

VI. Case Study of Therese Collins

Introduction

Therese Collins, the environmental science teacher in the institute, first greeted me with a completely puzzled stare. I soon learned that she never received her invitation to participate in this research project and had not been informed that she had been committed to participate in it by Mr. Gabel (Observation, 10/22/98). While the initial indication was that this could be a difficult situation, Ms. Collins never conveyed any resentment or dissatisfaction with the work that we did.

Therese was a newer teacher, with this being her third year of teaching (Collegial Meeting Notes, 12/20/98). Before becoming a teacher, Therese completed a degree in science and spent six years in the Army. She mentioned several times that she planned to continue studying science at the graduate level. Like many New York teachers¹, she began teaching on an emergency license and was going through paperwork process to become certified and licensed while I worked with her. She was drawn to the teaching profession because she found it easy and rewarding to

help people understand things. She explained, “I always like thinking about how people figure things out. I guess I knew what metacognition was before I knew there was a word for it” (Interview, 10/28/98).

Ms. Collins seemed to be constantly active – whether yelling at students to be quiet or pushing her way through the hordes of students that filled the halls between classes. After only a couple of hours with the kids, Ms. Collins frequently began to look worn and stressed out (Weekly Report, 10/30/98). This may have been from the students’ lack of attention to learning or due to the daily schedule that had her not only teaching six periods in a row, but switching classrooms three or more times during those six periods.

When in her own classroom, Ms. Collins tended to work mostly at the teacher station typical to many science rooms. She arranged her class at small tables in groups of three or four even though, in my observations, there was not significant teamwork during the class (Observation, 10/28/98).

¹ In 1997, 13% of the teachers hired by the state of New York were hired without a license in their main field. Of the teachers hired as new entrants (those who had not taught the previous year), 23% were not licensed in their main field. These numbers compare to the national averages of 8% of new hires being unlicensed overall and 11% of new entrants being unlicensed (Future, 1997).

Ms. Collins wanted her students actively involved in learning. To this end, she had her environmental science students collect bottles for recycling. Then, use the money from recycling for the school's fundraiser to help needy families. She also planned to help the students participate in the adopt-a-mile program and always watched for other positive environmental activities for her students to participate in (Interview, 10/28/98).

Ms. Collins reported that she regularly read professional development materials dealing with teaching science, teaching in general, and teaching reading. She was particularly interested in articles dealing with how students learn and those dealing with how students learn to read (Interview, 10/28/98). When I asked her about her interest in reading, she provided thoughtful insight about how her students often do not perform well because they do not understand what they are reading. Therese also reported that she sometimes tried out new ideas from the professional development seminars she attended (Interview, 10/28/98). She said that she altered the ideas presented to fit her own students better. She pointed out that often ideas gained from conferences and professional development workshops are too incomplete for her to readily adopt, therefore she had to adapt them.

In general, Ms. Collins seemed to enjoy teaching. She was convinced of the importance of making connections with her students and hated having them turn their backs on her during class (e.g., Interview, 12/9/98). She commented, “I know when I’ve worked with [the students] in smaller groups, I get something accomplished.” (Interview, 10/28). In many of my observations, Therese interacted by pulling up a chair and sitting down with a group of students to work (e.g., Observation, 12/2/98; Observation, 2/24/99). She rarely talked to the whole class as they worked on the computers, preferring instead to communicate with the students in small groups. Therese would tell the teams, one at a time, the information she needed them to have (e.g., Observation, 11/4/98; Observation, 12/2/98). Interacting with these small teams was how Therese seemed to feel most effective which was not surprising given the value she placed on understanding how the students were thinking. It also fostered a “safe” environment for the students. In Ms. Collins’ class, the students never hesitated to ask a question at any point.

Ms. Collin’s Green Mountain Paper Company Class

The seventh grade class using the Classroom, Inc. simulation, *The Green Mountain Paper Company* (GMPC), was the superintendent’s class. As defined by the school, the superintendent’s class was comprised of students who had scored in

the 70th percentile or higher on the math and reading exams administered by the school (Interview with Mr. Deveneau, 1/14/99). Because this was the top class, it was not surprising that Therese described them as having more pride in their work, being more disciplined, and better together than her other classes (Interview, 10/28/98). It was surprising; however, that in Therese's class there were only 12 students on the school's perfect attendance roll for the first semester and only six on the grade roster which only required a grade average of 85%. In fact, of those six students, the highest average was only an 88.6% for the semester (Bulletin Board, 1999).

Therese chose to work with this class because they are her most "manageable" class (Interview, 11/4/98). When I asked why she was only working with one class, Ms. Collins indicated that it was suggested by Mr. Gabel that she only do GMPC with one class (Interview, 11/4/98).

The class size fluctuated while I worked with Ms. Collins. It started out at 26, but through shifts in the classes in January two more students were added. Therese divided the students into eight groups of three and two groups of two students each. As with Ms Murray's class, this class was comprised of students from many countries and ethnic backgrounds and of spread from 12-15 years old.

Using Green Mountain Paper Company

Ms. Collins was introduced to Classroom, Inc. three years ago by being told to attend a workshop one weekend. Neither the program she used nor the choice to use it was her choice (Interview, 10/28/98). However, she this did not seem to upset her. In fact, when I asked her about the simulation, she commented that “it’s appropriate for what I do” (Interview, 10/28/98). She felt that this simulation offered her interesting avenues for raising the students’ environmental awareness. Further, she commented that using the simulation allowed her a stepping stone to help the students learn how to do research on the computer (Interview, 1/20/99). GMPC allows them a chance to get used to working on the computer and build their computer skills in a structured environment. She hoped it would allow them to move more easily to the Internet as a research tool.

Therese seemed to enjoy using the simulation. In fact, in her written reflection in December, she specifically addressed this saying, “The first question I have to ask myself is do I like using this simulation. I can say that I do. There are benefits both for me and the students.” (Written reflection, 12/29/98). However, she also had some concerns. She struggled with tying the simulation into her normal class work. Because she began using the simulation early in the school year, there

were topics coming up through the simulation that she had not yet covered. She explained:

When I had done [GMPC] before, it was later in the school year and there were more things that I had already covered. Now, I have to pull from other directions as far as making the tie with the curriculum. I mean, it's there, it's just I'm not there. The class is not there – the science part of it. So sometimes I'm a little – because I don't want to go ahead and talk about something we haven't touched on. (Interview, 12/2/98)

She also felt that she needed to add more enrichment activity suggestions. With the students, her largest concern became keeping them on task and working in their teams as her class was plagued with severe behavioral problems that affected everything that she attempted to do. These problems undoubtedly limited the learning opportunity offered by the program. Every debriefing, every set of instructions, and every questioning session was interrupted by talking or students asking questions unrelated to the discussion.

First Days Using the Simulation

Therese began working with the simulation by having the students explore types of factories and production needs as well as things they needed to know in order to work at Green Mountain Paper Company. To structure this work, she used a

KWHL² sheet (Observation, 10/28/98). During this activity, she had not really introduced the simulation except to say that they would be doing it and that there were many things she wanted them to learn from doing it (Observation, 10/28/98). She also had them think about what Green Mountain might do and had them consider where they might find information they would need other than in the simulation.

In my interview with Ms. Collins after the class, she expressed an interest in working with the students to finish the KWHL worksheet (Interview, 10/28/98). Because time ran out, she neither finished the sheet nor conducted a debriefing session to help the students tie together their work. Overall, Ms. Collins felt that the exercise went very well and suggested that the only major improvement she could think of for the exercise would be to include the students generating their own questions as part of the activity.

The following week, the class went to the computer lab for their first session with GMPC. Amid much commotion, Ms. Collins slowly called out the team names and members and seated the students at their machines. In keeping with her desire to

² A common tool in classrooms that asks students to explore “What I know,” “What I need to know,” “Where to find out,” and “What I learned.”

have the students learn something about Vermont, the home of GMPC, she named the teams using things that had to do with Vermont, but did not tell the students this. Before many teams had been assigned, the students wondered about what moose, wildflowers, Ben and Jerry's, and downhill had to do with each other. Ms. Collins told them it was a puzzle for them to figure out and, in my observations, never addressed it with them again.

During the period, Ms. Collins gave no real orientation to teamwork or to the simulation. She did not suggest roles the students might take or provide any structuring such as setting up a schedule for rotating roles. In fact, her only orientation focused on what GMPC does:

Therese: "What kind of company is this?"

Student: "They chop down trees and make paper."

Therese: "Your team will be the manager. During the day, or interaction with the computer, you have situations to deal with. You have to act as a" [prompting for the students to finish the sentence]

Students: "Team."

Therese: "Right – you're basically a 3-headed manager. Let me tell you the members of your team. Then I have to tell you the name of your team and which computer your team is going to work on."

(Observation, 11/4/98)

Once she had all of the students seated at their machines and somewhat attentive, she offered them a little more advice:

Therese: "We have to agree on some things, alright? Okay. I need to give you 3 more things. Question: How many of these mouse things are there for each computer?"

Students: "One"

Therese: "It has how many keyboards?"

Students: “One”

Therese: “This is what I need to do as a team – one keyboard and one mouse – each day we come to work on this simulation you need to rotate your jobs so it will be fair. Second thing – to make life simple, the team name is the password. If somebody’s missing and you don’t know the password it’s a problem. Has each team decided who will do the mouse for today? Everybody should be at ‘Get Acquainted.’”
(Observation, 11/4/98)

Because of the lack of direction and the lack of the third role in the group, the students often had team problems that Ms. Collins had to spend a considerable amount of time working on.

During the simulation, Ms. Collins primarily monitored the students to be sure they were not having technical difficulties. She would occasionally lean over a computer and take over the mouse to get the students into the program. Other times, she would field student questions. Usually, these questions were about what a particular resource was. Ms. Collins’ answer was usually, “Click on it and find out!”
(Observation, 11/4/98).

As the class period progressed, it was apparent that there were a lot of good things going on. There was a lot of reading, as evidenced by the students alternating reading out loud to the group. There was a high level of engagement, and at least four of the nine groups opened their GMPC electronic notepads and took some kind of meaningful (on-task) notes. In fact, in the first 20 minutes of time spent on the

computers, there was only one behavior correction. For this class, that was completely remarkable.

Near the end of the scenario, the students began to get frustrated because they thought they had completed their task, but could not leave the program.³ Ms. Collins approached this problem team-by-team, asking them as they looked at everything, pointing out various items in their office, such as folders, that they might need to look at and telling them that they would not be able to leave until the secretary told them they were done for the day (Observation, 11/4/98).

After 42 minutes, only four teams were still working. Therese asked the finished groups to take their seats with their team and to create a list of the resources that were used in today's scenario. This had little impact on the disruption in the room, however, and Therese was pulled away from the teams still working to get the other students seated. After ten more minutes, mostly spent trying to get the students

³ The GMPC program always has a follow-up item on the bulletin board after the main problem has been solved. The students cannot exit the program until that item has been read and the secretary announces that it's time to go home. In the first session, the students missed the item on the bulletin board – it is signaled only with a small mailbox flag sticking up on the bulletin board itself and the bulletin board is not in the manager's office- therefore, they were very confused about why they could not exit the program even though they had solved the problem and gotten some feedback already.

seated and asking them to take out a pen and paper, Ms. Collins posed a reflection question for them to work on silently: “How does it feel to be a new employee in an organization?” (Observation, 11/4/98). Originally, she told the students they would need to write at least 300 words, but after only a few minutes, she changed the requirements to two complete thoughts. She also clarified for several students that this was an individual assignment. As I found out during my time with Therese, the lack of attention being paid to the teacher by the students was typical for her class.

While the students worked on their reflections, they frequently looked to Ms. Collins for further guidance or positive reinforcement. In a very student-centered way, Ms. Collins constantly turned it back to them saying, “This is your reflection, okay? You don’t know how much you get paid. If you want to write that you want to know about being paid, you write what you want to write.” (Observation, 11/4/98).

Once the students had finished the assignment, with the exception of Jared’s group, Ms. Collins began to do a debriefing with the students. She said that she was going to ask a few students to read their responses to the reflection questions. Suddenly, Mr. Gabel came into the room and announced that the bell has rung, so the students did not have the opportunity to discuss anything.

Enacting the Framework

Overview

My work with Therese was similar, yet very different from my work with Evelyn. As with Evelyn, I focused on reflection, then proximal goals, and finally resources. However, Therese was a very different teacher from the beginning so the specifics of implementation varied greatly between Therese and Evelyn.

Phase 1

Therese's involvement in this research readily divided into the same three segments as Evelyn's. The first segment included our first few weeks together. During this time, our relationship was forged and I began to learn about Therese's goals, her teaching approach, her beliefs, and her frustrations. During these first four weeks (10/28/98-12/2/98), she began to learn about my beliefs and goals as well. While I did not overtly share these beliefs and goals with Evelyn for fear of resistance, I found that with Therese, sharing was a part of moving our conversation forward.

Phase 2

During Phase 2 (12/9/98 – 1/13/99), Therese showed many signs of trying to improve her classroom. Some changes she attempted were driven by my work with her, others were her own design. Many of the changes were tightly tied to the notion of proximal goals that she had wholeheartedly adopted. Our relationship also continued to evolve as I became a part of her classroom and my questions became a part of her thinking.

