Dear :

This is in response to the reviews of the above-mentioned manuscript and to the letter that Andy Anderson sent us. To begin, the letter and Review 1 reminded me of the things we talked and wrote about during the 1992 NARST conference and the subsequent editorial with Bill Kyle and Sandy Abell. As you will see, Review 1, which proposed rejection, is biased, culturally insensitive, contradictory, and cross-paradigmatic. We do not think that it is appropriate to base an editorial decision on such a review. On the other hand, Reviewer 2 proposed accepting the article with revisions or rebuttal of his arguments.

Please find enclosed our revisions of the manuscript “Toward an Epistemology of Teaching as Practice.” We addressed all of Reviewer 2’s comments. Below, you will find our rebuttal to the critique of Reviewer 1, taking up each point. After taking up each point made by Reviewer 1, we address some of the issues raised by Andy in his cover letter.

Jim, when you read the comments of Reviewer 1, we think you will agree with us that this is the worst kind of discourse of teaching we can imagine. It is the kind of language and description you, Ken and others have shown to the younger folks in NARST as being unethical. The reviewer is misrepresenting with a considerable viciousness what we have done and written about.

Sincerely yours,

Michael & Ken

REVIEWER 1.1: The relative lack of impact that educational research has had on classroom practice and educational policy is often attributed to the lack of relevance of our research to the lives of classroom teachers and/or how we "package" our findings and recommendations. Overall, this manuscript/research report has little more to add than a reiteration of the importance of context in learning to teach, supervision of teaching, the assessment of teaching, and research on teaching. For quite some time both teachers and researchers have understood that there exists no single set of skills and approaches that apply generically across teaching situations. Unfortunately, these authors have reiterated this point, but have chosen to "package" it rather awkwardly in a theoretical framework that will have little meaning to teacher educators and teachers, let alone those researchers who value practicality. The introduction of new terminology/jargon is not inherently negative if it adds new insight and meaning to phenomena of concern. However, the introduction of constructs such as habitus and Mitsein do little more than obscure some rather intuitive notions that have been recognized more directly by both teachers and researchers. This manuscript, unfortunately, is an exemplar of what is wrong with the direction educational research has taken with regard to the improvement of teaching.

OUR COMMENT: Our article speaks for the usefulness of the concepts we propose, especially the development of understanding through conversations about teaching that was shared. Praxeology is the term we use for this understanding. It is understandable given the reviewer’s comments that there exists a cross-paradigmatic view on our work, which does not do justice to it. On the other hand, we could read the reviewer’s comments as a sign of being ill-informed, out of date with the current literature on teaching as practice, and, in the extreme, simply
ignorant. Our theoretical framework is being accepted in the teacher education literature as the citations to our work show.

We reject the use of the notion of jargon, for there are only 4 terms that we introduced: habitus, being-in/with (formerly Mitsein), praxeology, and coteaching. We reject the notion of jargon, for the reviewer would equally reject the 20 words Inuit use to designate snow. To them, making the 20 distinctions is of vital, life-saving necessity. Similarly, in research, the words we use allow us to make distinctions (i.e., cut up the world) and therefore see phenomena otherwise not accessible. Otherwise you have to reject all science language as jargon. Even so, we have carefully revised the manuscript and have done what we can to reduce the use of technical language that might detract from readability.

The final sentence is pejorative and the use of such language is not appropriate in scholarly review. If there is substance to the comment it would be useful to have us know what exactly is an example of the problems the reviewer sees in our work and in the research relating to the improvement of teaching. Making such comments while protected from rebuttal by the cloak of blind review seems unfair.

REVIEWER 1.2: On page #3, the authors mention that we should “endeavor to understand why some teachers believe that methods courses and teacher education programs lack relevance.” It appears that the authors have focused primarily on the content of methods courses, programs, and supervision approaches (here and in the remainder of the paper) and have failed to recognize, or give proper attention to, the importance of the qualifications and expertise of the teacher educator. In particular, do the authors not recognize that a significant contributor to the problem of irrelevant courses and failure to recognize context can be traced back to teacher educators who have not taught in public schools for a significant amount of time, if at all? Although “coteaching” may have its value, no experienced professional teacher would ever forget the importance of context when providing suggestions to a beginning teacher or evaluating the performance of a peer.

OUR COMMENT: This is a claim that we have not yet seen substantiated in the literature. We have not seen papers that science educators do know little of public school teaching. This is quite a claim, a slating that the reviewer would not be able to defend in public. This is a heinous remark that smacks of elitism.

On the other hand, Michael Roth has taught for 12 years until 1992 and since then has taught in the public school every year since. Ken Tobin has written about teaching in this article out of his experience of teaching in the public school. We speak and write out of our experience of teaching in the public school.

The comment that “no experienced professional teacher would ever forget the importance of context when providing suggestions” is a clear example of the approach to teacher education we are challenging. That is precisely the point we have addressed in the paper. Telling does not make such a difference. Nor does showing. It is a matter of doing and coparticipating.

