Reformed Teaching Observation Protocol (RTOP)

Daiyo Sawada
External Evaluator

Michael Piburn
Internal Evaluator

and

Kathleen Falconer. Jeff Turley, Russell Benford and Irene Bloom
Evaluation Facilitation Group (EFG)

Technical Report No. IN00-1
Arizona Collaborative for Excellence in the Preparation of Teachers
Arizona State University

I. BACKGROUND INFORMATION

Name of teacher Dr. Debbie Jackson Announced Observation yes
(yes, no, or explain)

Location of class Main Classroom, 231
(district, school, room)

Years of Teaching _____ Teaching Certification _____
(K-8 or 7-12)

Subject observed EDM 317 - Teaching and Assessing Science in the Middle School

Observer Dr. Scott Sowell Date of Observation 4/20/06

Start time 2:30 PM End time 4:15 PM

II. CONTEXTUAL BACKGROUND AND ACTIVITIES

In the space provided below please give a brief description of the lesson observed, the classroom setting in which the lesson took place (space, seating arrangements, etc.), and any relevant details about the students (number, gender, ethnicity) and teacher that you think are important. Use diagrams if they seem appropriate.

There were twelve females and one male in this middle school science methods course, with the male being the only African-American. Students were arranged in groups of three to four at four different lab tables around the room. The SmartBoard was set up at the front of the class. The lesson revolved around introducing the students to the hand-held devices and their implications for teaching/learning science at the middle grades level.

LESSON DESIGN AND IMPLEMENTATION

		Never Occurred				Very Descriptive
1)	The instructional strategies and activities respected students' *prior knowledge* and the *preconceptions* inherent therein.	0	1	2	3	**4**
2)	The lesson was designed to engage students as members of a *learning community.*	0	1	2	3	**4**
3)	In this lesson, student *exploration preceded* formal *presentation.*	0	1	2	3	**4**
4)	This lesson encouraged students to seek and value *alternative modes* of investigation or of problem solving.	0	1	2	**3**	4
5)	The focus and direction of the lesson was often determined by ideas *originating with students.*	0	1	2	**3**	4

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Comments:
Dr. Jackson has clearly designed this lesson with a strong constructivist lens in mind. She validates students' prior knowledge and lived experiences, seeing them as central to the students' sense-making activities within the lesson. Her use of reform-minded strategies created an atmosphere where students' (as a group) generated new knowledge about the hand-held technology via their hands-on experiences with the devices themselves. Dr. Jackson successfully orchestrated an environment where the students' active participation was integral to how the lesson unfolded.

CONTENT

Propositional Knowledge

6)	The lesson involved *fundamental concepts* of the subject.	0	1	2	3	**4**
7)	The lesson promoted strongly *coherent conceptual understanding.*	0	1	2	3	**4**
8)	The teacher had a *solid grasp* of the subject matter content inherent in the lesson.	0	1	2	3	**4**
9)	Elements of *abstraction* (i.e., symbolic representations, theory building) were encouraged *when it was important to do so.*	0	1	2	**3**	4
10)	*Connections* with other content disciplines and/or real world phenomena were explored and valued.	0	1	2	3	**4**

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Comments:
Dr. Jackson's own interactions with technology during the lesson (e.g., hand-held devices, SmartBoard, Internet, video, etc…) served as a beneficial model for the students. The lesson reflected her strong content knowledge regarding not only the basic functions/purposes of the hand-held devices, but also of the wide variety of implications for middle school science teaching/learning. This knowledge is fundamental as these preservice teachers wrestle with becoming critical consumers of such technology. Dr. Jackson's lesson enabled them to generate, as a community of learners, a new understanding of this technology.

Procedural Knowledge

11)	Students *used* a variety of means (models, drawings, graphs, concrete materials, manipulatives, etc.) to represent phenomena.	0	1	2	3	**4**
12)	Students *made* predictions, estimations and/or hypotheses and devised means for testing them.	0	1	2	3	**4**
13)	Students *were actively engaged* in thought-provoking activity that often involved the critical assessment of procedures.	0	1	2	3	**4**
14)	Students *were reflective* about their learning.	0	1	2	3	**4**
15)	Intellectual rigor, constructive criticism, and the challenging of ideas *were valued.*	0	1	**2**	3	4

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Comments:
Students purposefully reflected on what they were doing during the lesson. Rather than having the students simply become familiar with the technology, Dr. Jackson facilitated the students reflecting on what they were doing and how it would benefit student learning. This involved students making, and justifying, predications about what they could use the devices for in their classrooms.

