

# VII. Evolution of Thinking About Professional Development

## Introduction

In coming to know and understand the teachers and the processes they went through, my understanding of what it means to be a teacher evolved. I began to equate teaching with a being a performing musician. As with musicians, teachers have a certain fundamental set of theories they operate from – these are time tested as a whole, yet individualized with each performance. As with musicians, there is also that unspoken, indescribable thing that makes or breaks a teacher (Interview with Mr. Gabel, 2/25/99). This certainly parallels the music world – that indescribable thing is what separated Salieri from Mozart.

As I began to know and understand Evelyn and Therese, they became, in my mind, like two well-known, respected musicians. Evelyn became, for me, Ray Charles and Therese became Ziggy Marley<sup>1</sup>. Why these two artists? Because they are both respected artists, yet of such different styles and approaches that comparison becomes very difficult. However, as with Ziggy and Ray, these two teachers did

---

<sup>1</sup> This comparison is not meant to imply that these teachers are of a particular quality. Rather, it is meant to explore their differences and hold them next to each other for discussion.

have some very important beliefs and styles in common and there were several learning points for me that were common to both.

Evelyn was definitely a “sit at the piano and play” kind of teacher. She enjoyed teaching, but you could only tell by looking at the subtle smile on her face, not by simply watching her or listening to her. Like Ray Charles, she was dignified and unwavering in her approach. Her audience, the students, sat and absorbed the teaching she presented much the same way that Ray Charles’ audiences sit in a dark room and watch attentively. Evelyn always remained in control of her class. She remained the center of the learning throughout the research and, even when facilitating, showed ties to more traditional ways of teaching. Like Ray, her repertoire was built of time-honored classics such as having students work problems on the board and do worksheets. However, she was also comfortable enough with herself and her skills that she could add small twists to the repertoire to keep it alive and interesting. She added a dash of cooperative learning here, and a sprinkling of real world tie-in there to create a more individualized playlist, customized to the audience in front of her.

Therese as Ziggy, was more interested in getting her students to stand up and experience learning. At a Ziggy Marley concert, no one remains seated – everyone stands and dances and experiences the music. This was Therese’s goal – for the

students to experience their learning. It seemed that in some small way, they were affected by the steady reggae beat she sends through the audience. Yet, like Ziggy Marley, Therese realized the importance of both accepting what came before and updating it for today. She was trapped in a system with expectations set by a previous generation. However, she was willing to take the old song list and make it more exciting, more alive, and add to it in ways that tie together what was known and what is happening. She was doing more than adding little twists to the old songs, though. She was also creating entirely new pieces from what she understands of the old and of the now.

Would it be fair to say that either of these teachers was better than the other? No. However, they do have very different styles, different strengths, and different needs. These differences helped inform me about how to support them in becoming the best they could be in their own medium. It is the purpose of this chapter to show how they overlapped in order to evolve my thinking about the professional development framework. Specifically, I will address the areas of the role of the professional developer, the role of change itself, and the importance of doing versus understanding. Further, I will explore the evolution of my thinking about reflection and proximal goals by reflecting back on the cases.

## **The Participant Observer as Conductor**

Throughout this dissertation, my role as the professional developer and participant observer has been only partially examined. It is important, in keeping with the musical metaphor, to remember that the professional developer was the conductor for this effort. While in the end, the teaching was only as good as the individual efforts put forth by the performers, it was my job as the professional developer to know which parts needed to be further rehearsed, which parts could wait for another day, and which parts were being interpreted well or not well.

As the conductor, I held the baton, decided the course for many of our sessions, and, absolutely, colored the teachers' music with my own interpretations of what teaching could be. While it was the teachers' reflection or implementation of proximal goals that changed their classrooms, it was my bringing in those parts and putting them in front of the teachers that brought the strategies into the concert of the classroom in the first place.

As the participant observer, I tried to be as much like an audience member as possible. However, I was an intrusive audience member and one who became a part of the music. At times, it was easy to balance the role of conductor and the role of audience member – much like the conductor of a jazz ensemble works with the ensemble in rehearsal, but lets the ensemble take charge in a performance. I was

always present, but not always leading or interfering. In the cases where it became impossible to balance the two roles, I always attempted to protect the inquiry at the expense of the professional development. This meant that I introduced strategies to the teachers rather than waiting for them to decide they needed them, used a tape recorder even though it may have squelched some of the conversation, and tried to move the teachers in directions that they may not have gone naturally. However, to the extent possible, I maintained the integrity of the professional development role as I had conceived of it in my preparation for the data collection.