REVIEWER 1.3: On page #5, the authors refer to the development of resourcefulness in response to a lack of resources as a constraint to teaching. It is not at all clear why becoming resourceful is a constraint to teaching. It would appear that development of resourcefulness is a way to overcome a constraint.

OUR COMMENT: This is misquoting what we wrote. Michael says on page 5, “The lack of resources is in fact constraining the kind of practices that can be enacted by any teacher.”

REVIEWER 1.4: The authors do a good job of stressing the dynamic and fluid nature of teaching. Any in-depth understanding of teaching needs to take such matters into account.

OUR COMMENT: We describe the dynamic of teaching as everyday activity throughout the article.

REVIEWER 1.5: The description of the teaching vignette on page #7 is a bit disturbing. Spiegel interrupted Cam's teaching and may have usurped his position as a credible teacher in front of the students. One of the most important obstacles preservice teachers need to overcome as soon as possible is having the students continue to view the mentor/supervising teacher as the authority figure. In short, the students must view the student teacher as the teacher. A mentor or supervising teacher that intercedes in an obtrusive way serves to inhibit this process in many cases. The authors, however, seem to think that Spiegel’s interruption of Cam’s lesson is fine.

OUR COMMENT: Again, the reviewer is judging a situation from the high horse. These kinds of judgment are exactly what we want to work against in calling for supervision, research, etc. to be done in the form of coteaching.
The reviewer is pronouncing judgments without knowing the situation. We wrote elsewhere about the problems that can occur in coteaching. Here, however, what is at issue is Spiegel’s situational judgment that he had to go in and help out. The reviewer is making judgments without adequate warrants. In fact, in our paper we describe such judgments as an example of the fallibility of the view from the side!

REVIEWER 1.6: On page #8, the authors take the position that the supervising teacher must "teach alongside" the prospective teacher or context will missed. Does the supervisor really need to do this? Hasn't the experienced mentor teacher experienced teaching the same students in the situation encountered by the student teacher? Does the supervision have to be teaching these students at the same time? In short the authors are really speaking about the importance of context, but they have not made a compelling argument that a supervisor is unaware of context unless he/she is teaching the same students at the same time as the student teacher.

OUR COMMENT: Nowhere on page 8 do we use the word context. On the other hand, using his own language to paraphrase what we have written is a political strategy to diminish what we have done because it does not fit in the reviewer’s framework. This is why we argue that the reviewer is judging our work from a different paradigm rather than on its own terms and according to standards of quality of constructivist research and evaluation (e.g., Guba & Lincoln, 1989; Ricœur, 1991). It is clear from our paper that coteaching does mean teaching at the "elbows" of another.

REVIEWER 1.7: The authors use the "coteaching" model for the improvement of teaching as also being consistent with what occurs in other professions (e.g., pilots, graduate students in science, banking employees) However, this model may not be true of all professions, as implied by the authors. Is this how lawyers develop their skills? What about engineers? What about doctors? It is not always the case that professionals learn their craft by "working elbow to elbow" with peers.

OUR COMMENT: We have never claimed this model is “true” for all professions. We said that it is the case in some, and provide a list. Lawyers in fact often work in firms and on teams, first as juniors then in more senior roles. They learn by participating. Doctors have an apprenticeship when they work as interns for a considerable time alongside other doctors. There are many more examples. The issue of whether or not coteaching is a good way to learn to teach is addressed by our paper. Yes. It is an approach to teacher education that has the promise to overcome some of the persistent problems that have addressed us for so long.

REVIEWER 1.8: The authors have consistently taken the position in the manuscript, by referring to the present investigation as well as others, that coteaching is an effective approach to develop instructional expertise. However, little evidence is presented to support this claim. All the authors have done is provide situations/conversations and described how these instances could possibly help both the experienced and prospective teacher. There is never any evidence provided that the teacher in question has actually benefited from coteaching, as illustrated in changed instructional behaviors.

OUR COMMENT: In the revised version, we make clear that coteaching is not the main focus, but rather a context for the kind of conversations in which we engage. Furthermore, we have written about some of the problems in coteaching elsewhere (Tobin 2000). Finally, in all of the cases researched by Roth, learning outcomes were positive for both teachers involved, whatever their ‘prior experience.’

REVIEWER 1.9: The introduction of habitus and the rest of the theoretical framework presented in the section on praxis and praxeology is of little value. This is unnecessary jargon and theory that simply obscures a rather intuitive and well-recognized point. We all know that classes, students, and teaching situations are all different. These are the very phenomena that make teaching so enjoyable or so dreaded. That is, some teachers welcome the challenge and find it invigorating, while others can't cope with the uncertainty. The point is that we have known for a long time that what works in one situation with one group of students may not work with another group of students. Just ask any teacher to compare how his/her lesson progressed in third hour versus fifth hour. Do we really need habitus to provide any insight? Does the introduction of the framework provided by the authors add any knowledge about the act of teaching?