CLASSROOM CULTURE

Communicative Interactions

16)	Students were involved in the *communication of their ideas* to others using a *variety* of means and media.	0	1	2	3	**4**
17)	The teacher's *questions* triggered *divergent* modes of *thinking.*	0	1	2	3	**4**
18)	There was a *high proportion of student talk* and a significant amount of it occurred between and among students.	0	1	2	3	**4**
19)	*Student questions and comments* often *determined the focus* and the direction of classroom discourse.	0	1	2	**3**	4
20)	There was a *climate of respect* for what others had to say.	0	1	2	3	**4**

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Comments:
A considerable amount of the interactions in this class were between students. Dr. Jackson initiated the lesson by orchestrating a conversation about what the students already knew about such technology. Students brainstormed, listened, participated in group work, etc…throughout the lesson. Hence, there was a wide variety of ways in which students communicated both their prior and new understandings. Most importantly, the respect for students' ideas was central to the success of the lesson. All students participated and contributed to the new knowledge.

Student/Teacher Relationships

21)	*Active participation* of students was encouraged and valued.	0	1	2	3	**4**
22)	Students were encouraged *to generate* conjectures, alternative solution strategies, and ways of interpreting evidence.	0	1	2	3	**4**
23)	In general the teacher was *patient* with students.	0	1	2	3	**4**
24)	The teacher acted as a resource person, working to *support and enhance* student investigations.	0	1	2	3	**4**
25)	The metaphor "*teacher as listener*" was very characteristic of this classroom.	0	1	2	3	**4**

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Comments:
Students were constantly active all throughout the lesson. Dr. Jackson orchestrated a vigorous learning environment where this student activity was purposefully leading them toward new and very fruitful knowledge regarding the use of technology within science teaching and learning. She constantly circulated around the room, facilitating each groups' efforts. During those times when the classroom was more focused on Dr. Jackson's talking, it was clear that her words were being used to help the students to make sense out of their immediate experiences with the hand-held devices; students' thoughts and knowledge remained central.

Additional comments you may wish to make about this lesson.

Dr. Jackson's lesson revolved around the students learning about hand-held Palm devices and their implications for middle grades science instruction. The lesson validated (and extensively used) the students' prior knowledge about technology (mainly in their daily lives) as well as inquiry-based pedagogical practices. Through hands-on experiences with manipulating the hand-held's, the students were able to figure out the basic operations. After each phase of the activity, Dr. Jackson successfully held a discussion that allowed the students to create meaning out of the experience. She maintained a good balance between providing them with instructions to follow and allowing them to problem-solve, individually and collaboratively, to learn the nuances of the technology. The discussion about the pro's/con's of using such devices in the middle school classroom was useful in allowing students to see the fruitfulness of the knowledge that they just generated. Helping them see this experience from both a student and teacher lens was unique.

Dr. Jackson successfully models excellent reform-minded science teaching practices in this lesson. Since we know that teachers often teach as they themselves were taught, such modeling is critical within preservice teacher education. Dr. Jackson accomplishes this type of teaching while simultaneously engendering a strong personal rapport with her students. She mentioned that she would like to remain in contact with these individuals as they enter into their induction periods as classroom teachers. This sustained relationship not only provides the teachers with a resource for professional development, but provides provide us (the teacher education department) with important data about how our students translate what they have learned here at CSU into practice.

Record here events which may help in documenting the ratings.

Time	Description of Events
2:30	Dr. Jackson (J): "Okay guys, let's go ahead and get started." J: Today, we're going to talk about technology, in particular the hand-helds. And since we only have one technology day, let's try and do as much as we can today. Not that this is all the technology there is, but… There are free CD's from Vernier on your tables, these are yours. I send away for them every year. *Students seem appreciative of this gesture.* J: Take out a sheet of paper. Something to write with and on. J: How much have you worked with hand-held computers. Any experience? No experience? [waits] Jill, you are shaking your head no. Some students offer up some suggestions: cell phones, PDA's…. J: You use it as an organizational tool. Students respond with differing levels of experience. None really have extensive amount and none mention specific educational uses. J prompts students from a previous environmental science class to recall using them in that class. J: Write down everything that you think a Palm could do. A list of things. Anything you can think of. What you think you could use it for with your students?
2:35	J gives them time to brainstorm individually for a few minutes. J: In the course of today, you are going to add to this list. We are going to work with Palms and add to this list today. We're going to watch a video and add to it from that as well. Dr. J asks for volunteers to generate a class list. Writes students' responses on smart board (using electronic pen). Written on board: Timer, internet, email, text message, pictures, organizer, calculator, calendar, videos, notes, graphs/tables, conversions, download from computer, voice-mail alert, addresses, phone numbers, keyboard, printing, GPS, games, grade-book, phone *There is plenty of wait-time to solicit new responses.* J: Anything else you can think of? A good list, but anything else?