This phase featured the most overt changes by Ms. Collins during the months I spent with her as she implemented proximal goals. During this phase of the research, my role became more integrated into Therese's classroom. It also became more complex and more imbedded in the context.

Phase 3

Finally, the third phase, which spread across five classroom weeks (1/20/99-2/25/99), was the phase impacted by Therese's reading of the Chuska's *Improving Classroom Questioning* (1995). During this phase, Therese seemed to focus more on learning issues and using questions to support learning. During this phase, I saw Therese develop both in her thinking and in her practice. Whether it was because of my work with her or her disposition or a combination of the two, she emerged at the

end of this phase looking for more inquiry-based learning experiences and ready to move on from GMPC into other research-oriented, computer-based activities.

Further, during this phase, Ms. Collins demonstrated that she had internalized proximal goals and was using them as a guide for her work in the classroom. Finally, it was also in this phase that I found that she no longer viewed me as an outsider – I had become a true participant observer – being both an outsider and insider at the same time.

Teaching and Learning

Teaching

Therese offered considerable insight into her views on teaching in our early work together. When asked what a teacher should do in an environment where learning is taking place, Ms. Collins offered that a teacher should help the students find information, tie learning to real life, pose the questions that begin the learning process, help the students put pieces together, and help the students think through how they will get the information they need to answer questions (Interview, 11/18/98). In her own classroom, Therese had one main overarching goal for her students – to “provide them with some basic tools so they can go and investigate things on their own with some guidance.” (Interview, 11/18/98; Interview, 2/10/99).

Considering this view, it was not surprising that Therese felt that a teacher need not be an expert in his or her field, rather, the teacher should be well-versed in the fundamentals of the field and know how to do research in the field (Interview, 11/18/98). Even when working with her students, Ms. Collins was very clear that her role was not to give them the answers, rather her role was to “get things churning.” (Observation, 12/2/98).

When I asked Therese what it meant to her to be a coach or a facilitator, she explained, “to me it means helping [the students] work through it and find the answers on their own.” She went on to make a distinction between facilitation and coaching. To her, coaching was a more hands-on activity – a way of “walking” the students through things. A facilitator, on the other hand should provide resources, but stand back and let students learn on their (Interview, 11/18/98).

In discussing these ideas further, Therese provided an example of good teaching centered around a newspaper article she found that talks about arsenic. She had planned to use the article in her class to tie the periodic table work they had been doing to real life. She described a teacher’s role in a learning classroom as pointing the students in the right direction (facilitation, by her definition.) She further explained,

This article is about arsenic. And, it's not a compound, it's an element that we can go and refer quickly to the periodic table and after they read the article they could say, "what's arsenic?" And I would – well, pose questions that would allow them to think about resources that they are already familiar with and the light would go on – the periodic table. Then, they could go and see what it looks like, if it's heavy, what have you. And from there, this thing is toxic, so [they might ask] 'How much of it causes people to become ill?' etc. etc. So, I would ask 'what kinds of references do you think you would [use]?' and 'Where would you find information about this?' And, hopefully they will find the information. If they don't come up with the right answers, I would just give them a few hints that would trigger some other possibility. Some things they may have little clue or no clue as the case may be. It's great if you can just say, 'Okay. Go this way. Now, go that way.' (Interview, 11/18/98)

As shown here, Therese wanted to model a thinking process for her students and wanted them to improve their inquiry skills.

In practice during our early work, however, Ms. Collins rarely used facilitative techniques. Instead, she tended to rely on a reactive approach during the simulation and a directive approach for the follow-up conversations.

Reactive Approach. When using the reactive approach, she circled through the room quietly watching except when students asked for help or were visibly in trouble. She wanted the students to figure things out for themselves rather than depend on her for everything. Further, she viewed her job as being one of providing resources and letting the students guide their own work (Interview, 11/18/98). In

these ways, the approach could be construed as facilitating a learner-centered environment. However, this approach also featured no support for thinking, no support for inquiry, no monitoring for understanding, very little modeling, etc. In that way it is a very laissez-faire approach much like the “hands-off” approach (Hawley & Duffy, 1998b).

In the good examples of these interactions, Therese pulled up a chair to sit with a group that was having trouble. The students kept working as Therese listened and after a few minutes, she saw that they were using good problem-solving skills and finding the answer for themselves, so, she quietly got up and moved on (Observation, 12/2/98). Through listening to the students, she found that they were solving the problem on their own and did not need her help. She improved on the interaction even more when she asked them later in the scenario what it was they were missing earlier when they were stuck (Observation, 12/2/98). Through this interaction, she allowed the students to develop a positive interdependence and use their own problem-solving skills. Through the follow-up question she conveyed a message that she cared about the students’ work and that she expected them to understand what they were doing as they work on the scenarios.

Sometimes, however, this approach left students struggling. Generally, Ms. Collins followed a set pattern around the room, looking over the students’ shoulders

in the order that she got to them. If a student raised their hand or came to get her help, she would ignore them until it was their team's turn (Observation, 11/4/98). In at least one instance, she watched as the students drew a road that went all over the map in chunks – not connected to itself even – however, the team did not indicate that they needed help, so Ms. Collins moved on (Observation, 12/2/98).

In one other form, her reactive approach took on the face of “cheerleading.” Ms. Collins provided positive reinforcement for student accomplishments – such as congratulating a team for completing three scenarios in one period or applauding high scores on the answers the students have given (e.g., 12/2/98). While these interactions provided positive reinforcement, they promoted outcomes over processes. There she did not congratulate teams for reading carefully or for writing thoughtful reflections. The message conveyed through this use of feedback indicated that the important things were to complete the scenarios and to make a high score.⁴ Further, this kind of reinforcement promoted no more understanding than no interaction at all would have.

⁴ While it may seem that getting the high score is analogous to thinking well, our past experience with the CRI simulations indicates that often choosing the best answer is not necessarily related to engaging in good problem-solving processes (e.g., Hawley & Duffy, 1998a; Hawley & Duffy, 1998b).

Directive Approach. When using her directive approach, Therese told the students exactly what to do, essentially, taking ownership of the activity from them. Minor examples of this approach ranged from Ms. Collins taking over control of the mouse to fix technical problems to telling the students, “Explore your office some more” when they became stuck in a scenario.

The more striking examples of the directive approach were based in the whole-class discussions. They were characterized by very inconsistent questioning that tended to lead students to a certain answers. The following example offers an excerpt from a typical follow-up discussion:

Therese: “As far as the scenario, what were things you had to do today?
Marcus?”

Marcus: “Building a road”

Therese: “What else”

Student: “Harvesting”

Therese: “Okay. As far as building a road, was that easy?”

Students: “No”

Therese: “What was hard about it?” [there is a hum of noise in the room.]
“Each team has its own feelings.”

Student: “Trying not to go over the wetlands and streams.”

Therese: “Why is that a problem?”

Student: “Wetland are where the animals live.”

...

[Therese had moved on to have the students consider other problems they
had]

Student: “At first we didn’t know where to go.”

Therese: “So you had to do a little, what?”

Student: “Research.”

...

[Therese moved the conversation forward by looking at another problem students were having]

Therese: "Were there problems harvesting 5000 tons of trees?"

Student: "We got more and it didn't cost much."

Therese: "How many got less than 5000 tons?" [Several hands go up – probably 2 or 3 groups. Several students call out how many they got.] Therese replies, "Everybody was +/- 300 tons?"

The students say they were all within that range.

Therese: "I noticed that when a lot of you got to the report, a lot of people were typing – and being creative, which is good, but did you need to be that creative?"

Student: "No."

Therese: "You had to summarize. It all hinged on whether you did good research. There's very little in here that you have to make up out of your head. Where did you get information?"

The students name some of the resources from the simulation.

Therese: "How is everyone doing in terms of employee satisfaction?"

[There was a burst of noise as they all tried to answer at once.]

(Observation, 12/2/98).

While there were many kinds of questions in this segment, it was overwhelmingly teacher-led and teacher-centered. Typical to her large-group discussions, Ms. Collins became the center of the conversations. She asked the questions and the students answered her. There was no sense that the discussion was anything a question and answer session between the teacher and individual students. If a student disagreed with another student or had an additional remark to make, it was always through Therese (e.g., Observation, 11/18/98; Observation, 12/2/98).

Facilitative Approach. The facilitative approach she had described was only rarely apparent in Ms. Collins' classroom work. However, it was apparent in a number of

different ways including promoting strategies, modeling, and monitoring for understanding. In one instance of providing strategies, she was so frustrated with the class' lack of willingness to read that, out of desperation, she suggested to one of the more problematic groups that they take turns reading the material out loud to each other (Observation, 12/2/98). Not only did they do this while she was there, but unlike the other teams who she had simply told to read, the team kept reading once Therese had walked away. In my interview with her, she explained her thinking, "When I got there, I thought "I know this sound ridiculous, but it could work as a method for the team to do." (Interview, 12/2/98). This demonstrated that not only was Ms. Collins' trying to solve a problem, but also that she was willing to risk trying something new to solve that problem. This approach of providing strategies, as well as the hints she provides, fit well with Therese's conceptions of teaching.

While she only occasionally used it, modeling was conceptually important to Therese from the beginning of our work together. She felt that an important part of her role as a teacher was to model how to use the "basic tools" of science and inquiry (Interview, 11/18/98). However, it was over a month into my work with her before I saw any modeling occurring. In that instance, she was working with a team that was having a problem:

Therese: “What does it say?”

Kevin: “We need to harvest some trees.”

Marc: [tells Kevin] “Click Harvest”

Therese: “How did you get there?”

Michael [from the next group over] pointed to the “start here” mark on the harvest plan to show them where to start

Kevin randomly clicked creating road all over the place

Therese: “What are you doing?” [Then to the whole team] “You should be asking these questions. What are we doing? What are we supposed to be doing? ... Go back to your office and see if you’ve missed something.”

They pulled up the report screen.

Therese: “You don’t really want to type yet, do you?” She leaves them reading the screen. (Observation, 12/2/98).

Here, Therese provided a model by asking the questions that the team should ask themselves. To improve the modeling in the interaction, she could have asked the questions and waited for answers. In this example, she also introduced a potential research strategy – the strategy of returning to their resources later if they needed more information.

To promote and monitor for understanding, Ms. Collins asked her students questions. Sometimes these were questions verifying that they understood vocabulary being used in the simulation, such as, “What is a pink slip?” (Observation, 10/28/98). Other times her monitoring would probe to be sure that the students understood what was being asked of them. For instance, in one interaction,

she verified that the students knew how much money they had to spend and that they knew how many logs they needed:

Therese approached a team and watched for a few seconds, then asked,
“What’s your budget?”

Student: “\$50,000”

Therese: “Okay.”

Student: “And we need ten thousand logs”

Therese: “Tons?”

Student: “Tons of logs.”

Therese: “Okay. Alright.” (Observation, 11/18/98)

In more a more complex example of promoting understanding, Therese attempted to focus on an episode in GMPC that dealt with the economic impact of a tornado by tying it to a recent hurricane in Central America. In the scenario a tornado had destroyed part of the trees, so GMPC needed to find other tree sources. At one point she asked the students if the Central American hurricane tied into the tree scenario (Observation, 11/18/98). While this was an excellent question for promoting thinking and helping the students see real-world connection, the learning opportunity was stopped short when the students answered, “Yes” and Therese moved on without probing into their understanding of how the hurricane relates to the scenario. The overall flow of the debriefing moved from memorization-level questions such as what the hurricane was named, to more thinking questions such as how the hurricane

will impact other parts of the world. Finally, she moved into the tie-in to real life (Observation, 11/18/98; Weekly update, 12/5/98).

Learning

To Therese, learning was tied to students asking questions. She explained, “It’s not so much that they’re coming up with questions. It’s not like textbooks and stuff – it’s not a black and white type of question – like, ‘what would happen if...?’ There are all kinds of possibilities in the questions they can ask.” (Interview, 11/18/98). In fact, she went one step further saying that it was through questions that the students asked that she could determine whether learning was taking place. She explained,

It always comes back to me in the form of a question. It’s some kind of a maze or a puzzle where first, they have no clue and then when they start opening one door, they get a little information and can open another door. They get a little bit more information and they start asking more and more questions. Okay? And, the questions can go to the point that, okay, I have no shame in saying ‘I have no idea, but, you could look here or you could look there.’ So, there’s a quality level in the questioning that becomes more of – they’re really searching – they’re really searching for information. (Interview, 11/18/98)

This excerpt demonstrated her belief in a spiraling system of learning centered around inquiry and likely to be authentic – very different from the arsenic example

which was centered around bringing context to the concept of the periodic table.

Further, it showed her belief that questions lead to learning, not just to right answers.

Ms. Collins also explained that learning sometimes happened through repetition, through students getting stuck and figuring their way out, and through students teaching one another. In all of this, she explained that the teacher's role was to help the students navigate through the learning experience. (Interview, 11/18/98).

Student Ownership

A vital part of Therese's approach was her insistence that students own their processes and their work. This was common in her discussion and in her actions. For instance, one student who volunteered to read her reflection read to a certain point, then looked at Ms. Collins and said, "I don't want to read no more." Rather than forcing the student to continue, Ms. Collins was content to let her stop reading (Observation, 11/18/98). Another week amidst questions about the reflection she was asking students to write, Ms. Collins told the students, "this is your reflection." (Observation, 11/4/98).