The implications of my role as the professional developer are worth considering. For instance, what would have happened if I was not knowledgeable or willing to learn about all of the areas we covered in the four months? What happened when I left? And what would happen if someone else tried to implement this same framework in another classroom? Is it possible that someone who does not have the knowledge base I have would be able to implement this framework in a meaningful way? How did this approach fundamentally differ from a top-down directive for reform – after all, it was my decision that the teachers should become more learner-centered, not their own?

These, and the other questions that emerged through this research, are all important questions that point to much need for further inquiry. However, the

purpose of this dissertation is to explore the data already collected to consider the impact and implications of this initial implementation of the framework.

## **Cross-Case Analysis**

### **Role of the Professional Developer**

From my work with these two teachers and the discussions I had with the outside observers involved in my data collection, I came to understand more about the role of the professional developer. I found that in this situation, the professional development support person should be a facilitator who is well-versed in the research literature as well as having experience in other classrooms. It was my ability to bring in stories of other classrooms as well as examples from the literature that helped build my credibility with the teachers. For example, I was able to use stories from my own experiences and from the literature as a basis of interview discussions (Therese Interview, 11/18/98) and as explanation of particular approaches I was promoting (Evelyn Interview, 12/7/98). Further, by recommending certain reading materials, I was able to effect changes that I had, through my previous attempts, been unable to achieve. The most important of these changes was Evelyn's movement toward a guiding approach in her questioning.

Next, the professional development support person should be just that, a support person. This means, that she should offer feedback, act as a second pair of eyes in the classroom, help the teacher find solutions to problems through reflection and brainstorming, and, perhaps, sometimes own the change process. As was shown in this research, promoting reflection had, by itself, a huge impact on both teachers. They were better able to discuss their own work and move toward their goals at the end of the research than at our outset. Evelyn, more than Therese, seemed to improve in her reflective skills. Therese, more than Evelyn, seemed to probe deeper into her goals and her own understandings in order to improve her teaching.

While being able to fully support the teachers is necessary, acting as an advisor to the teachers is not. I found it best to let each teacher have and interpret experiences on their own. For instance, while Therese seemed to understand and agree with conclusions I had posited about the students' problems on a scenario, it was not until the next session when Therese herself worked with the students that she was willing to treat those problems. While she indicated that she trusted me, she needed to see the problems with her own eyes in order to act on them (Therese, Interviews, 12/16/98, 1/13/99; Observations, 12/16/98, 1/13/99). In many ways, my experience seemed to be significantly like that of Richardson (1992). The teachers showed more interest in topics that arose from their concerns rather than those I

suggested. In fact, when I commented on readings, the conversation often stopped. Whereas, when they talked about the readings, their discussion grew.

Further, the professional development should take place in a context of one-on-one support and community support. While one-on-one efforts seemed to make the most difference in the classroom activities of these teachers during this limited study, there were undeniable gains made through the collegial group as well. For instance, the collegial group's generation of proximal goals for reading for understanding helped each of the teachers think through that problem and work together to improve the situation (Collegial Group, 1/21/99). In the final collegial group meeting, another important transformation occurred. Evelyn stepped out of her role as professional developer and mentor to Mr. Crane and Therese and learned from them (Collegial Group Observation, 2/26/99). This shift in dynamics was important for the teachers as it allowed the newer teachers to be the "experts."

### **Teacher Change**

At the outset of this research, I felt confident in my knowledge of teacher change and adoption. I knew it would be slow and difficult and probably met with some resistance. I also believed that if I could help the teachers see the value of change, they would surely adopt more and more of the facilitative practices I was

promoting. What I did not expect was the most important aspect of teacher change: these teachers did not change for themselves, they changed to help their students.

My initial inclination had been to center the proximal goals around the teachers – naming the steps they needed to take in order to become great facilitators. What happened, however, was that the proximal goals were centered around student improvement and how teachers could make that improvement happen. Therese first suggested this notion on 11/18/98 when she suggested that all of the changes she thought of to improve her own teaching always come back to what she wanted the students to be doing. She reiterated this idea again in a collegial group meeting when she suggested that using the students’ problems might promote reflection that could lead to change (Collegial Group Observation, 2/26/99).