OUR COMMENT: Here, the reviewer’s comment suggests that he is not up to date with the literature or is unwilling to consider alternative theoretical frameworks. The notion of habitus is actually central to the work of Jean Lave (e.g., 1988), Bourdieu (1990), and others. To say that it adds nothing is reprehensible. What the reviewer means to say is that s/he found nothing of value in reading/skimming through our paper. Our article develops the
notion of habitus quite carefully and in a context of specific examples in science teaching and teacher education. See our comment on jargon above.

REVIEWER 1.10: On page #12, the authors state that, “even though it is highly desirable for teachers to plan thoroughly for enacting a curriculum in classes like those in which Cam is teaching it must be remembered that the most appropriate course of events will unfold in the enactment and cannot be pre-specified.” Do the authors see little or no value in planning? Do the authors recognize the value of being able to edit a plan during instruction instead of having to create a totally new plan on the spot?

OUR COMMENT: We have not said that there is no value in planning. We are saying that the enactment cannot be pre-specified. This actually is central to the work on the relationship between plans and situated action (e.g., Suchman, 1987). On our re-reading of the paper and re-working it we both were struck that the paper has much to say to prospective and practicing teachers on the issue of planning. The reviewer's comments suggest that he does not know this literature on practice.

REVIEWER 1.11: On page #12, the authors speak about the problem a supervisor would have sitting on the side of the room and specifying “a correct course of action” for the practicing teacher to adopt. The authors opt for coparticipation, but what about the supervisor who simply offers a variety of things to consider and possible options? Isn't this more in line with currently advocated supervision practices? Again, if the supervisor is experienced and reasonable, the problem of context emphasized by the authors does not necessitate coteaching.

OUR COMMENT: Our work shows that proposing things to consider and possible options is exactly one of the central problems of teacher education (see also Roth, Lawless, & Tobin, in press). The reviewer has no support for his contention, whereas we write out of our own teaching and research practice. Of course one of the big problems teacher educators will face is persuading their colleagues to quit their pontificating from the methods classroom and to find their ways back into classrooms. They have to find their way back not to make wise suggestions (read from a yellow notepad), but to get up and coparticipate thereby rendering visible habitus that is (hopefully) effective in engaging students.

REVIEWER 1.12: Although the conversational approach between the authors is atypical of current research manuscripts, and at times interesting, it generally comes off as “preachy” and overly analytical. At other times the approach is rather pretentious and it tends to transform rather intuitive notions into what are apparently perceived as profound insights. The reader must struggle to avoid mental images of one teacher lying on a couch while the other plays clinical psychologist.

OUR COMMENT: Again, the reviewer has not attended to what we wrote. In the hermeneutic phenomenological approach that we are taking, lived experience alternates with critical (theoretically informed) reflection. We provide appropriate descriptions several times, among others in the methods section. If part of the metaleague do seem preachy (and/or pretentious) that was not our intent and it would have been helpful to identify those so that we could make appropriate changes in style. We think that the use of metaleague in reporting research and theory in science education is a promising contribution of this paper.

REVIEWER 1.13: At times, the reader wonders whether the descriptions of classroom practice and follow-up discussions are real or hypothetical. If these are actual teaching situations there needs to be some documentation of the claims being made about student understanding and behaviors. For example, on page #20, Ken speaks of the “significant transformations” made by his students. What data is this claim based upon? There is no description of how self-analysis was completed by the teachers in question. How did they systematically analyze the data about themselves to arrive at the conclusions reached? Overall, it is not at all clear how the narratives were constructed.

OUR COMMENT: Among others, this is another sign of the cross-paradigmatic nature of the reviewer’s assessment. We wrote that all of these are vignettes in the service of exemplifying a different epistemology. We did not claim to report on a single study. We refer readers to different writings in which we “systematically analyze” the data, of which we describe the origin. We feel that describing this here again takes more space than the journal has available and is unnecessary because it is not relevant to our central points. However, where appropriate we have included publications from our studies to which readers can refer for details of the studies themselves.
REVIEWER 1.14: It is not clear if the individuals reading the teaching narratives ever visited the classrooms in question. If not, how can these individuals comment accurately about classroom dynamics? Have the authors committed the same error that they have criticized in others through their analytical approach? How can the authors comment about each other’s teaching unless they were coteaching?

OUR COMMENT: We enact conversations about teaching. Tobin was in fact in Roth’s classroom, and we are doing likewise at the moment in the reverse direction. We have both been coteaching in the classrooms we wrote about, and therefore have been in the classroom.

REVIEWER 1.15: On page #22, and elsewhere, the authors swing too far in the direction of “the best way to learn about teaching is to teach.” Certainly, experience is indispensable, but when teachers learn simply through experience many bad habits are learned. The research literature on what occurs when teachers simply learn “on the job” is quite clear.