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Time	Description of Events
	J mentions about father checking his email at stoplights on his blackberry. Jokes with the students that that is just as bad as him teasing her for talking on phone in the car. *Nice reflection of humor/rapport with students.* J: With little or no experience, that is a good list. Pick up the hand-held that is on your table. Turn it on and take the QuickTour. Student, "How do you turn it on?" J: Who can figure out how to turn it on? Students tell others how. Collectively they figure it out.
2:40	J moves one student to table of two so that here are three at each table. *Clear indication that there this should be collaborative effort.* J: Once you get it on, take the tour and that will help you get familiarized with what's in there. J allows time for them to take the tour, circulates evenly around the room. While waiting, she starts a new list on SmartBoard entitled: "Hand-held (after Quick-Tour)" *This begins the comparison between prior knowledge and what they are currently learning about the Palms* As students continue working, the efforts become more individual and quiet as they move through the automated tour on the Palm. There is some student-student talk: some are sharing what they find out with their neighbors; some assisting others with certain functions.
2:50	One student asks question about what a Palm would cost. J uses the Internet search engine to find the answer; this is displayed on the projection on the SmartBoard. J uses the virtual keyboard to enter the information. She finds out the price of the Palm for the student. *Nice modeling of technology in the methods class as the students are learning about technology.*
2:52	J continues to circulate as the students continue to work through the tour. One student enters late (male student who has come from teaching). J goes over to him and gets him started on the QuickTour. J: As you are going through the tour, here's what I want you to do. Add to the list we generated before as to what you can do with it. And let's steer this list with regard to middle school science. What could you or your students do with this?

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Time	Description of Events
2:53	Continues to circulate, observing students; assists one student in navigating the menu on the hand-held.
2:54	J: Just another tid-bit of information as you add to your list. They do make devices that attach to your Palm that go directly to a projector. My cousin is going to be a software engineer and he has a phone that is also a Palm that has this device. When he goes out of town for a conference, he just uses his phone for his presentation. So, if he goes out for the day, he just goes with his phone and his wallet. *Another practical/personal connection to technology.* J: Okay, you'll have more chances to play with the Palms again. Turn them off and close them back up. Add to your list. If you have not added to the list, as a middle school teacher or student, add to your list. One student raises hand and offers up idea about taking it to field trips. "Recording pictures, sounds, and take notes." J adds this to the list on the SmartBoard J: How would that be valuable? Student responds with practical issues regarding students recording information efficiently during fieldtrips. J: What else? Student: homework assignments; J adds this to list on board. J: There is a function in there called "Tasks" and I use it to keep track of what I need to do. So, your kids could use it to keep track of assignments. What else? Student: Time zones J: What would the relevance for that be in science?
2:58	Student says it just sounds good. Some laughter. J adds this to the list and asks the class: Help her think about how that would be relevant for science. *A productive way to collectively generate meaning/possibilities for this technology.* Students offer up astronomy content or latitude/longitude. J: What else?

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Time	Description of Events
2:59	Student mentions using Excel for grading. J: What else could we use Excel for? For middle school science? *Keeps the focus of the conversation on the benefits for students' science learning.* Student adds that you could collect and manage data on there. J: What else could you use Excel for? Student suggests solving math problems J: What else could we use the Palm for? Student: Internet connection for research J: What else? Student adds that it would help to save paper; not having lab instructions written down. J adds all of these to the list on the board. J: What else in the QuickTour did you discover was there? Calculator, email
3:03	J: Okay? Anything else? Anything else that you learned that was in there. Not necessarily that was related to middle school science, but anything you learned? Students offer up some ideas and J records on board.
3:06	J: Did anyone find Word there? Microsoft Word was also on there. There are some things that I want you to know how to do on there before you leave. I want you to create a note. You are going to use Graffiti and make a note for somebody. I want you to take a picture. And I want you to save that picture. Save it, and then rename it. When you take a picture, it will save as a standard name that is not really useful…so rename it. I want you to beam either the picture or the note to someone at your table. Then, after you do all those things, we'll talk about using the keyboards. At your tables, help each other out to do these things. These three skills are necessary for you to have.