In my experience with these two teachers, it became quickly apparent that the way to change them was through the goals they had set for their students. I strongly believe that it was only through this approach that Evelyn was willing to change at all – after all, she reported numerous times that she felt she was doing an excellent job of teaching (e.g., 2/25/99). However, when asked how she would improve her teaching, she could point to certain changes she would make to help her students reach their goals. For instance, she offered that she should ask certain kinds of

questions and increase student opportunities for learning through extension activities (Interview, 2/25/99).

### **Doing vs. Understanding**

Another area that had a tremendous impact on my thinking about professional development, and teaching in general, had to do with the difference between *doing* something and *understanding* something. It seems that professional development, traditionally, is aimed at “doing level” skills. That is, it is aimed at filling the teachers’ toolboxes with many activities they can do in their classrooms. They can put students in groups, they can have students do research, they can use manipulatives. However, very little time is spent supporting teachers in developing an understanding about why to use these tools, how to use these tools, or how these tools will impact student learning. This *doing* and *understanding* dichotomy also carried through to the classroom and affected the way the teachers taught. For a simple example of this, I return to my first observation of Evelyn’s math class (Observation, 10/29/98). She was trying to explain addition of positive and negative integers to her students. She represented the negative numbers with filled in circles and the positive numbers with empty circles. She placed these in lines over each other and crossed out the corresponding number of circles to leave two empty

circles. She then told the students that this was called using manipulatives because it allowed them to easily see what they are doing. However, using manipulatives, is generally understood to mean actually using objects that can be shifted around (J. Moore, personal communication, April, 1999). While this point at first seems minor, it becomes an excellent illustration of the difference between *doing* and *understanding*. The teacher was providing a visual representation for marking out circles and counting what was left – a good technique. However, she was not allowing the students to become physically involved in the math by using solid objects that they could move around and figure out. By drawing on the board, the numbers remain more abstract than if there were solid objects. However, to the teacher, one was the same as the next. She did not yet *understand* manipulatives even though she felt she was *doing* manipulatives. If she had developed an *understanding* of manipulatives, she would have realized that part of their value was in the students' actual handling of the tools to solve math problems.

Another example of the pervasiveness of the *doing* level of thinking and professional development came from an interview I had with Ms. Murray. In this segment, she is describing what they did in a workshop that she attended the previous year:

They were basically like – more math problems per se. Um – algebra problems, using algebra tiles to come up with answers. Basically higher order thinking problems using algebra tiles or using overhead and giving certain numbers to see if you can match it up. There were a lot of logic-type of problems – one which was very, very interesting. There were basically logical problems. I think it as basically based on the new standards that we are now working with. Most of the mathematics that we did – it was like a mathematics seminar. Most of it really dealt with the new curriculum that’s coming out with the new standards, so that’s what we really concentrated on.

(Interview, 10/29/98)

This description describes a situation in which professional development was perceived as working good math problems. In other descriptions of math workshops that she provides, Ms. Murray provides similar descriptions to this. All of this indicated to me that either the professional development is not addressing understanding math and pedagogy or that the participants are not taking the message away.

The emphasis on doing was once again brought to my attention in the one CRI workshop I attended during my data collection (Peer Coaching Workshop Notes, 2/9/99). In that workshop, the goal was for the participants to learn about peer coaching. In the workshop, we participated in several activities designed to help the teachers become peer coaches. For example, in one activity, we watched a role play. The role play was an interesting approach except that it asked a novice peer coach to

support a teacher in a hypothetical situation. There was no real debriefing about what went well or did not go well or how the participants could see this working for them. Further, no one else had the opportunity to attempt to be a peer coach or ask questions about what the limits for peer coaching were or what it might be particularly good at. In the end, the participants were given a nice set of support materials: a handout titled “What Does a Coach Do?,” and pair of handouts with advice about how to give and receive feedback, two observation instruments, an article talking about the development of peer coaching over time, and the worksheet packet we had used during the workshop. These are all doing-level items. The teachers left there without a chance to practice being peer coaches, without a chance to discuss the pros and cons of peer coaching, and without having a chance to critically examine peer coaching as a tool for their toolbox. It is no wonder the teachers do not convey a conceptual understanding of what is covered in professional development activities if they never have to think about the concepts being discussed and they are not supported in integrating the concepts, and they are sent to workshops with little thought of whether or not the workshop is appropriate for their professional growth.

This over-emphasis on *doing* pushed the framework to focus more on reflection. In fact, reflection became a foundation – ever-present and always going a

little further. Through this stronger emphasis, the teachers were able to examine innovations and approaches more critically. From this, the underlying hope is that if teachers are more critical in their classroom decisions, they will model more critical thinking and allow for more higher-order learning than those tightly tied into *doing*. The students, after all, were rewarded for right answers, not good process. They were rewarded for being the first to finish an assignment, not for using the best thinking skills. And, they were rewarded for giving the teacher the answer she was looking for rather than learning to think for themselves.

