table 1 were collected in my last year as a teacher educator, more than 3 years prior to revisiting them here. I am intrigued to see how clearly they remind me that I undertook to present in that first class some of the major ideas I would develop through the term. Predict-Observe-Explain (P.O.E., see¹) is a teaching strategy for use in any science demonstration. Wait time (Rowe, 1986) is an intriguing teaching strategy that I like to introduce early and use frequently. The distinction between book knowledge and craft knowledge is one that I find to be more productive than the more familiar terms of theory and practice. Three ways to learn the meaning of "the stove is hot" serve to introduce the importance of learning from personal experience. Finally, I hope that the tickets themselves demonstrate that students can and will respond positively to a strategy that encourages metacognition—thinking about their own thinking.

1 <http://peelweb.org/StartPeel/article/399>

TABLE 1 Tickets from the first class of the fall term.

Understanding the different ways students are going to consider a physics observation is important in gaining insight on the different approaches a teacher may take. Popular yet unknown misconceptions can be revealed and teaching can become more directed. In practice, I think I'd like to develop my use of wait-time in order to encourage student engagement.	Wait time is an idea I want to explore further by reading about it and trying it myself. I never considered the benefits of taking a pause after a student answers a question. I think as educators many of us strive for discussion in class. Taking a pause seems like it would influence this. I am interested in how this may look in practice.	I thought it was interesting to talk about the three ways that you can learn that a stove is hot: by touching the stove, by watching someone else touch the stove, and by being told that the stove is hot. As teacher candidates, we need to "touch the stove" more. I would love to see more P.O.E.! I love the way that they challenge our intuitions about how the world works.
The value of craft knowledge and the difference between the classes we went through in undergrad vs. the approach of this course. I do not get awkward with long silence so I'm excited to play with wait times both in this class and in my practicum.	I think the most important idea is the idea of craft knowledge. I'm excited to have this new version to learn from rather than typical book knowledge. I would really like to explore both wait time and P.O.E. They both seem like excellent tools for a classroom.	One thing to take away from this class is that our learned heuristics and physical intuition can be incorrect. What I'd like to explore further is how to develop an accurate physical intuition.

TABLE 2 Tickets from the last class of the fall term (Class 18).

I have a clearer understanding of how I can develop my skills as a teacher. Moving between craft knowledge and book knowledge over my career is instrumental to my development. Taking a step back to evaluate my own practice and moving it in line with current evidence-based learning and the current generation of students will be helpful in keeping me in touch with my teaching.	I found it interesting that most of us mentioned that book knowledge and craft knowledge are best learned through an iterative process. Enjoyed the discussion of our end-of-class talks and how we could use them in our high school classes. Thanks for the paper and book suggestions—yes, book knowledge, but we have some craft knowledge to be able to process our reading more effectively.	I think it was interesting when the iterative process of building book knowledge and craft knowledge was brought up. I liked when the point was made about craft knowledge not being all there is to learning to teach. Book knowledge is important too, but more so after someone has craft knowledge to build on.
I found a lot of value in our conversation about craft and book knowledge. I enjoyed the perspective of needing to have a continuous loop between craft and book knowledge to build upon one another.	Good talks today. I was nice to read answers, especially to the selected question. Interesting descriptions on the inter-connectedness of book and craft knowledge. Looking forward to the in-class types of craft knowledge we discussed for next semester.	The topics discussed today were quite illuminating. Being able to provide feedback on our classes and suggestions for future classes was a unique opportunity which got me thinking about the process that was used to design this class/course.

I continued to request and receive Tickets Out of Class at the end of every class. Table 2 provides six examples from the last (and 18th) class of the term—the halfway point of the course. When compared to the comments in Table 1, these tickets give some indication of how their views had developed. The tickets in Table 2 indicate that this last class of the term included considerable discussion of the concepts of book knowledge and craft knowledge and the relevance of each to their professional learning. The term included a seven-week practicum placement that gave rich meaning to the idea of craft knowledge. "End-of-class talks" refers to another practice introduced in the first class: the last 15 min of every two-hour class were devoted to discussion of what and how they had learned that day. No one had to rush to another class, with the result that these discussions often lasted an hour or more. Presenting these tickets in Tables 1, 2 has reminded me how quickly and clearly exit tickets can remind a teacher of the memorable features of a class.