There was strong evidence of her commitment to the students owning the process even in her interactions with them. For instance, rather than telling the students an answer, Ms. Collins provided hints and strategies when students got

stuck. In one overt instance of turning over control to the students, Ms. Collins tried to help students with their report. She moved to the team that had answered the second and third question, but not the first. She read the first question out loud to them. The students were not able to offer any answer to the question.

Therese: "Can I ask you a question? There was a folder that has information."

Student: "This?"

Therese: "Maybe." [She also points out that there are notes on the floor.]

"Something is not right. There's another piece. How are you going to find the information?" [There is a short pause.] "It says, 'Describe the features used by the community.'"

Student: "The trees?"

Student 2: "A road?"

Therese: "Wait. I'm not giving you answers. I'm trying to get things churning. You need to search for the information because the information is very specific." (Observation, 12/2/98)

This interaction was particularly impressive for two reasons. First, Therese turned control over the work to the students and clearly defined her role in the process.

Second, while she was telling them to read, she did it in a way that fostered problem-solving skills. Rather than simply telling them to "read" or what to read, she asked them where they might find the information.

Learner-centeredness

As shown in the discussion so far, Ms. Collins' beliefs and approaches often did not fit together well. She wanted the students to own their work, but felt that she

needed to get them started. She let them lead, but judged the correctness of where they went. She felt that students should learn through following their questions yet remained tightly tied to the notion that certain materials needed to be covered. She wanted to connect to the students individually, in doing so, she lost them to off-task behavior. It was as if she conceptually knew the “right” things to do, but could not always enact them (Weekly Update, 11/18/98).

Using the “Teacher Beliefs Survey” from the Learner-Centered Battery (McCombs, 1997) helped to highlight some aspects of this internal tension. It showed that Therese held many learner-centered beliefs about learners, learning, and teaching. In fact, according to the scale provided, her score was nearly in the range of what was considered learner-centered (Table 6.1). However, it also showed that she held a high number of non-learner-centered beliefs about learners and teaching and learning. Her scores suggested that she was torn between a very traditional model of teaching and learning and the inquiry-based model centered around facilitation that she had described to me.

Table 6.1: Therese’s Initial Teacher Beliefs Survey Scores

	Learner-Centered Beliefs about Learners, Learning and Teaching	Non-Learner-Centered Beliefs about Learners	Non-Learner-Centered Beliefs about Learning and Teaching
Learner-Centered Teacher	≥ 3.4 (S.D.=.4)	< 2.0 (S.D>=.56)	< 2.0 (S.D.=.49)
Non-Learner-Centered Teacher	< 2.8	> 2.4	> 2.4
Therese	3.3	3.11	3.17

Reflection

As with Ms. Murray, Therese’s first phase was dominated by the use of reflection. Throughout my work with Ms. Collins, reflection remained an important element of the overall effort, however it was not as overtly influential as proximal goals and the resources seemed to be. This was perhaps because Therese was naturally reflective from the beginning of our work. One example of this reflectiveness came in our first interview when we discussed the importance of reading. She used an example from her class to illustrate her point:

And see this is a problem I have – There was a question. They read and the question had to do with what Chadwick or whoever the scientist was. What did he discover? And, their answer was, “The reason was…” Okay. The reason what? They actually thought that was the answer. Because the way the paragraph started [in the book] was, ‘He discovered the reason…’ I think that’s how it started. So, they thought that

was the answer to my question. I wanted to know WHAT did he discover, okay? And that was the answer right there. So, yes, they read the words, but they didn't even realize that that wasn't even an answer to a question. So, that's why reading. How do you get kids to understand and read with comprehension – for meaning. (Interview, 10/28/98)

Therese had obviously analyzed this situation in order to diagnose the problem her students were having and, presumably, to help eliminate the problem in the future.

Reflection was, however, a foundation for all of our interviews. Our reflective work quickly evolved from a question-and-answer model to a model that required me to take on several roles such as that of sounding board, resource, and a second set of eyes for her classroom. In these roles, I offered Therese the opportunity to reflect on her work and to hear about other situations and consider whether they were applicable to her. Further, I offered her my analysis of situations in her class each day – this generally spurred her looking back at what had happened and considering modifications she should make. Through these kinds of interactions, I identified the direction we were moving in to a certain extent, while allowing Ms. Collins to choose the course we would follow.

Reflection in Phase 1

Even during this first phase, our interviews took on the character of conversations between peers. Ms. Collins brought up topics and offered her thoughts

or concerns and I would offer my perspective – often pulling in stories from other classrooms that I had read about or seen. With Ms. Collins, it seemed natural that we became more like peers than researcher and participant. It was easy for me to share my perspective, but I always waited until she first shared her perspective on an issue before sharing mine (e.g., Interview, 11/18/98). In this way, I promoted her reflection and thinking first, then offered a different perspective.

During our interviews, I provided Ms. Collins with feedback on what went well during the day's activities. This proved to be important because when she had a bad day, Ms. Collins generally became quite frustrated. By focusing on what went well, I was able to help her stay motivated as well as highlight the things that I thought were important. For example on 11/18/98, all of the computers froze up causing a high level of chaos for the period. But, before that happened, I saw a good interaction between Therese and her students that modeled teamwork well. A student asked her a question and, rather than answering it, Therese asked him what he thought, then turned to ask a team member what she thought (Observation, 11/18/98). By doing this, Ms. Collins modeled teamwork and promoted the students' working on their own. So, when we began the interview, I made a point to mention that interaction and how good it was rather than dwell on all the things that had gone wrong (Interview, 11/18/98). By doing this, I kept the reflection focused in a positive

direction and helped ease the frustration that Therese often expressed. Further, this allowed Therese some insight into what I thought was important.

Another reflective tool I used with Ms. Collins was describing other situations for her to think about. For instance, one week we focused on questions and answers for a portion of our discussion (Interview, 11/18/98). I offered a scenario from a research report I had recently read, then offered her the scenario that had happened in a class I had observed:

Chandra: “I saw in a class one time – they were using Chelsea and the teacher asked the student, ‘why does the supervisor need to check – to verify – this check before you can cash it?’ And the student said, ‘because it might be stolen.’ And she as like, ‘no.’ and she went on to another person. And that person said, ‘Because it’s in the manual.’ And she was like, ‘Right.’ And, they were answering two different questions.”

Therese: “Exactly, exactly ,exactly. I mean the kid did answer the question. That was a legitimate answer.”

Chandra: “And, he was actually thinking harder than the person who said.”

Therese: “Exactly, exactly, exactly.”

Chandra: “The manual said this.”

Therese: “The whole purpose of the manual is to help you avoid cashing a check that might be stolen.” [She giggles.]

Chandra: “Stolen or”

Therese: “You know, whatever. Forgery”

Chandra: “I thought it was really cool because the kid had – cause there as nothing in the manual that says you need to get it verified because of this. He thought through it to the next step. But, the teacher was in a hurry and didn’t stop and say, ‘Why would you say that?’”

Therese: “Yeah. Yeah. Yeah.” [We return to discussing the article that started this conversation.] (Interview, 11/18/98)

Dichotomy of Beliefs

One of the important aspects of the reflection in this early phase of our work was the way it highlighted both Therese's beliefs and the inconsistencies between her beliefs and actions. For example, she was understanding-oriented and procedure-oriented simultaneously; she felt teachers should promote inquiry and help students learn, yet she used a hands-off approach with her students; and she struggled with trying to promote student-ownership only to undermine her own efforts.

One of the primary areas of dissonance between her beliefs and actions highlighted through our reflective activities was the doing versus understanding issue. Unlike Evelyn, Therese was more focused on developing understanding from the beginning of our work. However, she had difficulty in supporting this goal in her classroom.

Ms. Collins set several understanding-level goals for her students. The goals of tying the simulation to the real world (Interview, 10/28/98), reading for understanding (e.g., Interview, 10/28/98) and the goal of developing transferable research skills (Interview, 11/18/98) provide examples of the level of thinking that Therese wanted to see in her students. In her regular science room, Therese included language and activities that indicate that understanding was the desired outcome. For instance, when talking about a test on the periodic table, she reminded the students

that she did not want them to memorize the periodic table, instead she wanted them to be able to use it as a resource (Observation, 10/28/98). And, in the computer lab she also promoted understanding. Ms. Collins asked reflective questions and follow-up questions to promote some kinds of understanding. For example asking students, ‘What problems did you have,’ ‘How did you solve them,’ and ‘How is your team working together and what are some things you might do to improve it?’ (Observation, 12/2/98) or asking them to write about what it was like to be a new employee in the paper company (Observation, 11/4/98). Further, in some of her interactions with the students she made comments or asked questions that indicated the importance of developing understanding. One such interaction involved Therese asking a team that was forced to rework a scenario because of technical problems how they did on it the first time. When they report that they did not do well, Ms. Collins emphasized that this was their opportunity to improve their work from the time before (Observation, 11/18/98). Here she is promoting learning from their mistakes in a reflective, thoughtful way. However, she was not doing anything beyond commenting to promote reflection at this point.

Often when working with the scenarios, however, Ms. Collins became frustrated by the way students “just do it without trying to figure out why something works.” (Interview, 11/18/98). In fact, it was apparent through my observations,

(e.g., 12/2/98) that just because the teacher valued the process of learning through working the scenario and wanted the students to focus on understanding what they were doing rather than finishing, was no guarantee that the students valued those same things. In fact, the students in this class seemed far more interested in finishing the scenarios and moving on than in learning from them. This was evidenced through Samuel becoming unhappy when he could not finish the scenario due to technical problems. He felt that finishing equaled doing well on the scenario (Observation, 11/18/98). It was also demonstrated when the students turned to a “smart” classmate from a different team to help them work on the scenario (Observation, 12/2/98). In this case, the smart student was left to work on the computer, while the team members did other things. There was no value in learning; instead the focus was on getting that scenario finished.

While Therese reported being frustrated by these things as well as the students’ drive to get “right” answers without developing any understanding (Interview, 11/18/98), examination of her classroom behavior indicated she was helping to foster the attitudes through her feedback. For example, one team worked three scenarios during the class period one day in order to get caught up with the rest of the class after they lost their work due to technology problems. Ms. Collins told them they did “very well” (Observation, 11/18/98). In another instance, she provided

feedback to a team saying “Not bad. Not bad.” because the figures on their graphs were high (Observation, 12/2/98). Again, this focused on how many right answers they had rather than what they learned or how they answered the question. Finally, on 12/2/98 she asked the whole class about their outcomes on the graphs during the debriefing discussion. This, once again, promoted an outcomes orientation that Ms. Collins did not necessarily mean to promote.

Interestingly, Ms. Collins recognized that feedback was a vital part of students meeting the goals she set. She explained:

Feedback is the most important thing. They keep a composition book with everything in it. Homework, class work, anything. And, I collect it and I make comments on how they're keeping their notes, how they're organized, what's missing, if there's something missing. A couple times I've said, 'Oh, this is missing' because I didn't see it somewhere else. They'll come right back to me and say 'No, this is it here.' So now they know that if it was missing on this page, that they need to go back to that page and write that down – where they made it up kind of thing. So, that feedback shows me that they really – they appreciate it. It gives them a sense of direction and purpose. Like, I know she's looking at my work and it means something. I'm not doing just – it's not busy work. I think that's the biggest thing – giving them feedback – positive or negative. (Interview, 10/28/98)

But, as can be seen here, the goals she wanted to set and the goals being set were not compatible. After all, she set the goal for doing the homework the “right” way rather than considering its quality. She looked only at its organization and completeness. It

was likely that the students thought that completeness was the primary goal of the assignment whereas, Therese never named that as a goal for her students (Interview, 10/28/98). Her feedback was actually working against her goals for the students.

Through our reflective discussions, I learned that Ms. Collins was aware that there were problems. The only breakthrough in understanding Ms. Collins felt the students achieved in GMPC during Phase 1 was in developing an understanding of the consequences for their decisions (Interview, 11/18/98). She felt that the students were becoming more serious about the simulation and beginning to see it as more than a game. We both felt, and had seen indications, that the students were capable of far more understanding than they had developed. For instance, they were able to accurately reflect on their behavior and pinpoint ways in which they could improve it (Observation, 12/2/98). This indicated that the students were capable of identifying a problem and generating ideas to solve that problem and that they did understand what appropriate behavior in the classroom was. However, much like Ms. Collins, they did not follow through with appropriate actions to support the changes they suggested.

Reflection in Phase 2

As my work with Therese continued, my role evolved only slightly and the approaches to reflection remained virtually unchanged. In fact, one of the few major changes in our reflective work in Phase 2 was my implementation of the reflective questions I had adapted from Miller et al. (1998) (Appendix C). I chose to focus on the scenario that was just completed most of the time in my work with Therese. This was because in the one situation where I asked her to look forward to the next scenario, she was not conceptually prepared to do that (12/16/98). In general, Ms. Collins seemed most successful in her reflections when she looked back at what happened and talked about how she could change that to influence her later efforts.