## **Reflection**

One of the most important evolutions in my thinking came in the area of reflection. When I developed the original professional development framework, I envisioned proximal goals being at the center of my work with the teachers. After all, growth and change came through meeting those goals. However, in the enactment, reflection was the single most important element of the work I did. Both teachers reported that they found the reflective questions to be valuable (Interview, 2/24/99, Interview, 2/25/99). They both reported that the constant self-examination helped them to stay “on-task” and helped them become better teachers.

This is not to say that the proximal goals were unimportant. My work on this project demonstrated that the proximal goals help the teachers to stay organized and focused. In both classes, the goals provided more structure for the students – that is, they knew more about what the teacher wanted them to do each day. Further, Ms. Collins reported that the goals helped her feel like she was making progress and feel less frustrated by the day-to-day activities in the classroom (Interview, 12/9/98). The data also indicated that the proximal goals were helping Ms. Collins think through her goals for her students. They were acting as natural stepping stones for her. However, it was reflection that made the proximal goals more powerful. If the goals had been implemented in an environment that was not centered around reflection, it is quite likely they would have lost the qualities that made them valuable such as their ability to help teachers move between goals and their ability to help focus the environment.

Reflection was also important because of its relationship to the teachers' beliefs and actions. The reflection did, as expected, serve as a tool for aligning beliefs with actions in Therese's case and for reconciling conflicting beliefs in Evelyn's case.

## **Proximal Goals**

As presented in Chapter II, proximal goals were to be used as motivational strategies to help move the participants from being teacher-centered in their classrooms to being more learner-centered. The initial concept would have involved me working with each teacher to identify the areas in which each most needed to work on to become more learner-centered in the classroom. The likely implementation would have involved me developing the proximal goals with the teachers, or, more likely, for the teachers, and giving these formulated goals to them almost as a doctor hands a patient a prescription. The goals were to be focused on the teacher's efforts and the distal goal being for the teachers to become learner-centered facilitators while they used the simulations.

During this study, however, I realized that this approach would be inappropriate. After all, it fell short in a number of ways. First, it did not allow the teacher to own the change process. The changes that would have been made would have been the changes that I, as the professional developer, found appropriate. The teachers may or may not have found value in those changes and would have, at best, tried them because they wanted to help me not because they intended to use the ideas once I left. Second, this process would have been professional developer dependent. I would not have supported the teachers in learning how to generate proximal goals

for themselves. Rather, I would have been providing them with one more crutch to use and adapt to their situation in whatever way they felt was appropriate – whether it was consistent with the ideas behind proximal goals or not. Finally, the process as originally outlined assumed that the teachers would buy into the idea of changing for the sake of changing. It required that they know my perspectives on how teaching should be and adopt those. In short, the approach as initially proposed was not learner-centered. Rather than modeling the environment I wanted each teacher to create for her students, the initial plan required me to dictate how the teacher should react and behave with her students.

Fortunately, I realized much of this before implementing the proximal goals with either teacher and was able to make some dramatic changes in the approach so that the teachers could own the process and buy into it. Rather than focus the proximal goals on changing the teachers, I found it far more effective to focus the teachers' attention on improving what was going on in their classrooms. Once the teacher identified the areas she wanted to see the students improve in, we were able to break those areas down and each teacher was able to base her classroom behavior on meeting those goals.

As discussed in the case studies, each teacher was introduced to the notion of proximal goals very differently. In my work with Therese, the proximal goal

generation was originally far more directed by me than by her. In analyzing the data from my work with her, it became apparent that I cheated her out of grappling with the issues for developing the goals. She quickly became dependent on me to provide her with a list to work from. Fortunately, Therese was a reflective teacher who was comfortable altering the list I gave her to fit her students' needs, thereby preventing me from pushing her in a direction she would not have been comfortable with. By the end of my work with her, she was generating proximal goals quite naturally by herself and often spoke of her work with the students in terms of the next goal they would work toward.

In my work with Evelyn, I found myself at the opposite extreme. Because Ms. Murray began our research feeling that she was a very good teacher and because of her role as the professional developer for the school, I felt that she would be very resistant to ideas that I suggested for change. Therefore, I introduced proximal goals to her more as an idea to try in her room. Without any guiding questions and only a few examples to work from, Ms. Murray developed and implemented some goals; however, they seemed to lack the specificity needed to be successful. Evelyn did adopt goals somewhat, but still felt that they were something that happened outside of her regular teaching.