OUR COMMENT: Exactly, just peruse of the review of the literature produced by Grimmett and MacKinnon (1992) in Review of Research in Education. Other journals are full of the problems of current teacher education programs that lead to the gap between theory and practice (e.g., van Manen, 1995; Eraut, 1995). Again, the reviewer provides signs of not knowing the literature on teaching. Student teachers and beginning teachers tell us every day that the place where they learned to teach is in schools by teaching. As to the notion of “simply learning on the job” -- that is not what we are recommending.

REVIEWER 1.16: On page #23, the authors discuss the problems in Ken's chemistry class. The discussion is fraught with jargon and tends to be overly reductionistic. The result is similar to itemizing every aspect of driving a car. The process, although complex, is made to seem far more complex and unmanageable. The description of what went wrong in Ken's class is not useful for the improvement of instruction It has made the rather common problem of students being disinterested in a teacher's particular approach to subject matter into an overly complex set of interactions among psychological constructs. Not sure much of this would resonate within the best teachers.

OUR COMMENT: The failure described in the vignette is instructive, because it shows how “Science for All” may be fraught and be impossible. Working in the context and attempting to make changes is better than judging those who try from the high horse. We are not sure which parts of the narrative are redundant. Certainly we did not think them redundant. An appropriate role for a reviewer would be to identify which parts are redundant and to recommend changes. The master narrative aspects of critique are troubling. It is as if the reviewer has given up on the manuscript at this point and it simply making grand sweeping statements that have little place in professional discourse.

REVIEWER 1.17: The final sentence in the first paragraph on page #23 is disturbing. This sentence addresses the role of education in changing the position of underrepresented individuals in mainstream America. Is either position acceptable? Isn’t the latter just a little presumptuous?

OUR COMMENT: Again, the reviewer does seem to be ignorant of the differences between multi-cultural societies (such as Canada) and melting pot societies (such as the US). By forcing everyone through the same curriculum in the same way at the same time scale, people in fact are forced into the same mold. Whatever, there should be allowance for an individual teacher to take this position and to attempt to make a change.

REVIEWER 1.18: In the last sentence of Ken's statement on page #24, he bemoans the lack of narratives of how to enact curricula with learners like the ones he confronted. It is not at all clear how these narratives, which illustrate "how to enact curricula" would be any better than the advice of methods instructors, previously criticized in the manuscript.

OUR COMMENT: This is a question to be addressed in future research. Ken simply states that he is unfamiliar with narratives for how to make it better. We already know that traditional advice does not go anywhere. Bemoaning was not what Ken intended to do. It could be seen as a call for more research.

REVIEWER 1.19: On page #25, Michael makes a comment that typifies the problem with this manuscript. He states to Ken, "the very institutional structures undermine what you consider "good practice. " The statement is made as if it is a profound revelation or new insight about teachers' workplaces. It is not. The manuscript, unfortunately, is fraught with such comments.
OUR COMMENT: It would have been better if the reviewer had listed all these comments rather than to make an unsubstantiated blanket statement. What is wrong about a teacher realizing that what he does is undermined by the structures of the institution. Michael has worked as a teacher in several schools where the very constructivist teaching he attempted was undercut by testing procedures. We know that state/province regulations with standard curricula and testing turn teachers to teaching for the test. This is just what Michael was saying, not as a profound wisdom, but more as a matter of sad fact.

REVIEWER 1.20: The reader is compelled to consider NARST's mission to improve science teaching through research and the communication of research when reading this manuscript. It is doubtful that the way in which teaching is described would resonate with any recognized expert teacher. Would these individuals describe what they do in the terms presented in the manuscript? What does it mean that the description of teaching presented by the authors would be unrecognizable to the most well-respected in the science teaching profession?

OUR COMMENT: This is another scathing remark without substance. Of course, individuals unfamiliar and unwilling to think through the framework we provide will be unable to recognize what they are doing. This is why we want people to rethink what they are doing.

REVIEWER 1.21: Again, it appears that the authors' main points are the importance of reflection on practice and the context of instructional instances. These have been well-recognized for quite some time. The authors' advocacy for coteaching as a mechanism to solve the identified problems related to teacher development needs much stronger supportive evidence.

OUR COMMENT: This comment from the reviewer seems to add evidence to what we have suspected all along. S/he has failed to grasp the significance of what we have written. Reflection is a small but significant part of learning to teach. Reflection on your own does not help much. Our point is that coteaching provides a way of having shared experiences that become the topic of fruitful discussions, which then enhance and develop understanding of teaching (praxeology).

REVIEWER 1.22: It remains unclear (following page #30) why coteaching is necessary if context of teaching is to be considered. Doesn't the mentor teacher at the school site have the necessary experience with the same students and situation confronting the student teacher? Does the mentor teacher really need to be coteaching with the student teacher to offer context-specific advice?