Overall, the reflection was important for a few reasons at this point. First, the questions I was asking (Appendix C) were providing a focus on problem solving and critical thinking that was ever-present in our discussion. Further, reflection helped Ms. Collins evaluate the progress she and her students were making. By allowing her these opportunities to focus on particular issues, such as supporting teams, I helped her realize that the situation was perhaps better than she typically perceived it to be (e.g., Interview, 1/13/99). Finally, the reflective sessions occasionally spurred brainstorming sessions in which she and I generated ideas for improving approaches that she wanted to use with the students. For example, we spent time one day

exploring different ways she could expose the students to the issues involved with scheduling. Together we worked through the idea of scheduling the bathroom in their home each morning (Interview, 1/6/99).

At this point, it seemed that at least some of the reflection items we discussed were directly impacting Ms. Collins' teaching. One example of this was the designation of a role for the third team member. In her original introduction to doing the scenarios, Ms. Collins had only offered two roles for the three group members: keyboard operator and mouse operator (Observation, 11/4/98). Throughout my work with her, we spent a considerable amount of time discussing the behavior problems in the class. On 1/6/99, I finally offered some examples of ways that other teachers assigned roles to their students in the simulations (Interview, 1/6/99). We discussed that the teacher assigned the roles and that students often rotated the roles. Ms. Collins then mentioned that she was thinking of some kind of checklist the third team member might be able to do to record where the team had visited and what information they had gathered (Interview, 1/6/99). By the following week, Therese had found the approach she wanted and provided the third group member a role – answering the questions that she was having each team generate for the scenario (Observation, 1/13/99). It was an effective approach that grew out of Therese's reflection that her students were spending too much time off-task.

Learning About Reflection

In this phase I learned two very important things about reflection. First, Therese needed to be the one to have the experiences and reflect on them. Second, Therese was far more insightful about the strategies she developed or initiated than she was about those that were offered to her.

Importance of Personal Experience. During this phase, I had my only substantial interactions with the students as they worked on GMPC. Because of a major technology problem one day, the students were not going to use the computers (Interview, 12/16/98). However, a few somehow slipped on the machines once the problem was fixed and Ms. Collins chose not to remove them once they had started. Seeing that they needed help and that Ms. Collins needed to be able to focus on the 12 students who she was working with on a debate activity related to GMPC, I decided to facilitate the students. Because I had a video camera set-up for the day, I was still able to see Ms. Collins' work with the students. In my efforts, I talked with members of three different teams. Once I saw what the students were doing, I quickly realized that they needed more support if they were to learn anything working on this scheduling scenario.

My most intense exchange with the students was working with Kevin's group. As I related it to Therese later that day:

Well, Kevin's team, and I'm not trying to single out Kevin, it's just that's the team I was talking to the most, Jared was so mad at Kevin when they realized that they had – wait – they didn't realize they had done poorly. They had no idea that the way that they scheduled was bad. They thought it was fine. I asked, 'Are your customers happy?' [Kevin responded,] 'Yeah, let me show you' So, Kevin clicks over to the graph that they get on the bulletin board at the end. He points at employee happiness and it's like off the chart. The employees are thrilled to work there...And, I said, 'That's your employees, what about your customers?' So, he switched over to the other graph – the one that charts it over time and he – so he clicks over to the chart that tracks over time. And I said, 'Well, what do your customers think?' And he points at the - he looks at the employee happiness thing again. He points at week 1 and says, 'No that's week 1, we're at week 6 here. This is week 6.' I said, 'I know that. But which one of these graphs tells you how happy your customers are?' And he was disgusted with me at that point...Well, at this point I said, 'Ok so which one do you think it is Jared?' And he points at the community relations. I said, 'Well, that's sort of a way to tell because you know, it's your community and you can see what they think of you as a company. But, how can you tell if the customers are happy with the decision you made?' He said, 'Environmental Friendliness?' I said, 'Well, the environment – that affects what they think of you, but it doesn't really tell you what they think of you. So, what do you think 'profitability' is?' And he and Kevin both muttered something about having to do with the amount of money they make. But, they didn't totally see the connection there yet. And I said, 'Well, why is your profitability low?' And I think a light bulb must have gone off in Jared's head or something because he turned to Kevin and said, 'I told you that we needed to slow down.' And then he went back into the scheduling thing and wanted to change it, but of course, it won't let you change it once you get done. So, he was really mad at Kevin and I can't

blame him. Because Kevin had it – it was nice and pretty, but it was a disaster. (Interview, 12/16/98)

After relating this story to Therese, I continued by explaining the problems I felt the students were having:

Chandra: “And they were trying to keep the customers happy. The thing is that they don’t understand the chart. And part of the reason they don’t understand the chart is because the chart wants you to minimize the changeover costs. Okay, there are at least two problems. I’ll probably think of more as I’m talking. They don’t understand that time is linear – they think in twenty-four hour days. So when they get to the end of a day, it doesn’t carry over to the next day – they just stop.”

Therese: “Okay – so you get to start all over again.”

Chandra: “So, it can be 2 or 3 hours short of the end of the functioning day and they just stop and go to the next line. So, they’ve got all that dead time there. That’s the first thing – that they don’t think of time as being linear. And part of it’s that that graph is broken up Day 1, Day 2, Day 3.”

Therese: “Oh – so they’re thinking of it that way.”

Chandra: “Yeah – so they’re thinking, you know, ‘okay at 11 o’clock at night we stop’ even though there’s an hour left in the day.”

Therese: “So then they don’t – oh, then the other thing is shifts – they”

Chandra: “I don’t think they even thought about shifts.”

Therese: “You know it’s like you could continue running until you get the job done.”

Chandra: “Then, they also don’t understand changeover costs. And, I’m not sure where changeover costs are discussed, but it says on the chart to keep your changeover costs as low as possible. And, I know they’re not paying attention and that they don’t know what it is because I asked each team ‘what are changeover costs?’ and not a single one had a clue.” (Interview, 12/16/98).

Throughout this interview, I felt that Therese understood, and agreed with, my assessment of what had happened. Because of this, I was very surprised the

following week when she did very little to prepare the students to deal with changeover cost. In fact, in her prescenario discussion, Ms. Collins had the students name the variables they had to consider in scheduling the paper. After they named time, money, and kinds of paper, however, she asked the students to generate five questions to be answered after the scenario and released them to work on the computers (Observation, 1/6/99).

In this session, Ms. Collins was the active facilitator and was able to make more sense of the situation for herself. She, in fact, pulled the students from the computers to discuss changeover costs as a whole class because the students simply did not understand. She commented later:

It's a matter of more planning on my part, because I didn't – even though they didn't do well the first time, I didn't really get the opportunity to see why they didn't do well. So, this time, I could really see why because that time was just a [bad] day altogether. But, now I can see with my own two eyes, where the stumbling block is and with more preparation, I could get them on the road. Because once we sat down and we talked about it – I believe - if only half of them really were actively engaged, I still know that they can all get it. So, that's the only problem there. (Interview, 1/6/99)

Her assessment of the problem was, obviously, the same as mine had been as evidenced by the fact that she pulled the students off the computers in order to more thoroughly investigate “changeover costs” (Observation, 1/6/99). While Ms. Collins

never indicated a lack of trust for me, per se, she needed to see and experience the problems for herself in order to know how to deal with them.

Importance of Ownership. Another extremely important point that appeared in this phase of our work was my realization that she was able to offer far deeper rationales and understandings of approaches when she generated them than when I provided them for her. For instance, when we discussed her first implementation of the proximal goals she explained why she had chosen the goals she was focusing on:

Therese: “Okay. I guess, you know, having an agenda of what they were going to do first and then getting them to – Well, first of all, getting them to come in, sit down, settle down at the tables rather than the computers. And then, from there, get them – have them start thinking about the scenario right away. I guess, before they were just more concerned with being on the computer as opposed to working on the scenario. You know it’s like, ‘okay – what are we going to do today.’ I mean, because anything could be on the computer and they could be happy, you know. [She chuckled.] Whereas this way, they are focused on ‘we’re going to just be thinking about making paper from paper’ and have those prequestions generated, formulated and hoping they along the way, in the process, found the answers to some of those question or came up with – discovered other questions.”

Chandra: “That’s – on the list I gave you, which we don’t have to stick to, I’m not saying why are you off the list – that doesn’t matter. But, sort of what got you thinking about having them doing the thinking before the working.”

Therese: “That’s what you suggested.” [She laughed.]

Chandra: “And where did the generating of questions come from?”

Therese: “So they stay focused on the scenario – so they get – they extract more out of it.”

Chandra: “Because what your answer was, was the first thing that I’ve heard that fits in line with what you said students do when they learn. You said that when students are learning, they’re generating questions. And, now you’re saying, maybe they generated questions while they were doing this scenario. And that’s the first time I’ve actually heard those two pieces come together.” (Interview, 12/9/98).

This particular interaction was important not only because of the alignment it showed between Therese’s beliefs and practices, but also because it showed the difference in thought between what I had asked her to do and what she had decided for herself to do. In the proximal goals list, I had suggested certain activities. She had taken my suggestion, but could not offer further explanation for why it was important than it was what I had suggested. However, the part of the implementation she had developed herself was paired with a very nice, thoughtful explanation for why it was important.

Reflection in Phase 3

The final phase was characterized by continued questioning and deeper probing in the reflection. For instance, previously I had focused on how Therese supported problem solving and monitoring for understanding. Now, because her answer always involved saying that she asked questions, I went further and asked her to talk to me about the difference in the two (Interview, 2/10/99). Further, I asked her to envision things rather than simply talking about them. For instance, in trying to

understand her vision for how the class should work, I asked her to describe to me what I would see if the students were doing what they were supposed to (Interview, 2/10/99). These kinds of questions forced Therese to think more deeply, and more explicitly about different areas we had been focusing on.

Another characteristic of the reflection at this point was in helping Therese look at things from a new perspective. For instance, she had included reflection, either written or in discussion, in almost every scenario from the beginning of my work. However, when I asked her what she thought the students thought it was for, Therese replied, “The reflection, itself? Now that you ask me, no. Sorry. It works for me, but I guess I have to re-evaluate the whole reflection thing...Okay they’re only doing it just to please me. And that’s not the ultimate goal. The ultimate goal is not to please me. It’s to get them to think more about topics. So, that’s something I need to think about. Cause I hadn’t thought about that.” (Interview, 1/20/99).

One final benefit of reflection at this point was in providing an opportunity for Ms. Collins to feel proud of the work her students had done. While this was something I had done for her previously, in this phase, Ms. Collins began to examine the positive steps her students had taken each day. For instance, one day she reflected on the students’ growth during their work on GMPC. She said, in evaluating teamwork, that the students had moved from a “0” to a “6” on a scale of 1

to 10 (Interview, 2/10/99). She elaborated by pointing out the growth in Brian's team, saying, "Because remember in the beginning they didn't want to work together, now they're getting their work done." (Interview, 2/10/99). Her assessment agreed with my observations. While there were certainly still problems in the groups, overall there was less fighting, more cooperation, and a higher level of engagement. The students were actively reading, often out loud to each other, and doing their questions as they went. Ms. Collins speculated that perhaps the improvement was due to the third group member having a role now (Interview, 1/27/99).

Alignment of Beliefs and Actions

Phase 3 was full of advancements in Therese's implementation of goals and strategies that she had identified in our reflective sessions. Some of the most important involved bringing her practices more in line with her beliefs. Ms. Collins promoted student ownership over the scenarios by encouraging them to ask questions as part of their assignment for each scenario. These questions provided a structure for the learning experience as the students generated them, answered them, then discussed them as a group. From time to time, students would ask particularly thoughtful questions. In these situations, Ms. Collins always provided positive feedback for the thinking involved in the question generation, thereby promoting

“understanding” over “doing”. For instance, in this interaction, the positive feedback was telling Brian that his question was a good one and having him add it to his list:

Therese: “Who else is satisfied?”

Marc: “The community.”

Therese: “I see you want employees and community. So your choice – does it affect the community?”

Brian: “Yes because [pause – looks like he’s thinking] I think so – in a good way – like for a long time. It might break again but not anytime soon.”

Therese: [synthesizing] “Okay – you want the community and this prevents the odor.”

Brian: “Will the odor dissolve in the atmosphere – what will happen?”

Therese: “That’s a good question. Put that down as a question you have.”
(Observation, 1/20/99).

Similarly, in a scenario dealing with an accident at GMPC, Tracy asked Ms. Collins if the worker was wearing a hardhat when no information about this was given in the scenario. Ms. Collins praised Tracy for the question and told her to add it to her list of questions for the day, much as she had with Brian in the previous example. Then, during the debriefing, Ms. Collins asked the class, “Did Wally have a hard hat on?” After a student offered an opinion, Ms. Collins said, “Michael and Tracy, you brought up some good points about the hard hat. What might some of the issues be? Yes, Michael?” (Observation, 2/24/99). This was a way of celebrating the hard work the students had put into their scenarios and making sure that they felt they were given credit for that work.

Therese further promoted “understanding” rather than doing in her more thorough efforts at probing. She pushed the students to be more specific and to really consider what they were doing before she would move on. For instance, during one scenario a team wrote that they chose to replace a faulty valve in a piece of equipment because they wanted their customers to think they care. Ms. Collins asked:

Therese: “Who do we think these customers are?”