By the end of the research, I had developed a question framework for this process that I used collaboratively with three members of the collegial group (Appendix F). Based on the response in the group and my other work with the two case study participants, it seems that these questions should have served as the basis for the development of proximal goals from the beginning and that the introduction to proximal goals could have come in the form of a discussion based around these questions. By shifting proximal goals in this way, there is a focus on what the students need to improve and all of the strategies that a teacher can use to support this improvement.

Overall, this work was an important shift in the use of proximal goals. Rather than using them for learning, as they are commonly discussed in the literature, the proximal goals became tools for teaching. Further, from working with these two teachers, it seems that there is great potential in using proximal goals as teaching tools. They served as a structuring device to not only help the teacher see where the class was in relation to goals that had been set, but also move forward in getting the students from Point A to Point B.

## Resources

In my work with these two teachers, I found my initial inclination to provide a small library of materials for the teachers to be flawed. By doing this, I actually prevented them from using the resources because they were overwhelmed. Through the discussions I had with the teachers and my observations of what it took to promote the teachers reading any professional development materials, my understanding of how they should be used evolved. First, the materials should be provided on an as-needed basis, but as immediately as possible. If a teacher was struggling with collaboration, for instance, to be able to pull out an article with good ideas and provide it on-the-spot would have greatly increased the chances of the article being read. Further, it would likely not have been one of the many articles being skimmed over because it had immediate relevancy.

Next, I found that, because of time constraints, teachers often do not read entire articles, therefore the articles chosen for professional development should be very clear and include structures that help guide skimming such as numbered lists and bullet points. The point of the article should be to help the teacher, not hold her captive.

Finally, through a combination of the resources and collegial group, I learned that teachers have the power to influence each other. If one teacher reads an article or

book and finds it exciting, she can help motivate others to read. For longer-term efforts, this effect could be very important.

### **Collegial Group**

The collegial group in my research effort proved to be most valuable in two ways. First, it provided a forum for sharing ideas and helping each other. When we began our work, the teachers did not know anything about one another's simulations or what was going on with them. By the time we ended, the teachers knew at least a small amount more, but, more importantly, they realized that they were all struggling with the same problems. Through the group, the teachers were able to brainstorm new ways of dealing with problems as well as learn from each other's experiences. Second, the collegial group helped equalize the teachers. In the first meeting, Ms. Murray took charge – and, it seemed that this was a fairly typical experience. However, through the sharing of different experiences and the opportunity to discuss issues in a informal setting, the teachers quickly shifted their interactions with each other. Everyone could be the learner and everyone could be the expert.

### **One-on-One Interactions**

At the heart of my work with the teachers were the one-on-one interactions I had with them. Through these interactions, I was able to build trust, promote

reflection, suggest strategies, and offer opinions. Both teachers felt that this one-on-one relationship was vital to keeping them “on track.” In their reflections they noted that the benefit of having me there was that it forced them to keep progressing in their work and to keep working with the simulations and the teaching styles they were cultivating because they knew I would be there and expect that. While the interactions I had with the teachers were more intense than could reasonably be expected in practice, it seems that the positive influence of the interactions makes them worth considering further. It may be that part of the interaction aspect of the framework could fall to peer coaches or the teachers could work in teams and alternate roles. However, it also seems that sometimes the interactions were successful because of the expertise I could offer as a developer – especially the expertise of outside experience. My knowledge of how the simulations worked in other classrooms and my knowledge of the literature were both beneficial to the professional development effort at certain points.

### **Simulations as a Problem-Solving Tool**

While this dissertation sought to understand supporting teachers as they used simulations, little attention has been paid to the simulation thus far in this discussion. The simulation environment was important in this research for two reasons. First, it

provided the teachers with an environment that was built to promote problem solving. They freed the teacher from the constraints of having to develop materials that promoted problem solving. Second, they were important because they were on the computers. The students were intrinsically motivated to use the computer and, therefore, worked on the problems more diligently than they likely would have if the problems had been paper-based.

However, in some ways the simulations also interfered with the goals of problem solving and critical thinking. For instance, their multiple choice answers promoted non-process oriented discussion as the teachers asked how many students chose the right answer. Further, the multiple choice answers provided an opportunity for the students to appear to be solving problems when they were actually guessing at the right answer. Both of these aspects of the simulation strengthen the notion that teachers need to ask the students high-level questions to be sure that the students are working on the leading edge of their abilities.