OUR COMMENT: “Context” is the term used by the reviewer. We refuse any attempt to be measured on the grounds of an alternative paradigm. Our work (e.g., Roth, Lawless, & Tobin, in press; Roth, Lawless, & Masciotra, in press) shows that the dynamics that rule a situation cannot be grasped from the outside. That is why we advocate coteaching as a way of experiencing each situation (being-in) with another. The reviewer is locked into thinking about knowledge as what can be spoken or written. Here we are writing about learning by teaching with another in a particular community. The talk about praxis is important but so too is what can be learned by teaching in a coparticipatory way.

REVIEWER 1.23: There is also a significant and disturbing issue raised by the panacea of coteaching. Just because a supervisor finds it difficult to work with a particular group of students, it does not mean the students are a difficult group. Perhaps the supervisor is not a good teacher. If the supervisor's difficulty is used to temper feedback to the student teacher we may find ourselves in the position of assessing prospective and experienced teachers on a curve that uses the supervisor as the reference point. Is this consistent with competency-based teacher education?

OUR COMMENT: We do not claim coteaching to be a panacea. Again, this is a word and a perception by the reviewer that we did not claim. The reviewer is also very unprofessional with respect to his peers. Teacher educators get their job because a group of peers has judged him/her as capable of doing it. Judging from the high horse of blind review that others can’t educate teachers is pejorative and totally unbecoming of this reviewer. The issue of competency-based teacher education is slipped into the critique for what purpose? We are not advocating that there should be no standards for teaching. There are implications of what we say for those who would take on the challenge of specifying criteria for competency based teaching and teacher education. Given Ken's extensive
experience in this endeavor in Georgia, Florida and Texas there is much that we could write here -- suffice to say that those who go down this path should be sure to learn from the graveyard of those who have gone before.

The reviewer carries a deficit model of what is proposed in coteaching. Coteachers learn by teaching with the other and what they learn is not necessarily available at a conscious level. What concerns us about the comment is the implication that teaching performance can be dichotomized as effective or ineffective. There is give and take in coteaching, times when one teacher steps forward while the others steps back a little.

REVIEWER 1.24: The "solution" to the chemistry episode on page #31 may be a bit misguided. It seems that the students' initial problem was with the composition of the bubbles and not the relative proportions of hydrogen and oxygen.

OUR COMMENT: "What are those bubbles?" Yes, there has been quite some research done on this question. It is interesting and solidly grounded in the conceptual change worldview. Perhaps as the reviewer read the paper the bubbles studies jumped into his/her mind. Just because it is an interesting question, however, does not mean that it is germane to this situation. Roth is an experienced science teacher with an MSc in physics, and graduate work in physical chemistry. The reviewer should perhaps be more trustful of what teachers do rather than slighting them from his/her high horse. In this vignette Roth situationally decided that what he did was what needed to be done. Just what point is the reviewer wanting to make here? Would s/he have taken a different course? It is impossible to tell because the unfolding events of a classroom determine what is and is not situationally appropriate. We take the position that the teacher did what makes sense to him at the moment.

REVIEWER 1.25: The discussion about instruction on page #33 gives a good appearance, but is there any evidence that the students actually learned what was intended? Again, the manuscript thoroughly discusses the possible benefits of coteaching discussions, but provides virtually no empirical data in support.

OUR COMMENT: The manuscript is not concerned with student learning. The manuscript is not concerned with proving the benefits of coteaching. The vignettes provide a site for our discussions in which we explicate key ideas about praxis and praxeology, mainly in a context of science teacher education. Throughout, we provide citations to our own work as an indication that elsewhere we have published studies that have discussed coteaching, including the shortcomings.

REVIEWER 1.26: The example of Michael and Nadely's coteaching experience is of little use since Nadely "did not have a science background." Naturally, any help she could receive in the area of subject matter would be welcomed. How she could provide any assistance to Michael regarding the teaching of science is a mystery. One wonders…

OUR COMMENT: As pointed out, our work with Nadely has been published including her as an author (Roth, Boyd, Bowen, & Boutonné, 1998; Roth & Boyd, 1999; Roth, Masciotra, & Boyd, 1999). This shows that we provided evidence for the fact that it was useful. The third sentence “One wonders…” signifies the reviewer's lack of understanding about teaching in elementary schools. Most elementary teachers normally do not have more than 3 science courses as preparation. That questioning students for explanations is rare was shown by a number of well-known publications including Lemke (1990). Furthermore, the majority of interactions is in the form of the triadic form of dialogue. This is what research shows (see Mehan’s work, Poole, 1994).

REVIEWER 1.27: The authors should carefully consider their discussion about Nadely and her teaching with respect to the research on PCK and teachers with little subject matter knowledge. What does that research say about Nadely’s ability to teach science just because she has seemingly learned some new questioning strategies?