Having illustrated my use of tickets out of class, it is appropriate to ask "So what?" and connect this discussion to the issue of reflective practice. In a university class meeting once or twice a week, I ask students to write at the end of every class. In primary or secondary schools, once a week might be useful,

perhaps on Friday to review the week or on a day when a particularly important or difficult concept was the focus of a lesson. Writing, even briefly, is a different kind of mental activity for our students. It invites them to consider the quality of their learning. When their teacher responds to comments with additional explanations or changes in approach, it deepens the teacher-student relationship and conveys to students a sense of having a modest influence. In the teacher education classroom, requesting tickets at the end of class models an unfamiliar teaching practice, particularly when productive changes clearly follow from comments made on tickets. Reflective practice is about reframing ideas and personal assumptions based on learning from experience. Tickets out of class can be a valuable experience that fosters reflective practice and metacognition.

Self-study as methodology for understanding one's teaching

As previously suggested, I believe that individuals in a teacher education program are very quick to notice gaps between what and how they are being taught. At times, how we teach them may

be more important than the ideas we are trying to develop. *If teacher educators wish to encourage reflective practice, they must also model reflective practice.* I was fortunate to be involved in the development of self-study of teacher education practices research in the 1990s, and sharing with students that, with their help, one is studying one's own teaching is an outstanding way to begin modeling reflective practice. Dewey emphasized the importance of identifying and grounding our beliefs about what and how we teach:

Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends, constitutes reflective thought... It is a conscious and voluntary effort to establish belief upon a firm basis of reasons (Dewey, 1933, p: 9)

Teacher candidates have often told me that they watch closely the strategies used by their professors. Do they not have a right to expect the very best teaching in a teacher education program? If we wish to teach reflective practice, we must model it in our teaching, but we must also occasionally take time to unpack what we are doing and confirm that our modeling is being noticed. In the spirit of reframing that comes with reflection-in-action, it can also be powerful to share our previous experiences that have surprised us, caught our attention, and generated reframing that led to the practices we are currently using.

The challenge of changing a program to encourage reflective practice

The period 1995–2000 was a turbulent time in the teacher education program at Queen's University; it was also challenging in exciting ways. A new dean was willing to take risks and in 1996–1997 a pilot program for 60 teacher candidates tested a new structure: After a week's orientation, candidates began the practicum on the first day of the school year, returned to the university for 2 weeks of classes near the middle of the 16-week period, and then did the usual coursework and a four-week practicum in the second half of an eight-month program. In 1997–1998, all 600 candidates followed this pattern; after 14 weeks of school experience, their responses to courses were remarkably different. In our first class, my own students in secondary science methods generated 63 topics they wanted to explore. The impact of extensive school experience was stunning, so stunning that faculty voted to abandon the structure at an end-of-year retreat. While a few faculty members rejoiced at the impact of what had been learned from experience, most of our colleagues seemed to find it too difficult to adjust to a different type of student. In hindsight, I see this experience

as an important indicator that changing a program to encourage reflective practice is indeed a monumental challenge to the embedded traditions of initial teacher education.