Further, the simulations did not support students once they did start to think. For instance, in Ms. Collins class, students who asked questions that could have led to more learning were stopped by a total lack of the information necessary to pursue learning. One instance of this involved students wanting to know which grade of paper had the highest profit margin for the company. They were unable to determine

this because the only data they were provided was the selling price for the paper and not its production cost. Another example involved a student wanting to know what the implications were of a smelly chemical that the paper company had released into the air. He wanted to know if it would break down or if something else would happen. Because the program did not provide the name of the chemical, the students' curiosity could not be followed up on and a learning opportunity was lost. While this kind of problem is not worth discontinuing the use of the simulation, it is something that the teachers need to be prepared for by being willing to recognize the quality of the students' questions and by promoting the students' attempts to learn answers to these questions when it is possible.

### **Evolution of the Professional Development Framework**

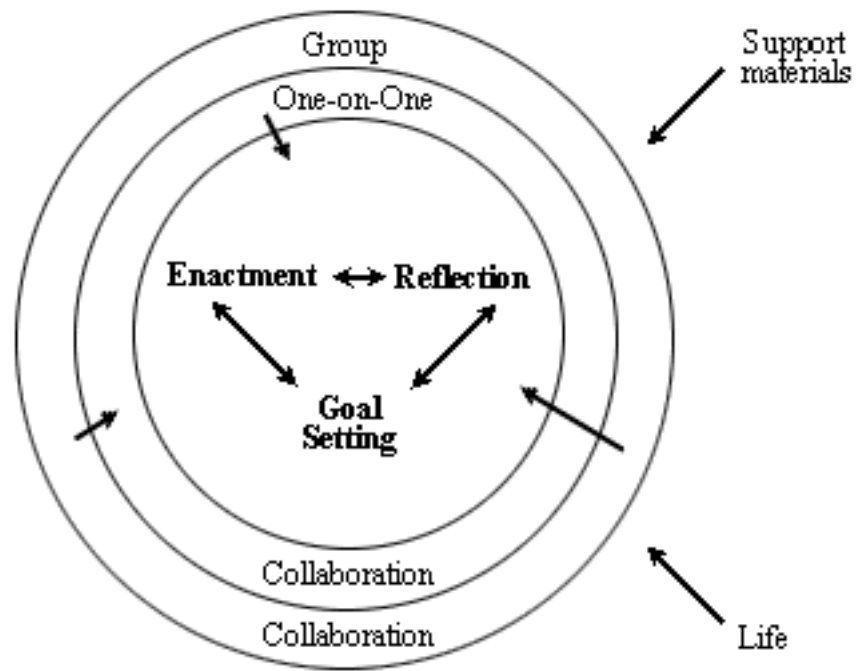
The work reported in this dissertation has led to a major evolution of the professional development framework originally designed for this project. This new framework is certainly not complete and, pending further exploration, will likely change over time. However, it is, based on the data presented in this study, a viable and effective approach for supporting teacher change.

## **Factors that influenced the framework**

The new framework reflects an evolution in thinking about its original components. In addition to looking at certain elements differently, it includes some of influences that were not originally accounted for in the original framework. For instance, “Life,” as shown here, represents all of the outside factors that influenced the teachers and what they did in their classrooms outside of implementing the simulations in a learner-centered way. Some of these influences in this study included having the computers freeze up on them, having the principal come into class looking for an attendance sheet, being tired from working a second job, or being worried because of problems in their personal lives. They are important to the framework because that affected the classroom in unpredictable ways. However, in my work with these two teachers, I found that many of the factors that this influence brings can be planned for. For instance, teachers can create back-up plans for computer failures as Therese did by having her students prepare a debate based on a situation in the simulation. From a professional development perspective, life as an influence is important because it points to the need for flexibility and individualization in the implementation of the professional development effort. This seems to be especially true in environments in which technology is being used.

The other outside factor that influenced the framework was resources. In the case of my research, I found that the resources impacted the teachers when they were presented one at a time. However, they were unwilling or unable to deal with large amounts of information, even when it was organized. Further, the teachers could only know that which they had access to. If I had not introduced the questioning book (Chuska, 1995), they would likely have never read anything about questioning. In this case, without my materials, the teachers primarily had access to subject-specific materials. Further, they were mostly curricular rather than theoretical or generic pedagogical information. In implementation, this means that the teachers need to be provided with materials that will enhance their professional development experience. For example, I was able to provide materials that were focused on the issues of facilitating in this environment centered on simulations. These materials may need to be provided using a “just-in-time” approach, though, for teachers to really benefit from them. Further, the professional developer may need, as I did, to suggest particular readings and follow-up on those suggestions in order to ensure that the reading has occurred.