COMMENTS: PCK and similar frameworks are exactly what we want to overcome in our work. Invented for political purposes by Shulman, PCK was not so much a theoretically sound category as much as a political expediency. The question for advocates of PCK is how to enact what is known. The gap between what can be spoken and what can be done is as great as can be imagined when one considers PCK as a viable way to think about teaching and learning to teach. According to Dreyfus and Dreyfus (1986), explicit knowledge that can be articulated
only reaches Level 3 on a 5 level scale. Levels 4 and 5 are exactly those that we attempt to address in our work because they resist articulation. It is the kind of knowledge teachers have and use in practice but cannot communicate about it. It is beyond language. Accordingly, preservice teachers therefore cannot learn about it through reflection but can experience what the teacher does by coteaching. It is the kind of knowledge that recent work in AI, robotics and cognitive science (e.g., Agre and Horswill 1997, Steels 1997) permits robots to acquire by moving about in the world and learning from interacting with objects and people.

REVIEWER 1.28: Michael's description of how he helped Loretta's students understand the importance of collecting sufficient data is problematic. First, it is not at all difficult for students in grade 7 to realize that more data is better than less data. This is an idea that most elementary students can grasp rather quickly. More importantly, the students spoke of how bugs "liked" intermediate temperatures and "didn't like" the cold. Such comments were left disturbingly unchallenged by Michael. What was learned in this lesson?

OUR COMMENT: Again, the reviewer judges a situation that he doesn’t know. Here, many of the grade 7 students were handicapped and behind in their development. They did not know. What Michael did was help them to understand because they didn’t know. If Michael left these comments unchallenged, for whatever reason, it is better to look at the fact that he didn’t do rather than slighting him from the outside. As an experienced and knowledgeable science teacher (see above), he made the situational decision to go on and not to challenge the young learners. What is disturbing to us is the elitist tone of this reviewer that s/he knows best about what should have been done in this and most other scenarios described in the paper. In many respects our paper is written for people like this reviewer. That s/he takes such an antagonistic and close-minded view of what is presented is quite disturbing to us.

REVIEWER 1.29: The end of the first paragraph of Conversation on page #40 is another example of how a rather intuitive and well-recognized aspect of teaching is stated awkwardly and couched in unnecessary terminology. The main idea is simply that reflecting on practice can lead to deliberate teaching actions in the future or teaching actions can be performed automatically almost as a reflex or habit. Interestingly, Michael exalts the power of *habitus* in the following paragraph by stating that it can result in situated actions without the teacher having to take the time to reflect. The “powerful” concept is something every teacher and researcher already knows; some teaching actions are the result of reflex or habit. Indeed, haven't we already known for a long time that the problem with the teacher who "runs on automatic pilot" is that he/she is not responding to the particular students and situation at hand and this often results in instruction that fails. The concept of *habitus* does not appear to have provided any new insights.

OUR COMMENT: Again, the reviewer should better leave the main ideas in our terms rather than to diminish them in his/her own incompatible paradigm. The reviewer provides no evidence that there is an unnecessary terminology. Habitus, however, IS necessary because it covers what PCK and other things do not cover. The reviewer has shown throughout the review that she/he does not know as much about teaching or research on teaching as she/he wants us to believe.

The condescending self assurance of the reviewer blinds him/her to the power of habitus. If s/he would take the time to consider carefully the implications of teaching as praxis some very significant changes might be deemed worthwhile in how teachers are educated in his/her institution.

REVIEWER 1.30: Ken comments, on page #41, about potential changes in Loretta's teaching as a result of her coteaching experience with Michael. However, the reader is provided with no evidence of any changes in Loretta’s subsequent questioning style and/or teaching approach. The value of co teaching must be based on presentation of empirical data and not on what appears to be possible at an intuitive level.

OUR COMMENT: This change is not the focus of the paper. Rather, we addressed it elsewhere in our writing (e.g., Roth, Lawless, & Tobin, in press). But Tobin was there to witness in person the coteaching between Michael and Loretta.

REVIEWER 1.31: Michael's comment about the value (or lack of value) of structure at the top of page #42 is interesting. It is not at all clear why a supposedly expert and experienced teacher would think "structure is bad."
OUR COMMENT: It’s a fact that as a constructivist and student-centered teacher, Michael has not overly structured students’ activities. His success as a teacher and the recommendations he received for his teaching and awards for his research on teaching only testify to it. Throughout his scholarly career, Michael has shown the benefits of learning environments with as little structure as possible (e.g., Roth, 1995 “Authentic School Science”). Just as an aside comment, the issue of structure also was a big issue for Ken. His students did not have the social capital of the middle class and Ken found himself scurrying to provide a different form of structure that was appropriate for what his students did bring with them from their homes and did not assume capital they did not have.

As for the tone of the final sentence. Shame on you reviewer! How dare you raise questions in a blind review about the level of expertise/experience of a colleague.

REVIEWER 1.32: Toward the bottom of page #42 Michael speaks about the collaborative relationship he has experienced with teachers in coteaching situations. One wonders how collaborative his situation was with Loretta, given that she referred to him as Dr. Roth in front of the students. Were Loretta and Michael really on equal footing in terms of whose advice about teaching and subject matter were considered?