Summary of strategies for encouraging reflective practice

- Work quickly to build a positive relationship with each of your students.
- Encourage reflective practice (learning from experience) indirectly, gently and persistently.
- Listen frequently and carefully for instances of reframing of assumptions about teaching and learning.
- Model reflective practice in the teacher education classroom.
- Use metacognitive moments to explore if and how modeling is being understood.
- Be aware of one's own skills of reflective practice and how they developed while learning from experience.
- Listen frequently and carefully to support instances of reframing of assumptions about teaching and learning.
- Minimize use of the word *reflection* in discussions and assignments; focus instead on the need to develop skills of learning from experience.
- As teacher candidates acquire practicum experiences during a program, revisit the term *reflective practice* to monitor the development of skills and understanding.
- Take on the role of practicum supervisor or arrange to visit at least one student during each practicum to refresh one's first-hand knowledge of how beginners learn from experience under the guidance of a mentor teacher (who may not focus on reflective practice).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Amidon, E. J., and Simon, A. (1965). Teacher-pupil interaction. *Rev. Educ. Res.* 35, 130–139. doi: 10.2307/1169735
- Brown, C. L., and Russell, T. (2012). "A collaborative self-study of a physics teacher's first two years of teaching," in *Self-studies of science teacher education practices*. eds. S. M. Bullock and T. Russell, Vol. 2012 (Berlin: Springer), 9–29.
- Cook-Sather, A. (2002). Authorizing students' perspectives: toward trust, dialogue, and change in education. *Educ. Res.* 31, 3–14. doi: 10.3102/0013189X031004003
- Courtin, B. (2017). *An account of my practicum experiences*. Queen's University, Kingston, ON.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. D.C. Heath and Company.
- Giffin, S. (2022). *Thoughts about a teacher education program*. Queen's University, Kingston, ON.
- Harrison, D. E. (2014). *The evolution of a pedagogy: A preservice teacher's learning experience*. Queen's University, Kingston, ON.
- Labaree, D. F. (2000). On the nature of teaching and teacher education: difficult practices that look easy. *J. Teach. Educ.* 51, 228–233. doi: 10.1177/0022487100051003011
- Lortie, D. C. (1975). *Schoolteacher: A sociological study*. United States: University of Chicago Press.
- Munby, H. (1989). Reflection-in-action and reflection-on-action. *Current Issues in Education* 9, 31–42.
- Munby, H., and Russell, T. (1994). The authority of experience in learning to teach: messages from a physics methods class. *J. Teach. Educ.* 45, 86–95. doi: 10.1177/0022487194045002002
- Munby, H., Russell, T., and Martin, A. K. (2001). "Teachers' knowledge and how it develops," in *Handbook of research on teaching*. ed. V. Richardson, 4th Edn. (United States: American Educational Research Association), 877–904.
- Rowe, M. B. (1986). Wait time: slowing down may be a way of speeding up! *J. Teach. Educ.* 37, 43–50. doi: 10.1177/002248718603700110
- Russell, T. (1988). "From pre-service teacher education to first year of teaching: a study of theory and practice," in *Teachers' professional learning*. ed. J. Calderhead (London: Falmer Press), 13–34.
- Russell, T. (2005). Can reflective practice be taught? *Reflective Pract.* 6, 199–204. doi: 10.1080/14623940500105833
- Russell, T. (2007). "How experience changed my values as a teacher educator," in *Enacting a pedagogy of teacher education*. eds. T. Russell and J. Loughran (United States: Routledge), 182–191.
- Russell, T. (2009). "Personal-experience methods: re-experiencing classroom teaching to better understand teacher education," in *Self-study research methodologies for teacher educators*. eds. C. A. Lassande, S. Galman and C. Kosnik (Netherlands: Sense Publishers), 67–81.
- Russell, T. (2013). Has reflective practice done more harm than good in teacher education? *Phronesis* 2, 80–88. doi: 10.7202/1015641ar
- Russell, T. (2014a). "Paradigmatic changes in teacher education: the perils, pitfalls and unrealized promise of the reflective practitioner," in *Teacher education in a transnational world*. eds. R. Bruno-Jofré and J. S. Johnston (Canada: University of Toronto Press), 158–176.
- Russell, T. (2014b). "One teacher educator's career-long development of a pedagogy of reflection," in *International teacher education: Promising pedagogies part a*. eds. L. Orland-Barak and C. J. Craig (United Kingdom: Emerald Group), 55–72.
- Russell, T. (2016). "Narratives of the power of experience in a teacher educator's development," in *Professional learning through transitions and transformations: Teacher educators' journeys of becoming*. eds. J. Williams and M. Hayler (Berlin: Springer), 13–28.
- Russell, T. (2018). A teacher educator's lessons learned from reflective practice. *Eur. J. Teach. Educ.* 41, 4–14. doi: 10.1080/02619768.2017.1395852
- Russell, T., and Martin, A. K. (2017a). "Reflective practice: epistemological perspectives on learning from experience in teacher education," in *Reflective theory and practice in teacher education*. eds. R. Brandenburg, K. Glasswell, M. Jones and J. Ryan (Berlin: Springer), 27–49.
- Russell, T., and Martin, A. K. (2017b). "Teacher education needs an epistemology of practice," in *Search and research: Teacher education for contemporary contexts*. eds. J. Mena et al. (Spain: Ediciones Universidad Salamanca), 111–118.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*, San Francisco: Jossey-Bass.
- Schön, D. A. (1995). The new scholarship requires a new epistemology. *Change* 27, 27–34. doi: 10.1080/00091383.1995.10544673