Student: “People.”

Therese: “But why do you say ‘customers’ – ‘we want our customers’?”

Student: “Oh” [She types and changes we want our customers to be happy to say ‘we want everybody to be happy.’]

Therese: “Who’s everybody?”

Student: “Everybody.”

Therese: “Who’s everybody?”

Student: “People of Greenville.”

Therese: “‘Everybody’ makes me wonder who is everybody?”

Student: “Everybody in Greenville – our customers.”

Therese: “Where are your customers?”

Student: “Everywhere.”

Therese: “Where is the smell?”

Student: “Greenville.”

Therese: “So, who’s complaining?”

Student: “Everybody [pause] in Greenville.”

Therese: “Why not be specific.”

They change it to say “Everybody in Greenville.” (Observation, 1/20/99).

To ensure that everyone benefited from this, she also covered this topic in the debriefing that followed the scenario (Observation, 1/20/99).

In a similar instance, Ms. Collins used this approach during a debriefing session. Through her questions she not only helped the students clarify their thinking, but also provided good thinking questions in a way that demonstrated to the students that they needed to go another step in their analysis of the situation:

Therese: “Someone in your own words, tell me what this problem was about.” (Calls on Anna)

Anna: “They had fish called trout in it and people like fishing. Somebody did something so the troutfish got killed.”

Therese: “Can anyone add to this? Tracy?”

Tracy: “The oxygen level went lower or higher”

Therese: “Before we even get to that – the mystery is”

Students: “What’s killing the fish?”

Daniel: “It’s not really a problem – we didn’t cause it.”

Therese: “How did they know the fish were killed?”

Kendall: “An employee said he caught no fish”

Therese: “He concluded the fish were dying?”

Kendall: “They weren’t there.”

Therese: “Ok”

Anna: “There was a guy who has been fishing for 50 years and now the fish aren’t there.”

Therese: “If someone said people were killed – what kind of evidence would they need to prove it?”

Students: “Bodies”

Therese: “The bodies. The evidence that people died would be bodies. What would prove that the fish were killed?”

Student: “The fish would be floating”

Therese: “Is that what happened?” [Pause] “I’m asking – were fish floating?”
(Observation, 2/3/99)

This shift to promoting understanding was tied at least partially, to one of the outside observers modeling questioning in Therese’s class by focusing on credibility of

information (Observation, 1/20/99). In the scenario the students were working on, the accounting manager and yard supervisor were providing key information about a chemical that was being released into the air. In an effort to model good questioning and pushing student thinking (Duffy Debrief, 1/20/99), Duffy asked the students questions about the credibility of the people providing the information about the chemicals. As Duffy worked with the teams, Ms. Collins watched and listened as she worked with nearby teams (Observation, 1/20/99). She immediately adopted some of the same strategies she had just seen and heard. Through her thoughtfulness and reflection, Ms. Collins was able to move the questioning strategy forward and refine her approach.

In one final instance of Ms. Collins promoting process over outcomes, she worked with a team to promote an understanding of the value of evidence. As she was watching Todd's team a new folder was placed on their desk in the simulation. Todd quietly exclaimed, "Oh no, not another one." Ms. Collins spoke up saying:

Therese: "Another what?"

Todd: "Another folder."

Therese: "Don't you have to make some decisions?"

Marc: "We did..."

Therese: "What did you use to make those decisions?"

Marc: "We looked – they said we had four options – a verbal warning that won't be kept"

Therese: "But, my question is what will you use to make that decision?"

Marc: "His past performance."

Therese: “Where are you going to find that?”

Brian: “We already reviewed that.”

Therese: “Oh okay. So, I’m trying to figure out – do you think there are too many folders?”

Brian (laughs): “Yes.” (Observation, 2/24/99).

While the students did not totally “get it,” Ms. Collins was trying to promote an appreciation of and attention to the evidence that I had not previously seen.

However, it should be added that there were still occasional instances of promoting the procedure or the outcome as well. For instance, in her debriefings, she often asked questions like, “How many chose X?” conveying that the right answer is what really mattered (e.g., Observation, 1/20/99; Observation, 2/10/99). Even one outside observer commented that Ms. Collins sometimes focused on the wrong things – preventing the students from understanding that what really mattered was the development of understanding (Yoshida Debrief, 2/25/99).

Consequences of Reflection

As highlighted in this section, the reflection was an important part of my work with Therese. It allowed her to learn more about herself and to look at her classroom in terms of the goals she had set. She emphasized the value of reflection in my work with her saying:

I mean the feedback has influenced [my teaching] because every time I do something I think in terms of whatever

suggestion you gave me. It's not even a matter of suggestions – it's a matter of some questions that you asked me that somehow I incorporated and started thinking about 'why' and 'what it is I really want to do?' So, it helps me keep on task.
(Interview, 2/24/99)

To this she added that my work with her would have been even more effective if I had modeled things for her at times.

Proximal Goals

Introduction

Proximal goals became very important in my work with Therese. It was through my work with her that the focus of the goals was redefined from centering on the teacher's improvement to focusing on student development. During one of our interviews, she really highlighted the impact of student performance on her own work in her response to a question about improving:

Chandra: "What area or areas right now would you most like to be doing better in as the teacher?"

Therese: "See everything that I think of always comes back to what I want them to do. Okay." (Interview, 11/18/98).

From this point, I realized that for successful implementation, proximal goals needed to revolve around helping the students. My thought was that by critically evaluating the students' needs, each teacher would be able to improve her own performance.

Further, it was my hope that using proximal goals to plan the students' progress would allow the teachers to stay focused and to keep moving forward in their work.

To this end, I introduced the concept of proximal goals to Therese in that same interview by explaining:

Part of what my role is supposed to be as a researcher other than just asking you questions and making you think is try out some different training strategies. And one of the things I've done a lot of reading on that worked in other circumstances is called proximal goals. With proximal goals you have a big goal. Like your big goal is to get them to flow between activities and so you break it down into what are some smaller steps we can take to get there. Because, as we achieve these smaller steps, a) we can recognize we've achieved something because they are small concrete steps and we have a feeling of success every time we get one because we're going forward. Where, if we're just trying to get them to 'flow smoothly' well we could work for the next 20 weeks and [not even know if we got anywhere at all]. (Interview, 11/18/98)

As the interview continued, I learned about the goals she had for her students at this point in their work. I then took those goals and used an "Action Planning Guide" (McCombs, 1995) to develop a set of proximal for promoting on-task behavior, promoting metacognition, and creating more activities to tie GMPC to the curriculum and students' lives.

Introduction of Proximal Goals

The formal introduction of proximal goals occurred during the last week of Phase 1 (Interview, 12/2/98). Unlike my introduction of proximal goals with Evelyn, this introduction put me very much in the position of the “teacher.” I not only told Therese about the concept of proximal goals, but also supplied her with a list of goals I had generated from our conversation the previous week (Appendix G). By doing this, I took ownership away from Therese and missed her natural goal-setting tendencies that had surfaced in our work to this point (e.g., Interview, 11/18/98). Further, I created an artificial sense of dependency on the professional developer by making it seem that special knowledge was necessary to create these goals (Interview, 11/18/98; Interview, 12/2/98). In the end, the only real options for Therese involved which goals she would implement and in what order. All of these factors went against the notion of creating a professional development environment that imitates the learning environment to be created. In fact, the only learner-ownership here was the option I gave Therese to not use the goals at all as long as she could help me understand what she did not like about them.

The proximal goals themselves, while seemingly thorough to me, were somewhat confusing to Therese. As she looked over them, she freely raised the questions that she had about them. In this way, the introduction of the goals proved

to be a reflective tool as Therese looked both back on her previous actions and forward to how she would enact some of the goals. For instance, she was initially alarmed at the suggestion of providing more structure for the introduction and said;

I can't figure out a way to tell them – to give them the basic plan for the day without touching on the scenario. Because even if it's like – this may seem childish or babyish – but it works very well when they are organized and we walk in. But, part of the problem is that we did have to make a shuffle because this computer wasn't working and I had shuffled them over there. So, we have to keep it, get it back together again so they know where they're at. So, that's an easy thing. But, I can't think of any other basic plans for the day aside from getting into the scenario. (Interview, 12/2/98)

By raising this concern, I was able to understand her issues and thoughts as well as clarify my own. Through several exchanges of this kind, Ms. Collins was able to clarify her understanding, reflect back on how her class had gone, and plan ahead for implementing the proximal goals.

Implementation of Proximal Goals

The initial implementation of proximal goals in Ms. Collins' class changed everything. Therese chose, in the first week, to focus on three goals aimed primarily at improving student behavior from the list I had provided: providing an agenda for the day, getting the students to sit down at the tables away from the computers, and promoting thinking about the scenario before the students go to the machines

(Interview, 12/9/98). Therese reported that she chose these three goals to help lessen the confusion that was occurring in the computer classroom (Interview, 12/9/98).

She further explained her choice in these goals saying:

You know it's like, 'okay – what are we going to do today.' I mean, because anything could be on the computer and they could be happy, you know." [Therese chuckles.] "Whereas this way, they are focused on 'we're going to just be thinking about making paper from paper' and have those prescenario questions generated, formulated and hoping they along the way, in the process, found the answers to some of those question or came up with – discovered other questions.
(Interview, 12/9/98)

On 12/9/98, the students entered the computer room to be greeted by Ms.

Collins writing rules of conduct on the board. At this point, she turned away from the list she had begun writing and asked the students to reflect on how their movement into the computer room was going. Most of the students agreed that the plan they had been using – to come in and go to the computers – was not working well. Ms. Collins asked for clarification and a student offered that they tended to wander rather than sitting down right away. Ms. Collins continued this conversation by telling them that they were "going to think about the scenario before we get into it." However, what followed was an extremely short conversation in which she only asked the students to tell her the name and number of the scenario. Then, Ms. Collins continued,

adding, “2. Take notes: start thinking about the scenario” to the rules of conduct on the board.

Ms. Collins, then began a discussion of the scenario using a KWHL approach. She first focused on what the students knew based on the title of the scenario by using a series of closed-ended, leading questions to help the students consider reusing and recycling (because the scenario was “Making Paper from Paper”). Throughout this conversation, Ms. Collins recorded the students’ issues on the board and the students were supposed to write down the questions so they could answer them at the end of the scenario. Unfortunately, the only really clear question she provided for them was, “Do you think everybody will use recycled paper?” Everything else she provided could more easily be considered an area of concern than a question.

Once the students were settled at the computers, Ms. Collins returned to her rules of conduct on the board erasing the first two steps for the day and started over. After several minutes and multiple interruptions to deal with discipline problems, Therese had replaced the original steps with four steps:

- Take your seats at the tables
- Start thinking about the scenario
 - What will it involve, etc.?
 - Generate as many questions as possible
- Go to the computer and start working. Keep in mind your questions.

- When finished the job, go back to your tables to write your reflections. At this time you should be able to answer many of your questions. Do you have any new questions after having completed the scenario?
(Observation, 12/9/98)

Once the students completed the scenario, Ms. Collins asked them to write a reflection and copy the rules from the chalkboard. She then began a whole-class discussion about what they did in the computer room today. As with the earlier conversation, many of the questions she asked were closed-ended – in search of a single, “right” answer. For example, “This is a landfill full of paper. If we bring it back what’s the word?” Then she asked the students to revisit the question about companies buying recycled paper:

Therese: “What I was thinking was will customers be willing to buy recycled paper? Did you remember? Some customers would and some wouldn’t. Why wouldn’t a company want to use recycled paper? Write this down. This is something to think about. Why wouldn’t a company want to use recycled paper? That’s a question for thought – A question I want to see answered.”

Student: “It might look darker.”

Student: “People who would buy recycled – some people wouldn’t want to use recycled at all.”

Student: “Some people might not know [about recycled paper].”

Student: “The paper company cuts trees. If the company uses recycled paper, it might ruin the business of cutting trees.”

Therese: “No, no – that’s not quite.”

Student: “Fresh paper is better than recycled.” (Observation, 12/9/98)

With the implementation of these proximal goals, Ms. Collins had not only gained some control over her extremely rowdy classroom, but she had also provided

a more organized and relevant introduction to the scenario than I had seen before (Observation, 12/2/98). As I reported in my journal: “The most exciting thing this week was Therese’s implementation of proximal goals. The best part was when she actually talked about the students generating their own questions – that’s how she feels they learn and now she is having them do it – bang.” (Journal, 12/10/98). The reason that this was so exciting, as I pointed out to Therese in our interview on 12/9/98, was that it showed that she was moving toward bringing her belief that questions form the foundation for learning in line with her teaching approach. In the end, the fact that Therese had generated this approach on her own was most exciting. While I had provided her with sets of proximal goals, students question generation was not a part of what I had offered (See Appendix G).

In our interview on 12/9/98, Therese reported that she found the proximal goals useful on this first day of implementation because:

Instead of trying to reach the light at the tunnel – being at the one end of the tunnel and wanting to be at that end of the tunnel, you know, there’s a lot of frustration along the way. Whereas if, you could say, ‘ok – well, you get them to do this and that’s good and then you just introduce stuff, step-by-step. You can feel yourself getting to the end of that tunnel. So, I guess I’m no different from them. I want instant gratification and I don’t want to do the work in between. (Interview, 12/9/98)

Further, she noted a difference in the demeanor of the class, saying, "...it was just more calm. Everybody was more focused on their work and that transition from the – when the majority of people were finished with the scenario – to going and sitting down." (Interview, 12/9/98).