OUR COMMENT: This reviewer statement is totally insensitive to our local culture. First, professors at UVic address each other in formal meetings (department, faculty) with their titles (“Dr. X…”). Second, undergraduate students address their professors with their titles. Third, graduate students from the large Asian population here in the Pacific Northwest have difficulties addressing their professors other with the doctoral title because of the customs in their home countries. (The editors can find out more about this from the article Roth & Harama posted at Roth’s web site.) Loretta addresses Michael in class as Dr. Roth for the same reason, and to have her students learn to respect others. Use of the term Dr. Roth (or Dr. Tobin) is a sign of respect, a sign the reviewer might consider when writing reviews without signature. Furthermore, what does the reviewer have in mind as the bases for collaboration? How does the use of “Dr. Roth” give any sign of whether or not a relationship is collaborative?

REVIEWER 1.33: At the end of the paragraph preceding the Implications (page #43) section, the authors claim that their recommendations are based on practice rather than the “traditional route that led from theory to practice.” Indeed, the contrary is the case. The recommendations and the framework for the investigations are heavily derived from theory, at times a theory that was a forced-fit to teaching. Little new insight is provided about teaching, the manuscript simply describes the familiar in unfamiliar terms.

OUR COMMENT: Again, the reviewer gets it wrong. We derived our epistemology by engaging in teaching middle and high school teaching. We are not judging others from a high horse. Our work—and this article shows it—is deeply grounded in praxis. Ironically, the reviewer has force-fit a framework on our paper in making his/her critique. Of course there is no problem with this -- how could it be otherwise. In the declining spirit of Erickson, however, we would argue that this reviewer is indeed a bricoleur who takes what is available to make comments that could never pass peer review or even argument in a small group of peers. In many respects the reviewer shows a complete lack of respect and is taking advantage of a perceived power edge to run up the score on the authors. One thing we have learned in the science education community is that it is imperative to assign respect to our colleagues who spend many hours thinking about issues with the hope that improvements will occur in places where they will make a difference. Some of our dearest friends and colleagues hold the most antagonistic perspectives to our own, but we respect them, listen to their arguments and give them full respect in our interactions with them face to face or in peer review (double blind or as is the case here single blind). We must say that in some instances we have signed our reviews so that an author can contact us about our comments. What is paramount in our profession is to treat seriously the work of our colleagues and even if you disagree to show the utmost of respect for their perspectives. Go further, try to learn from them.

REVIEWER 1.34: In the Implications section, the authors extol the values of learning by doing. However, it is not clear that anyone has recently claimed otherwise. The authors claim to have based their implications on the results of the current study, but one is left wondering whether what was reported was a study at all. Virtually no data is supported for the claims that have been made.

OUR COMMENT: The reviewer fails to note that nearly all teacher preparation program have their students follow 4 years of lectures in the ivory tower before allowing them to engage in some (e.g., 6-15 weeks) “practicum.” The reviewer has failed to grasp the purpose of the paper, assigns a set of purposes that were not intended by us, and
makes his/her claims accordingly. We have been in the Academy for a long time and have assumed numerous editorial positions. Reviews like this one are of little value and maybe are quite deleterious.

REVIEWER 1.35: The authors spend much time discussing the virtues of an “insider’s” view for the education of prospective teachers. Interestingly though, what has been presented as an “insider’s” view in the manuscript will not at all ring true to practicing or beginning teachers.

OUR COMMENT: This is a hypothesis that is not substantiated by the reviewer. We have shared the initial version of this paper with coop teachers, supervisors and methods instructors and used it as a basis for discussion about learning to teach. Whilst we cannot see it as being good bed time reading the readers seemed to understand the paper and found it useful in framing their roles during their year-long field experience. Not only that, colleagues from around the country have written requesting the paper and not one of them has written back with stinging rebuke. We would not be surprised to see it heavily cited. In addition, in a series of articles (Roth & Boyd, 1998; Roth & Boyd, 1999; Roth, Masciotra, & Boyd, 1999) we showed that the preservice teacher Nadely Boyd not only learned in the coteaching situation. She also learned from and about our “praxeology, and from writing about our respective teaching in this way using the notions of being with, Spielraum, and habitus.

REVIEWER 1.36: In the section on Assessment the authors discuss how Cam or Ken would have been viewed as unsuccessful if evaluated with a “traditional teacher performance checklist.” The authors claim that these instruments do not consider the context of Ken's teaching and, therefore, misrepresent how well he may have taught. With all due respect, Ken's described performance was anything but successful regardless of the assessment approach. Using Ken's performance as a reference point to gauge the success of other teachers ...