**Figure 7.1: Evolution 1 of Professional Development Framework**



### **The Heart of the Framework**

The new framework centers around reflection. Based on my work with these two teachers, I would assert that the reflectiveness must be developed before any change will start to appear. Therefore, the teacher and professional developer have to build a common set of experiences so that the reflection on enactment – that is, what the teacher just experienced in her class – can occur. Further, the facilitator needs to be able to help the teacher start to understand how pieces work together. For

instance, in my work with Ms. Collins, she stated that she was not sure how to support problem solving in the simulation (Interview, 12/1/98). Yet, when I watched her class, I often saw her promote problem solving in different ways. For instance, she had the students generate questions to guide their work, she promoted careful reading, and she started new activities by having students think about what they already know. The ultimate goal would be for Ms. Collins to recognize how her strategies all fit together. This can only be achieved through reflection and facilitator feedback.

Reflection must then be refined. In the study, this happened through repetition of reflective questions over time with the addition of more specific and more in-depth questions slowly replacing the generic ones. By using this approach, I found it easy to move the teachers to become more thoughtful about their practice.

Along with the reflection on enactment, proximal goals make up the heart of the framework. Proximal goals provided a motivational force for the teachers and provide a foundation for reflection. Further they offered a structure for change that was not present without them. They forced the teachers to really focus on her goals for the students and how she could get them there. Further, because they need to be constantly revised, the proximal goals provided a foundation for the teacher to

consider how successful an approach was and what other approaches might work as well or better than the strategies already tried.

The proximal goals needed to be introduced in a way that immediately allowed the teacher to take ownership over their generation. Further, it seemed they should be followed-up on in the collegial group. In this research, I found that with Therese, including the goals in a number of ways seemed to help her integration of the goals into her teaching style.

In this research, of the approaches I took to proximal goals, the one that seemed most appropriate, most clear, and most likely to succeed was the introduction of the proximal goals handout (Appendix F). When I used the questions to lead a discussion with the proximal group, I felt for the first time that the teachers were actually developing good, focused goals. Further, the questions helped provide a framework that forced the teachers, if they used them, to focus on the real issues of reaching whatever goals they had set for their students. Further, the questions seemed to have the potential to lead from Point A (where the students were) to Point B (where the teachers wanted the students to be) in a fairly seamless way.

Finally, enactment completes the triad of essential building blocks for the framework. It was through the enactment that changes happen. In this study I found that it was through reflection on the enactment that problems were highlighted and it

through the reflection that the proximal goals were developed. All three strategies depended on each other. No piece by itself seemed to be enough. In fact, in Therese, and to a certain extent Evelyn, the three pieces could no longer be separated by the end of my work at Thacker. They had become interdependent.

### **The Context for the Framework**

The two outer circles of the framework represent the context within which the change takes place. The first is one-on-one collaboration. It is during this peer-to-peer or teacher-to-professional developer interaction that deep reflection takes place. This is the context that allowed the heart of the framework to work. As pointed out by both teachers, if I had not been there, they would not have kept going in their efforts. In fact, Ms. Murray commented that she would have reverted back to her old way of teaching. Having that outsider present seemed to challenge them to hold a mirror up to their teaching and describe what they see to someone else. It was during these one-on-one interactions that the teachers seemed to grow the most and seemed to really try to work through some of the problems they were seeing. In order for this to be effective, I found that I needed to provide a safe environment and act more as a listener than as an adviser. However, I also had to support and encourage on bad days and was invited to share in excitement on good days. Further, there were times

when I needed to offer ideas or information based on other classrooms I had seen or articles I had read. Based on my experience, this one-on-one relationship needed to include both debriefing sessions and classroom observations. This helped build a well-rounded image of what was happening in the classroom.

The second context within which the change occurs was a peer group. In this research, the peer group served several purposes. First, it allowed teachers to share problems, stories, and experiences with each other. By doing this, the teachers' initial feelings of isolation were eased. Further, the collegial group allowed each teacher to be a follower and each teacher to be a leader. Even Mr. Crane, who had been very quiet in most meetings, came to life when he was asked a question that allowed him to share his expertise with the group (Collegial Meeting, 2/25/99). Finally, the peer groups allowed for learning – from each other and from the staff developer.