Second Set of Proximal Goals

On 1/13/99, I introduced a second set of proximal goals to Therese that focused on reading for understanding. The creation of these goals had come from a need expressed during a collegial group meeting (Observation, 1/7/99). All four teachers expressed discontent over the amount and quality of the reading their students did during their work on the computers. In order to help support Ms. Murray and Ms. Collins, I tried to develop a set of proximal goals that would start to address their concerns. As before, however, I only delivered the goals to Ms. Collins. Ms. Murray had already been working on developing goals to deal with this issue (Interview, 1/7/99; Observation, 1/7/99).

This second set of proximal goals, like the first set, was presented to Therese in a very directive way rather than supporting her in the development of her own goals. This time, however, I provided her with not only my brainstorming about the topic, but also the guiding questions I had used to develop the goals. In this way, I

was attempting to model my thinking and enable her to develop her own goals. This, however, still fell short of her owning the development process.

It was this experience combined with a trial run of the questions in the collegial group that led development of the proximal goal development guide (Appendix F). Further, it led to my realization that providing her with my model of thinking was inadequate for preparing her to generate her own goals. In fact, this particular set of goals was never implemented in any form during my research.

Proximal Goals in Phase 3

During Phase 3 proximal goals continued to play an important role in my work with Ms. Collins. Therese demonstrated, through interviews and actions, that she had not only come to view proximal goals as important, but had made them a part of her teaching approach – in essence, she had internalized them. As early as the second week in this phase, I realized that she was always thinking in terms of proximal goals. She explained;

I guess it's really the way things work. You start out in little baby steps and you crawl, you run, you jump, and what have you. So, I guess it's a more natural thing to do than saying 'okay, I want to be an Olympic athlete' and just have this gold medal hanging up there and I'm not doing anything down here to reach that goal. So, it's a more – it's a natural progression. The way to make things happen. And, when something goes wrong or doesn't work, you can pinpoint it to 'okay I tried this

and this didn't work.' As opposed to 'this is what I want.'
Well there are a whole lot of things under there that may or
may not have contributed to you reaching that goal. So, the
little bit at a time is easier to swallow. (Interview, 1/27/99)

She continued emphasizing the importance of proximal goals through her discussion of what was happening in her class. For instance, when we discussed her plan for using the Internet for research, she described said, "the little step was for them to go find information, but I think I need to collect the information and let them pick out what they need." (Interview, 1/27/99). She also commented that metacognition was "something I need to set up some proximal goals so that I can get there. Because...we're not in that area yet." (Interview, 1/27/99). Again, this showed a step-wise thinking indicating that she was helping them move between goals. This tying of her reflective process to proximal goals fit perfectly with the framework for professional development. Further, beyond a doubt, proximal goals were helping to organize Therese's thinking about and approach to her class.

The most important aspect of the proximal goals in this phase was my development of a set of questions to help the teachers generate their own proximal goals (Appendix F). As reported in Evelyn's case study, I first introduced the questions during a collegial group meeting (Collegial group Observation, 1/21/99). The three teachers present, had all expressed their frustration with their students'

lack of reading for understanding. After listening to them for a few minutes, I decided that this was the perfect vehicle for introducing the goals. So, I took over the lead of the meeting, asking them the questions from the guide I had developed and recording their discussion on the chalkboard.

The most interesting question proved to be “What kinds of things might help get students to the goal?” When we looked at what he teacher can do, Therese sounded shocked and said, “Besides providing questions?” Upon deeper consideration, the teachers added that they could scaffold the environment, provide questions, and use jigsaw techniques to help the students. Obviously, these questions provided a new way to look at problems. The teachers were able to leave the group meeting with a set of steps for improving their students’ reading that they generated (Collegial Group Observation, 1/21/99; Journal, 1/21/99; E-mail, 1/21/99).

Ongoing Use of Proximal Goals

Therese’s ongoing use and evolution of the proximal goals remained an important aspect in my work with her. Each week, she tweaked what she did until, by the end of phase three, she was asking the students more and more relevant questions to promote critical thinking and the students were exhibiting more on-task behavior. For example, by using a video checklist, we were able to track the quality

of the interactions Therese was having with her students over time. The checklist allowed us to focus on the nature of the interactions Therese was having with her students and the level of questions she was asking. For this assessment, two researchers (Orrill and Kirkley) analyzed videotapes from 1/6/99 and one from 2/24/99. The amazing differences in Ms. Collins' behavior and focus are shown in Table 6.2.

Table 6.2: Checklist analysis of teacher-student interactions in Green Mountain Paper Company

	1/6/99	2/24/99
Amount of time spent on scenario	25 minutes	32 minutes
# of relevant interactions	12	11
# relevant interactions that promoted critical thinking	7 (58%)	10 (91%)
# relevant interactions that promoted higher-order critical thinking	3 (25%)	8 (73%)

As with Ms. Murray’s data, Ms. Collins data is divided first into the categories of relevant in irrelevant interactions. The relevant interactions included any discussion associated with promoting learning through the simulation. Relevant interactions did not include troubleshooting technical problems, disciplining students, or any discussion not related to the simulation. The “number of interactions that promoted higher-order critical thinking” was a subset of the “number of relevant interactions that promoted critical thinking.” Therefore, the chart for 2/24/99 could be read as eight of the eleven relevant interactions promoted higher order thinking or as eight of the ten interactions that promoted critical thinking promoted higher-order critical thinking.

Examples of higher-order critical thinking included those interactions in which Ms. Collins pushed the students to think more deeply, promoted reflection, or provided an opportunity for further inquiry. For example, in one of the higher-order critical thinking examples, Ms. Collins approached a team and asked them “What’s happened so far?” The students provide a brief summary of what they had done, but then mumble something about the employee folder.⁵ Ms. Collins asked the students what they thought they would find in the folder. The students explained that the employee sometimes got hot-headed but that he was loyal to the company. Therese then asked the students if loyalty was important. They acknowledge that it was. Therese then moved on to another team (Observation, 2/24/99). Clearly in this example, there was room for more pushing, however, Therese did question the students about their thinking and pushed them to be sure they understood the value of the information they were examining.

In her lower-level critical thinking examples, Therese stopped too far short of promoting meaningful experiences for her students. For instance, she often only monitored for student understanding by asking groups if they knew what they were

⁵ In this scenario, the students were investigating an accident that occurred in the wood yard. They must decide what, if any, action to take against the crane operator who caused the accident. The employee folder referred to that employee’s work history information.

supposed to do or if they understood certain words they were reading. While these interactions were important and presumably helped the students learn that they needed to monitor their own understanding, the interactions did not promote more critical examination of the situation or of the problem-solving process.

While these data, especially when combined with other data gathered during the project, point to the fact that there was more room for improvement, such as incorporating more interactions and interacting more with the students (Yoshida Observation, 2/24/99). The data also show growth in pushing and supporting critical thinking on Ms. Collins' part. It should be noted in considering these data that the proximal goals alone were not responsible for this shift in style. At least one other intervention from my study had considerable impact on her teaching – reading the Chuska (1995) book. However, the proximal goals did, by themselves, affect the classroom behavior and the overall teaching approach used. It was the implementation of proximal goals that added the prescenario discussion to help the students generate guiding questions for their work. And, the addition of those questions helped the follow-up discussion in two ways, first, the students paid more attention to what they were reading because they had to answer the questions they had generated and, second, answering the questions became the framework for the postscenario discussion insuring a constant tie to the scenario.

Resources

Introducing Outside Resources

For Therese, the resources were important from the beginning. Unlike Evelyn, she greeted them with a tentative excitement – I think she was overwhelmed by the amount of materials in the notebook (Journal, 11/4/98). Right away, she looked through what was there and said that she would read the Chuska (1995) book that night. While she did not follow through on that plan, she did, in fact, read several selections from the notebook during my work with her. Often, she could not recall what she had read from the notebook, though, because she read items from it and from other sources quite regularly and sometimes did not finish pieces that she had started. She explained:

But, there was something else – I really haven't had a chance to read like I wanted to. So, and I sometimes I don't finish what I read. I get little pieces and 'Oh yeah, this is good, and go on with that.' And, then it's something else. So, it's bad to say, but I get the articles kind of confused. I know I read something good over there and I read something good over there, it's just it may not have been out of the same thing. But, next week, I'll be more focused – I'll have it clear in my mind what the heck I was doing. (Interview, 12/9/98)

In the few instances where we dealt with the resources in our interviews, however, they either sparked important conversations that allowed Therese to evolve her thinking or Ms. Collins turned to the resources based on our conversation. One

such instance came from me asking Therese if she had read anything in the notebook. As she looked through it to see what she had looked at, she pointed out some of the questioning pieces. This sparked her talking about how questioning helped her see the logic in how students were thinking, even if they were going in an accurate direction (Interview, 11/18/98). As the conversation evolved, we discussed supporting student thinking. This led Ms. Collins to choose another article, “Teaching critical thinking: Eight easy ways to fail before you begin” (Sternberg, 1987) to read (Interview, 11/18/98).

Resources in Phase 2

A major focus on resources in this phase was actually on me providing Ms. Collins with ideas from the literature that I had read. I was able, on a few occasions, to draw on literature to offer Therese suggestions for her classroom. For instance, I was able to assure her that middle school students can collaborate (Interview, 12/16/98) and I was able to draw from the Chuska (1995) book before she read it to suggest a way to work on a problem Ms. Collins’ had of being in the center of every discussion (Interview, 1/6/99).

In this phase I decided that, in an effort to maximize the value of the collegial group, I should ask the teachers to read some materials and discuss them. To this

end, I asked them to read Chuska's *Improving Classroom Questioning* (1995) in our second collegial group meeting (Collegial Group, 1/7/99).

Improving Classroom Questioning

Phase 3 for Therese began with her reading of the Chuska (1995) book. As with Evelyn, Therese was strongly impacted by reading the book. Before reading the book, she would ask many good questions in her post-scenario discussions, but there would not be an overall direction to the conversation (Yoshida, 12/14/98). It was, instead, several minutes of random questions promoting the students' understanding. Further, even when problems in thinking showed up, Ms. Collins did not address them. One example of this was the pre-debate discussion she had one day when there were technical difficulties. Instead of doing the scenario, the students were asked to consider whether or not to open a daycare in the plant. The issues that the students raised and questions they generated indicated that they probably did not understand what a daycare in the workplace would be like:

Therese: [Writing as she talked] "Where to set up kids. Where will the kids be located? These are questions. How many single parents? Where will the kids be located in this big company? Anna?"

Anna: "Who will supervise it"

Therese: "Okay, who's going to supervise it?" [She wrote the question on the board. Then responded to a student question that was inaudible "...No. No, this is just like a drop in the hat thing. Excuse me." [Called on Michelle.]

Therese: “Michelle says, “How much will it cost?” How much does it cost? What is going to be the expense? The cost to the company?” [She wrote the cost question on the board.] “Can you think of any other issues that would be involved here?” [Repeating something a student has said] “Supervision of the kids.”

Therese calls on another student.

Therese: “He mentioned something that – he had another idea. He said what happens when the kids are wandering around? Okay. They’re not going to be wandering around. There’s a big issue. There’s a big issue in terms of kids being in this plant. What do you think is going to happen? There’s another big expense involved in having children around this large company.”

Student: “They might get hurt by the machines and the mother might sue.”

Therese: “So, what does that involve? Suing somebody? Getting hurt?”

Student: “They can’t sue because [inaudible]”

Therese: “But, it’s a good point. The word is ‘insurance.’ Insurance. They already have to pay for insurance to just operate the business for the employees and the machinery. Now, you’re introducing another element, the small children. The children are not going to be running around. They’re going to be in some location set-up – supervised. But, if they do become injured, even in this supervised environment, there is this problem of them getting hurt and there’s insurance to take – let me write insurance.”

Kevin calls out “Make their parents sign a piece that they [miss a couple words]”

Therese: “Fill it out, fill it out – it’s called a waiver.”

Anna: “You have to know what kind of toys and materials – if they’re clean”

Therese: “So, supervision, safety.” [She wrote this on the board.] (Observation, 12/16/98).

Ms. Collins was doing many good things here to help support student thinking and to help fill in the gaps in their knowledge, however she was either not understanding or not addressing the fundamental misunderstandings that seemed to be showing up.

The students did not understand that the daycare would be away from areas that were unsafe and that the children would not be wandering everywhere. In this instance, it seemed that Ms. Collins treated each symptom, discussing insurance and waivers, instead of stopping to help the students see how a daycare in the workplace might work.

Further, she was requiring the students to develop their own issues for the scenarios. The first week she did it, the students worked with her to generate a small list:

Therese: “What type of product? The product we manufacture is paper, but what kind? They manufacture paper, what kind of paper do they want to make?”

Student: “Environmentally friendly?”

Therese: “Okay – what else?”