OUR COMMENT: With all due respect, the writer of these comments should dare go and teach in the situation in which Cam and Ken are teaching. From a traditional perspective, they achieve much more than what has been done, especially from the high road taken by the reviewer. We engage in coteaching exactly in opposition to the kind of stance taken by the reviewer. We articulate our framework and how we go about it throughout the paper. We do not regard Ken's teaching as successful. The point is that it is going to take someone like Ken to go in there and learn how to teach these students if the situation is ever going to be addressed. Writing standards for K-12 students and for teacher education does not address the critical problems. It is often dangerous in there and if science teacher educators get the impression that it is easy they should roll up their sleeves and show how. Ken went to the school because the students in Opportunity had been set aside. Now that he has been there for over a year he can see that the school has been organized in ways that are very counter to sound educational thinking. This in the face of the superintendent receiving numerous awards for the policy initiative that launched Children Achieving in our city. People making decisions and policies from the side are endangering urban schools in many respects. Let this reviewer walk the walk in neighborhood high schools. Not the magnet and lottery schools--they have contributed to the problem. Teachers who can make a difference in urban schools will first have to learn to teach in urban schools-- and in so doing they will benefit not so much from self righteous preaching from those who have become teacher educators but from teaching, from coordinating praxis and praxeology.

Reactions to Andy’s Cover Letter

Anderson: … what this manuscript has to offer is new rhetoric without fundamentally new insights into very complex and important issues.

The paper explores critical issues of teaching and learning to teach science in terms of two theoretical frameworks that have NOT been applied extensively in science, Bourdieu's habitus and a powerful idea of coteaching that is embedded in Heidegger (being with/in) and Schön (coperparticipation). To describe these ideas as rhetoric is to have only a surface level understanding of our goals in writing the paper and the significance of the changes we are proposing.

Your editorial remarks about teaching in Opportunity (small learning community) suggest that you have not
attended to the declared intentions of the paper. The vignettes about Opportunity were used in the paper to present a situation in which *habitus* breaks down and to show the promise of coteaching in situations in which learning to teach is a goal.

We disagree on the congruence between craft knowledge and *habitus* and see the ideas of Bourdieu as being highly relevant to the goal of learning to teach and teacher education generally. In fact, it is central in thinking about some of the ongoing challenges of the theory/practice gap. Habitus was introduced exactly to address the role of craft knowledge and situated practice. Habitus, in Bourdieu’s descriptive “structured structuring disposition,” is central to Jean Lave’s work. To say that the notion is irrelevant is simple ignorance of current streams in research.

Even though you claim to have coteaching as a central part of your own science teacher education program we have not read one paper from your research group on this very important issue. There are few theoretically rich descriptions of coteaching in the literature. We regard our paper not as a validation of coteaching but as an exploration of the concept and an illustration of how coteaching can be enacted and to describe its potential in theoretical and to a lesser extent empirical terms. A paper that describes the practical and theoretical issues of enacting coteaching is forthcoming. We regard our paper as timely and view it as a problem in the science education literature that there is a dearth of theoretically rich papers to inform practice. Our paper addresses this perceived shortcoming.

Your summary suggests that we are writing a paper about urban science education. This is not the case in this paper. The paper is about learning to teach and teacher education. Urban schools are an important context for the study because so many teachers have to (re)learn to teach in such contexts. As is often the case in research, we find it convenient to provide vignettes from one end of a spectrum to illustrate critical issues that must be addressed generally. That Ken did not expect to be so unsuccessful initially draws attention to many student teachers who, no matter where they are assigned, have to learn to teach. Our paper provides some tools and suggestions for rethinking how we approach assignments and roles pertaining to learning to teach.

*Anderson:* At times you come dangerously close to the kind of logical fallacy that we associate with "constructivist teaching." The fact that students must construct their own knowledge does not logically imply that they never benefit from being told things. Similarly, the fact that prospective teachers must develop their own *habitus* does not logically imply that coteaching is the only method through which a productive habitus can be constructed.

Your comment is uncalled for in your role as editor. A close reading of the paper would show how we place ourselves regarding the role of praxeology and praxis--in fact this is the thesis we are developing in the papers. In our revised version of the paper, as it was in the initial version, we address this issue explicitly and do not come dangerously close to the logical fallacy you describe. The problem with what you have said is that the first two of the above sentences are uncalled for and not relevant to the point you want to make. Are you implying that we state or believe that coteaching is the only way to develop habitus? If so, it might have been better to have just said that and taken us to the places where we seem to be stating or implying that. On our careful reading of the paper we do not find places where this is a problem. Andy, the role of editor is to facilitate good publications and to lift the level of the research that gets published in the journal. We find comments such as those excerpted above to be discouraging and they build an attitude of resentment. We see JRST as our journal and want to feel welcomed by the Editors and their polices. We would have preferred to receive a more encouraging response from the Editors. We knew we were taking risks in writing this paper as we did -- but still we chose JRST as the venue for possible publication because of our commitment to the organization.

Your comment about economic feasibility is personal opinion and has to be tested before such sweeping statements can be made. In the past, we have provided calculations (e.g., Roth 1998) which show that teacher development would cost less in coteaching arrangements. Furthermore, UPenn has implemented coteaching across
their program. Thus, we see that it is feasible, though the effect of contextual factors mediating feasibility in other settings need to be researched.