These contexts are, in many ways, the communications tools of the heart of the framework. Without the one-on-one interactions and the group interactions, there would likely be no chance for reflection and little chance for exploring new ideas.

## Conclusion

In summary, this research effort was successful in evolving the framework of professional development presented at the outset. Through the work described here, it is apparent that the notion of using a complex, constructivist professional development model (Richardson, 1992) can be a successful approach in supporting teachers in becoming more facilitative in these classrooms as they used the CRI simulations. Further, it supported the notion that reflection was vital to this change effort (Richardson, 1990).

Based on the findings from this research, it is likely that the nature of this computer-based simulation environment impacted on the teachers' initial approaches and their changes - and thus, on the framework itself. The data indicated that the teachers approached the simulations differently from the way they approached their other curriculum. According to Ms. Murray, the simulation forced her to closely examine the students' abilities as she planned. This means that Ms. Murray reported being more aware of, and perhaps more interested in, students' thinking when using the simulation than she reported being when she used her standard curriculum materials. This indicates that the simulations are potentially change agents in their own right. This may explain part of the success of this framework. Further, as already discussed, the simulations provided a unique learning environment centered

on problem solving. This may have had a positive impact on the teachers' willingness to consider student thinking and cognitive development. Finally, the simulation environment served as a focusing agent for the teachers. They were able to think about their goals for the students in this one, limited environment, rather than dealing with their class goals. In this sense, improving their work on the simulation could be viewed as a proximal goal to improving their overall teaching.

As with all research, this study raised many more questions than it answered. First and foremost, there is need for further exploration of this framework and some of the components that comprise it. We know virtually nothing about the value of proximal goal setting as a teaching tool or as a tool for change. There is still much to be learned about ongoing professional development and professional development through peer interactions. And, we have only begun to look at what it means to be a learner-centered teacher and the implications that being learner-centered has on professional development. Finally, this study raises serious concerns about how we promote understanding through professional development rather than simply supplying teachers with more tools to use.

Further, there are more questions than answers about how to develop the kind of learner-centered environments we want to see implemented in classrooms. For instance, the issues surrounding the teachers' use of the resources point to the need to

develop a system of information that provides pieces that are immediately relevant so that the teachers can and will use it. This would perhaps require some form of highly organized, computer-based professional development library in order to provide maximum support. However, there are currently no systems of this kind available. So, how would we build a system like this? And, what support would be needed to promote its use in the teachers' work days?

Another area that emerged from this research is how to scale this effort. First, can the framework be implemented by someone who is not an advanced doctoral student? If so, what are the time implications in bringing about sustainable change? What does the support look like? When I left the school, I felt the teachers were at a point where a peer coaching situation have adequately met the teachers' needs for reflection and communication. Would using a peer coach have been successful? What would the peer coach need to know? How long should the teachers be supported in order to see lasting change?

Finally, within the narrow focus of teacher change, this study raised the question of what cost was justified by the outcomes. I was one person working with only two teachers for four months. In that time I saw changes, but more evolution was needed to complete the teachers' movement to being learner-centered. While it is hard to know how much more time was needed, it seems likely, based on research

findings in the literature and reported in this dissertation that to make a meaningful, lasting impact years of support might be necessary. To implement a professional development effort of the kind explored here within even a single school would require a specially trained professional developer for an indefinite period of time. Is the benefit worth the potentially extreme cost of doing this?

In addition to these professional development issues, numerous other questions emerged for further consideration. For instance, how can we better use technology to promote critical thinking? In this research, the students grew out of the simulations too easily once they started to think deeply about what they were doing. What is the acceptable level of complexity for software products of this kind? Should the software be built differently or should responsibility fall to the teachers to pick up where the software leaves off?

Another aspect that came through in this research dealt with effective use of technology. The teachers often complained that in order to use the simulations they had to give something else up or that the simulation did not fit with their curriculum. What impacts do these issues have on the technology use? How can we use this framework of professional development to help the teachers tie their everyday curriculum and the simulation together? What kinds of curricular and physical

changes would have to be enacted to allow the teachers to do this? Finally, how do these concerns tie into the notion of the learner-centered environment?

In summary, there is much need for further research on professional development, on software design, on software integration, and on promoting critical thinking. This study merely provides a preliminary understanding of what the issues are and how they tie together.