Student: “Recycled”

Therese: “Okay, but more specifically?” [She pointed to a computer] “This is one paper company and this is another – why would I buy this company’s product instead of that one?”

Student: “Quality.”

Therese: “High quality paper. So one of the issues you have to think about is the quality of the paper. What are some other things you have to think about?”

She then added to the list on the board:

Quality of paper

Source of paper

Michael suggested that they should think about who will use the paper – so,

Therese added that to the list.

Therese: “Do you think everybody will use recycled paper?”

Student: “No”

Therese: “Some say yes, some say no. You might want to find out why. Does that seem like a reasonable question?” (Observation, 12/9/98).

These early attempts were certainly steps in the right direction; however, they were still inadequate for meeting Therese’s goal of promoting understanding.

However, Ms. Collins’ was greatly impacted by her reading of Chuska’s *Improving Classroom Questioning* (1995). In my conversations with her and in my observations of her class during the third phase of the research, there was a difference in her approach to the students and questions that, as far as I could tell, was a result of the book. She explained that the book’s suggestions were things she was trying to apply to her students and herself. Then she elaborated, saying:

...It’s not to say that I didn’t think about how my questions sounded, but I guess I’m paying more attention to how they sound and are they really asking what I want? ... It’s like you may say one thing, but it’s not really what the question is asking... (Interview, 2/3/99)

Ms. Collins’ started becoming a better and better question asker as well as more supportive of the students generating their own questions. Therese explained her dedication to supporting students in generating questions by saying,

If I generate the questions, it’s, I want to say useless... If it comes from them, it has more meaning than when I give it to them. So, insisting on that. And now insisting that they work on those questions – try to find answers to those questions by insisting on that – it’s – you own the question, now you try and find the answers. (Interview, 1/27/99).

In Phase 3, each day she had a discussion before the scenario. Of the five prescenario discussions in the phase, four required students to generate some kind of questions. For example, when the students worked on “The Trout Mystery” scenario, they generated the following questions to guide their thinking

- What is a trout?
- What do fish have to do with making paper?
- Do the fish cause a problem?
- Does the episode involve the plant killing the fish?
- Are the fish causing a problem in the environment?
- Are the fish causing a problem for the plant?
- Are we causing the pollution?
- Is there a lake nearby that the plant is hurting?
- How much is this problem going to cost us? Can we fix it?
- Is this problem effecting the community
- Does this problem effect employees?

As she walked around during this scenario, Ms. Collins did not talk to many teams, however the interactions she had were focused on promoting student thinking. For example, in one group she noticed that the students had written something about “brownness” killing the fish. She stopped and questioned them:

Therese: “Brownness? What does that have to do with the fish?”

[The two boys in the group had no idea]

Therese: “What does the brown have to do with the oxygen levels?”

Kevin: “The brown stuff is on the trout – it’s killing them.”

Therese: “Is that what it said?”

Kevin: “Yes”

Therese: “What’s the cause?”

Kevin: “Toxic waste in the water.”

[So far the answers had come only from the two boys. The girl had been silent and had not indicated any agreement or disagreement]

Therese: "Laurel, do you agree?"

Laurel: "The temperature and sediment levels went up."

Therese: "Not just the sediment, but the temperature?"

Laurel: "Yes"

Therese: "What caused the change?"

Laurel: [Inaudible]

Therese: "You can't think of anything causing the change?"

Jared told Therese about what a fisherman said on the news in the scenario.

Therese: "Some outside group is trying to make you look bad. Is there something there that might have caused it?"

Kevin: "Chlorine?"

Therese: "Why not look in your files?"

Kevin told Jared where to click

Laurel started looking at the trout habitat data. Kevin and Jared lost interest.

(Observation, 2/3/99)

While it is only one small example, this example shows the emphasis that Therese had begun to place on students thinking and on students explaining themselves.

By the end of the phase, the orientation discussions involved a discussion of relevant issues that were tightly tied to the questions the students were generating. For example, for a scenario dealing with an accident in the wood yard, the students were asked to recall if they had ever been injured at school. When a student said she broke her ankle at school, Ms. Collins asked her to recall the procedure that was followed when it happened. Tracy recalled six separate steps while Ms. Collins recorded them on the board. Then, Ms. Collins told the students to transfer this to a work situation, "You are the general manager. You get into the office and

everybody's at you. So and so was injured. What are you going to do? What do you think you need to know?" (Observation, 2/24/99). From this the students generated ten logical, information-oriented questions to guide their work. The questions they asked included:

- What was the injury/accident?
- What happened?
- How, where, and when did it happen?
- Why did happen?
- Could this accident have been prevented? (Observation, 2/24/99)

In each scenario, these prescenario questions varied according to the small amount of information they got from the scenario title and discussion Ms. Collins led. The one thing Ms. Collins insisted on was that the questions cover all four of the indicators in the scenario – environmental friendliness, profitability, employee satisfaction, and community relations (Observation, 1/27/99; Interview, 1/27/99).

Within those parameters, the students generated lists that had many similar questions, but also certain special questions. For instance, on 2/10/99 Ms. Collins introduced the students to the concept of a byproduct in her introduction of the scenario. Instead of using a typical environmental question, "How will this impact the environment," the students asked:

- "Where can it be disposed?"
- "Are there chemicals that will affect the environment?"

- “Can this byproduct be used again?” (Observation, 2/10/99)

In fact, it was questions like these that drove Ms. Collins to say that she felt the students were asking better questions and demonstrating that they were thinking in more of the business mode (Interview, 2/3/99).

Further, in Phase 3, Ms. Collins’ own questioning of the students began to be more thorough. As discussed in the “reflection” section of this chapter, Ms. Collins’ probed more and required more thorough thinking from all of her students. However, she still had room for improvement. For instance, she tended to ask too many questions at a time. For example, in one prescenario discussion she asked, “One of the employees injured at work place and you are the general manager, what you gonna do? What do you need to do? What type of question do you ask? What would you like to know?” (Yoshida Observation, 2/25/99). Further, while her support of thinking in the scenarios had improved significantly, only a few teams really benefited from it. She tended to focus her attention on the teams that were the most dysfunctional – meaning that only about half of the class was supported through questioning (e.g., Yoshida Observation, 2/25/99; Observation 2/10/99).

Collegial Group

Introduction of Peer Group

In my work with Therese the collegial group provided a valuable forum once it started to meet. Because of scheduling conflicts and cancellations, there was no collegial group until Therese was already in her second phase. Before this initial meeting, the only mention of the group had been me asking her if she thought a group of this kind would be helpful. She replied:

Well, even though I've never been to one, I would think that – I would like a peer support group to share ideas, how to deal with issues in the classroom. I guess, really, what I would like is – you see this Green Mountain Paper Company – I thought that I was going to do it with another teacher – a math teacher because – since it was math involved, that we could work together. Someone else could do the math side of it – or anything else – and I could do the environmental side of it. So, I guess that's kind of a co-teaching kind of thing. I don't know. That's what I would like. But, peer – you said peer support group – you know a group who's in the same boat trying to solve problems. But everybody can't be at the same level, even though they're peers. You have to have people with different experiences so you can all benefit from it. Because, if you're all green behind the ears, then it's a big wet mess. (Interview, 10/29/98)

Early Meetings

In Phase 2 of Therese's work, there were only two group meetings. As discussed in the Evelyn's case study, the first meeting was mostly organizational with a considerable amount of time being spent on the discussion of the simulations. But, the second meeting started moving the group, and the professional development framework, forward. During the second meeting, Therese reported back on a workshop she had attended at Classroom, Inc. focused on using the simulations with a project that incorporated three to four computers into each classroom in New York. The workshop looked at the issues involved with having too few computers for the number of students in the classroom (Collegial Group, 1/7/99). Ms. Collins provided a brief description of what happened as well as her own thoughts about the topic. Therese conveyed a positive attitude and seemed willing to try some of the suggestions from the workshop, particularly those that split the class up so that part of the students were working on the computer and part was working with the teacher on scenario-related activities. However, Evelyn, who had not attended the workshop, emphasized that she had tried some of the strategies at other times in her classroom and was not successful with them. She conveyed that she felt all students should be working on the same thing at the same time (Collegial Group, 1/7/99). It was too easy for Evelyn to dismiss the ideas and too hard for Therese to defend them because

they were only ideas that she had heard about, not anything she had tried or seen working. While it was impossible to know if the effect would have been different had all of the teachers attended, it seems likely that the approach would have had a better chance of being perceived as achievable if all of the teachers could have spoken directly to the person who had tried them.

The good aspect of this discussion was that it led into a discussion among the four teachers that dealt specifically with problems they were having in their classrooms. Therese started this discussion by explaining that she felt that splitting the students up would help her work on their understanding more, pointing to the extreme problems the students were having understanding the concept of “changeover costs” in the scheduling scenario. She attributed this lack of understanding to the students’ lack of careful reading. Ms. Murray immediately jumped in as a facilitator, offering suggestions and asking Therese what she had done to prepare the students for the scenario. In an effort to move to the larger issue of promoting understanding, I turned to Mr. Deveneau and Mr. Crane and asked if they were having similar problems promoting reading in their simulation. This started the conversation moving in a direction that all of the participants could benefit from – and each was able to share helpful hints with the others. In this way, Therese sharing her experience from the workshop was very valuable.

Phase 3

As time went on and the collegial group continued to evolve, Ms. Collins played an important role in it. She again attended a Classroom, Inc. workshop, this time on peer coaching, and shared her experience with the other teachers. This second experience was quite similar to the first except that rather than focusing on classroom issues, the discussion that followed focused on how hard it was to mentor people. This was one of the few times when Ms. Murray's naturally tendency to act as the expert was helpful to the discussion. This was because Therese would mention one of her thoughts on the workshop, such as the peer coach's primary role is as a listening board. Evelyn was able to move from this point and say, that being a sounding board was really hard because, as the peer coach, her experience was that she wanted to help the other person (Collegial Group, 2/25/99). Again, sharing the experience of the workshop seemed to not work as well as attending the workshop would have. However, it did force Ms. Collins to synthesize what she saw in order to summarize it. In this way, the jigsaw approach to attending workshops that Mr. Gabel had ordered (Collegial Group, 12/10/98), was beneficial.

Therese's comments on the Chuska (1995) book, helped spark interest in Evelyn and the others to read the book. In our collegial group meetings, Ms. Collins was always willing to share the aspects of the book that she found particularly useful

and those she found questionable. For instance, she liked the focus Chuska put on analysis and tied it back to the work she did the day before on the scenario by asking the students whether or not they could believe information about chemicals that came from their financial person (Collegial Group Observation, 1/21/99). She also liked some of the lists of questions that Chuska recommended. She specifically pointed to the summary questions as being helpful:

- What were the main features?
- What are the most important outcomes?
- Who had the most impact on the outcome?
- What needed to be considered? (Collegial Group, 1/21/99)

Her only spoken concern with the book dealt with one section that recommended that teachers should start questioning students as an orientation to something new approximately two to three weeks before they do the lesson. Both she and the other members of the collegial group were skeptical about this (Collegial Group, 1/21/99).

One other important aspect of the collegial group work in Phase 3 was that it allowed the teachers to share their thoughts about professional development with me (Collegial Group, 2/4/99). I had copied some materials from two books on cooperative learning for the teachers. When I provided them with the materials, I introduced it as coming from the leaders in the field and mentioned that they (Johnson and Johnson) work a lot with teachers. This sparked a conversation about

why professional development typically takes place outside of the school. She pointed out that even though individual teachers do benefit from attending seminars away from school, they could not bring the materials back and present them the same way. Further, it was not always convenient or possible to leave town for seminars. The group discussed this further, pointing out that the school has a budget for sending them away to various professional development activities, yet gets very little return on the investment being made. The teachers felt that if the school would pool that money to bring the speakers into the school, more teachers would benefit from the experience. They point out that this would also mean that in-service days could be used for professional development eliminating the added burden of hiring substitute teachers. This conversation reemphasized the need for professional development to happen in the school (e.g., Guskey, 1988). Further it solidified Therese's early assertion that teachers should go to workshops in groups so that they could form an informal support group for trying out the ideas they have seen (Interview, 10/28/98).

Changes in Beliefs

As shown through this chapter, Therese evolved significantly during my work with her. Through the implementation of the professional development

framework, and her whole-hearted adoption of the various facets of it, Therese was able to improve her questioning strategies, better align her beliefs with her practices, and move toward promoting more critical thinking in the classroom. She still struggled with classroom management issues and teamwork every week, though. In fact, it could be argued that much of her effort was lost to the disruption in the classroom (Duffy Debrief, 1/20/99; Yoshida Debrief, 2/25/99).

Teaching

By the end of my work with Therese, she had expressed two major shifts in her thinking about teaching. The first, was a shift in the way she thought about GMPC, the second was a move toward a more inquiry-based model of learning.

Her thinking about GMPC shifted from viewing it as a tool for supporting the learning of certain concepts and skills. She now explained that she viewed GMPC as a stepping stone to other activities. She explained to one outside observer (Duffy):

I want to incorporate using the technology in the classroom and [GMPC] gives me a format – something already laid out. And, little by little, I can go beyond what Green Mountain has to offer by – like this particular scenario – letting them research what these different disasters we've had in the environment – Exxon Valdez and all that kind of thing. So, it's given me a base to start to get into the technology. Letting them – and me – being loose enough to getting used to the noise level and what have you. Today was very moderate. It

wasn't anything out of control. So, at least I know I have to find my own comfort zone. (Interview, 1/20/99)

By the end of my work with her, she was beginning to act on this shift in thinking.

For instance, she allowed some the students to go outside the simulation to do research related to the scenarios (Observation, 1/27/99). While she intended to do more of this kind of work, time issues and her model of using research to reinforce content rather than teach it, prevented much more work on the machines.

Therese also explained that GMPC provided an almost real-world situation for her students by itself (Interview, 1/27/99). She explained the value of this saying:

This has some meaning and if they can see that 'Oh, well in this situation.' If they read about it and see it in the simulation, this is a little more tangible – it's like they're part of the simulation. It's like, 'You've got employees, you've got this, you've got that.' As opposed to just reading the newspaper article about it. You know if we don't go into the depth that the ism [can] – that feeling is not going to be there. (Interview, 1/27/99)

The other shift that Ms. Collins talked about was in her thoughts about teaching. While the changes she discussed were logically connected to her initial discussion of teaching and the teacher's role, I was impressed by the advancement she made. First, I revisited her goals for the students:

Chandra: "What is your overall goal for your students in general. Basically, what I want you to do is think about this sentence and finish it: I feel like a success if my students leave my class at the end of the year being able to or knowing ... what?"

Therese: “Okay – [long pause] Ok. Looking at a problem, being able to ask questions to solve the problem, looking – well asking what resources are available to them to solve the problem, and for going to the resources and solving – and finding solutions and answers. So, first, identifying the problem, asking questions about the problem, then identifying resources for finding answers, and then going to that – to those sources. That’s something they can use all over.” (Interview, 2/10/99).

She further elaborated saying that a good teacher sparks her students’ interest,

...You light a spark. You light a little fire and you get kids to – just trying to see where that little spark will take them. To me, it’s about curiosity. To encourage curiosity. As a teacher, if I could stimulate whatever you want to call it –curiosity, to the point that the kids say, ‘Well what do I do to find out about such and such?’ and actually do it and then just come back to me as someone to kind of guide them – steer them along the road, give them suggestions, and say, ‘Well, why don’t you look here?’ And, actually look in that direction and say, ‘What did you find out?’ I guess that would be the ultimate. I would feel satisfaction if kids would, come up with their own problem, and think about ‘What kind of questions?’ ‘Where am I going to find the answers?’ And for them to actually do it – try to find the answers to the questions. And, you know, accept the fact that there’s no right or wrong answer. (Interview, 2/10/99)

While this was not radically different from her earlier discussions of what a teacher should be, there was one important change. She no longer talked about helping the students to “think correctly” or getting the students on track. The notion of “correct” thinking had faded away.

Related to this shift, Therese expressed an interest in moving to other teaching formats. She found that textbooks are not enough for her and that the tie to a single textbook frustrated her because of its limitations in allowing her to tie things together (Weekly update, 2/17/99). For example, she said, “You see what – this is going into the next lesson, but on the one hand, from my background, you know when we talk about the chemistry involved. If you just talk about medicine and lab tests and things like that. I wish I had a physiology book, because if I had a physiology book, then I could show them what the chemistry has to do with the physiology.” (Interview, 2/10/99). While this was still very bound to a teaching approach rather than a facilitative one and still tied to the textbook model, she was showing signs of wanting to move to a more interdisciplinary format. Further, she expressed a need to move to a more project-oriented approach to teaching:

I was thinking about the textbook – I guess in the beginning, I thought the textbook was all I needed to teach them. But, I’ve come to find out or realize that it’s not all that I need. And, I don’t want to shoot myself in the foot, but if the year was longer, I could do a lot more with them in terms of making them do research. Finding out information about different things. As opposed to just trying to give them this surface things that you get out of the textbook. So, maybe – more projects. Let’s say four projects in the year – or forget four – three projects in the year that involve some research. But, at the same time, I have to give them some fundamentals...But, going back to – on the one hand, you want the kids to research things, but at the same time, you have to give them some

basics – some fundamentals – which in the book – that’s what you need the book for. So, how to blend it. Make a blend right there. You just can’t say, go out and find out about this and they don’t have any background, so I have to find a way to give them enough background so that they can go out and then keep coming back – it’s a balancing act. (Interview, 2/10/99)

As shown here, Ms. Collins had not yet totally removed the need for “basic” information, however, she moved considerably from where she started. In fact, she also pointed out that she felt she needed to move the students from simply memorization to seeing the big picture (Collegial Group Observation, 1/21/99). This need for more projects also showed up in her discussion of the ways that she would like to improve her approach to GMPC. She explained that she would like to insert research opportunities and more discussion into the scenarios (Interview, 2/24/99).

Learner-Centeredness

At the end of this study, I again administered the Learner-Centered Battery’s “Teacher Beliefs Survey.” (McCombs, 1997). During this second administration, Therese showed no change in her learner-centered beliefs about learners, learning, and teaching (Table 6.3). She scored slightly lower in her non-learner-centered beliefs about learners, meaning that she was moving more in the direction of being learner-centered. However, she appeared to have become more non-learner-centered in her non-learner-centered beliefs about learning and teaching. This could be

attributed to many factors, including the time of the school year that it was or her frustration-level from something that happened during the day. Or, it may be that all of my efforts to help support her had inadvertently moved her more toward being non-learner-centered, or perhaps confused, in her thinking about teaching and learning.

Table 6.3: Therese’s Teacher Beliefs Survey Scores

	Learner-Centered Beliefs about Learners, Learning and Teaching	Non-Learner-Centered Beliefs about Learners	Non-Learner-Centered Beliefs about Learning and Teaching
Learner-Centered Teacher	≥ 3.4 (S.D.=.4)	< 2.0 (S.D>=.56)	< 2.0 (S.D.=.49)
Non-Learner-Centered Teacher	< 2.8	> 2.4	> 2.4
Therese - Initial	3.3	3.11	3.17
Therese – Final	3.3	2.56	3.25

Conclusions

In my work with Therese, as with Evelyn, I saw evolution toward the kind of teaching style I had set out to support. In fact, with Therese, the evolution of her fundamental beliefs about teaching went beyond what I could have hoped for in four months in that she was moving toward an inquiry-based approach to all of her teaching.

My experience with Therese taught me a considerable amount about teaching and how to support them. Her willingness to take risks allowed me to work with her very closely and make suggestions that I may not have been able to make to other teachers. She was always willing to listen to suggestions and often implemented those suggestions in ways that were different from what I expected, but appropriate to her teaching style. From the perspective of developing this framework, Therese's willingness to try things out and ability to reflect on what had happened were invaluable.

Need for Flexible Approach

As with Ms. Murray, Ms. Collins taught me a lot about the professional development framework. First, I learned the need for flexibility. Ms. Murray and Ms. Collins were very different teachers, yet I applied the same framework to both of them. It seemed that the framework was broad enough that it allowed room for different personalities to function well within it. For instance, with Ms. Murray, I remained an outsider who she was trying to help (Interview, 2/25/99), whereas, with Ms. Collins, I was a part of her class (Journal, 2/9/99). With Ms. Murray, I offered suggestions, as an outsider, whereas, with Ms. Collins, I worked with her to generate different ideas (e.g., Interview, 2/10/99). Because of the approach I used, the

framework itself did not have to be changed to accommodate the different teachers. However, it showed me the need for keeping the framework open enough to allow for this flexibility.

Reflection

Therese really drove home the importance of reflection as an agent of change. She was a naturally reflective person dedicated to helping her students. However, as the professional developer, I was able to bring structure to her reflections that allowed her to benefit from them. It was this structure that helped Therese consider her goals and how she was attempting to meet them – a process that helped align her beliefs and her actions. Further, by providing resources and introducing proximal goals to her, I provided the tools for her to use with her reflection in order to move forward (Interview, 2/24/99). I think that, with Ms, Collins, reflection was the foundation of the process. Without it, nothing else would have happened. However, without the outside elements, the reflection would not have been as effective. This led me to consider that it was more than reflection on proximal goals that the framework was supporting. It was an interplay between reflection, enactment, and proximal goals.

Proximal Goals

In my work with Therese, proximal goals offered a variety of learning points. First, I developed a better understanding of how to introduce them to teachers. In my first two attempts to introduce them to Therese, I left her with no way to move beyond my work. In both cases, I generated lists of goals. In the second instance, I tried to model thinking by sharing my thinking with her. Neither approach was satisfactory. I had to develop a way to help her develop the goals on her own.

Further, it was through Therese's whole-hearted adoption of proximal goals that I was able to learn that they can be used as a teaching tool. This is particularly exciting because proximal goals have traditionally only been used as learning tools – guiding the learner in what to do next (F. M. Pajares, personal communication, August, 1999). Therese showed that the goals adapt well to teaching and that they were effective in helping her move from one goal to the next, something she had struggled with in our work before using proximal goals.

Finally my proximal goals work with Therese showed that an aspect of their success was in her total adoption of them. They worked for Therese because she did not view them as an add-on. Rather, they were an integrated part of her thinking. This informed my understanding in that it addresses the need for the framework

to be seamless and totally integrated into the change effort as an almost invisible structuring device.

Resources

The resources posed an interesting challenge with Ms. Collins. She was an avid reader, and always claimed that she wanted to read more of the resources I had provided. However, she had trouble separating one resource from another in our conversations and she admitted that often she did not finish reading articles that she began (Interview, 11/18/98). Further, it seemed that she was most likely to choose, and presumably read, an article if it grew out of her immediate needs or interests. These factors combined suggest that, in addition to being too much at one time, the notebook was too easily set aside and too easy to skim through. Perhaps the resources should be provided on an as needed basis. In the as needed system, the professional developer could have immediate access to a small collection of relevant articles and, as topics were discussed, offer articles to the teachers.

The drawbacks to the as-needed approach would be of two primary kinds. First, the professional developer would be taking ownership over that facet of the development. In my approach of using a large notebook, the idea was that the teachers would have total control over their reading. The risk was that they would

not read anything. As shown in this case, at least one teacher did read some of the items I had provided. Second, the system would depend on the speed with which the professional developer could get the articles to the teachers. In my experience, if it took a week to provide a particular item to Therese, she no longer seemed interested. It had lost its priority.

The other challenge posed by Ms. Collins was the problem of teachers only skimming the pieces or reading only portions of the articles. This tendency suggests that all of the resources chosen need to be scrutinized to be sure that the chances of misunderstandings arising out of skimming are minimized. For instance, in articles with boxes or charts, those items need to convey the essence of the article.

Collegial Group

The collegial group proved most important in my work with Therese in that it became an equalizer between all of the teachers. It provided each of the teachers an opportunity to be a learner and an expert. In addition to likely raising efficacy, this also is likely to impact the relationships that teachers forge with each other. Further, the collegial group offered one more forum for reflection and one more source of information on solving classroom problems. Because of this, the collegial group should be kept as an important part of the professional development framework.

Role of Professional Developer

Finally, my work with Therese provided several learning points about the role of the professional developer. Ownership was definitely my greatest learning point in this case study. While I was promoting learner-centeredness, I took control of many of the tools and strategies, thereby cheating Therese out of the experience of doing them herself (e.g., introduction of proximal goals, 11/16/99; developing activities for Scenario 7, 1/13/99). Once I made a conscious effort to not provide these materials and aids for Ms. Collins, she started taking over the development of them for herself as was evidenced in the interviews that discussed proximal goals (e.g., Interview, 1/27/99). In order to facilitate learner-centered principles for teachers, the professional developer should use a learner-centered approach.

Ms. Collins also helped me try a potentially effective role for professional developers. Particularly in the first phase of this research, I used an approach that approximated peer coaching more than mentoring. I was Ms. Collins' sounding board. As she pointed out, "reflecting back in isolation does not open up another viewpoint." (Reflection, 12/16/98). Therefore, one of the important roles a professional developer needs to take on is that of the sounding board and idea person.

However, working with Ms. Collins also pointed out that professional development could be fun for both the participant and the developer if there is a good working relationship. By the end of my work with Therese, I had become a part of her class – no longer an outsider as evidenced through her comments at the Classroom, Inc. workshop we both attended (Peer Coaching Workshop Observation, 2/9/99). In our conversations we often both ended up laughing or talking about other interests as part of our work. This kind of relationship helped make the change process safer for Therese and more enjoyable for both of us. Therefore, it seems likely that creating a more collegial relationship should be a part of the goal of the professional developer.

All of the experiences I had with both Therese and Evelyn, while limited, re-emphasized that a professional development program must be ongoing⁶, in context, and sensitive to its participants. Further, this professional development effort indicated that a safe environment in which deep thinking about the classroom was an important element could be successful. These are all difficult conditions to address in the context of the normal school setting.

⁶ In a framework of this kind, the distal goal changes and, therefore, is never reached. Instead, there should be a constant evolution with the teachers constantly striving to find new ways to support their students.

This research raised many questions about what a professional developer should be in order to promote these features of a framework. In this case, the professional developer's knowledge of the literature and other classroom experiences was invaluable. The implications of this may be that a professional developer needs a far broader theoretical and practical background than we might be able to hope for.