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Time	Description of Events
3:08	As students begin to work, J circulates around the room observing what the students are doing. J: Make your note at least a couple of sentences.
3:12	One student asks about help with a particular screen and J answers her question. Students get excited about figuring out the beaming capacity and a few show others. J helps (inaudible) one student with the beaming of information from one Palm to another. *As they are working to figure out these functions, there is a great deal of student-student interaction and collective work.*
3:14	J goes over to another group to see if she can pick up a note being beamed from another student. There is some difficulty and J admits, "I'm not sure what is going on." She is joking with one particular student about the difficulty she is having. *Nice rapport; no assumption that all technology is perfectly used all the time; difficulties arise.* One student asks for clarification on how to rename something and how to get to the photo gallery of the Palm. J helps her. J continues to circulate.
3:18	Students are enjoying the beaming process. There is laughter as they actually get it to work; enjoyment.
3:22	When one group is done all the three things, J has them start on figuring out the keyboard. She provides them with very basics, but asks them to generate a Word document by using the keyboard function. *Nice orchestrating of task*; *J created a productive space between following directions and figuring out things for themselves. Not any stress about new technology, plenty of student-student support. Productive conversations about using the software on the Palms.* Another group: lots of student/student interaction about figuring out details; J continues to circulate J starts a second table on the keyboard tasks; there is a difference between the technical/set-up things that they need to know to get the keyboard working and the "figuring-out" of how to use it that she leaves up to the students themselves Sets up the last two tables with keyboards

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Time	Description of Events
	Troubleshoots one person's keyboard problems.
3:24	J: There is a little trick that I forgot to tell you. You have to have keyboard software in order for it to work. If you don't have it, I can beam it to you or someone at your table can beam it to you. There is some beaming of the software. J assists/troubleshoots with one student about getting the keyboard to work.
3:25	Students have now understood the keyboard function and many are wrestling with how to create the Word document, figuring it out for themselves.
3:28	J: Instead of trying Word, try typing a Note. We don't have "Documents To Go" software installed on the Palms…so you need to use the Note function. Try memo instead of note and you can get more lines. There is some frustration with getting the notes/memo/document function down pat…but there is good persistence among students to figure it out. J is supportive, but not telling them exactly how to figure it out. J continues to circulate and assist. Students are still enjoying beaming to each other.
3:32	Student asks for clarification about BlueTooth (what it is and what it does) and J describes how that works. J: Take about two more minutes and stop playing. J: Turn things off, put it up, and put it in the middle of your desk. Okay guys, what else, now that you know how to do some things with it? Any more uses you can think of for you or your students? Student brings up using the beaming function for collaborative work; J adds that to list on SmartBoard; there are a few other suggestions

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Time	Description of Events
	J: What else? Middle school science? No new student input J: Alright….this website it linked to WebCT. This website specializes in educational software for the Palm. [displays website on SmartBoard] I'll show you a video where teachers are talking about how they use Palms in their classroom. As this plays, write down different ways that these teachers talk about how they use the Palms. [Starts video on SmartBoard, but there is some technical difficulty]
3:38	J: On the back of your paper, make a T-chart. J has students get out a sheet of paper while she attempts to resolve video problems. Video finally starts, but there is still a problem with it playing running. So, J has them go back to their papers.
3:41	J: On your t-chart, write one side pros and one side cons. What are the pros and cons of using Palms in your middle school science classrooms? Let's say you have a perfect world and you have 30 Palms and 30 keyboards, what would the pros and cons be of using them in your classroom? This is individual first.
3:43	Students immediately start working. J works on fixing the video and recalibrating the SmartBoard so that her touch is more accurate. Some students watch this. She then writes "PROS" on the board.
3:46	J: Once you have your own list, talk to each other and get a list for the table. If other ideas come up as you talk, write those down as well. Students begin discussing. J circulates. Video re-starts and J has them go back to the other side of the paper. The video does not show picture, but the audio is there. The video still catches and she has them go back to the group pros/cons list. J: "I'm sorry about that." J: Let's start with class list of pros, then cons, and then how we can address the cons. So, first the pros. Students offer ideas and J writes them on the SmartBoard.

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Time	Description of Events
	Student brings up the idea of inquiry. J probes for why and how the Palm would be useful for inquiry. The student then moves into general ideas about using it for science fairs. J directs conversation toward the fact that they could use it within inquiry-based science instruction, but that it could also be used for other methods. Asks students for ideas on that. Student gives example of they could use it to organize information during a debate. J writes that down on the board. J: Just because you have a Palm does not mean that you have inquiry-based instruction. Student gives example of how it could be used for very traditional teacher-centered instruction. Another student offers up that it is useful for visually impaired students J continues to write ideas down on SmartBoard; has difficulty with the writing function a little and jokes that she will turn it off and use the blackboard in just a minute. Class continues with pros list.
3:52	Student adds that using technology "looks good" for the image of the school. Another that it would cut down on the cost of paper. J: What are some other pros? Students: It's engaging, gives students technology skills students will need later in life, easy to transport, … J: Look at your list. Anything else that your group came up with? If I wanted to take you outside to collect data, we could. Student: It could facilitate 5-E, all the functions we listed earlier, organization J: Organization is one of those things that is important to science, but it was also important for everyday lives. Anything else that is a pro? Student: up to date information via the Internet. J: Let's talk about the cons. What are some?

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Time	Description of Events
3:55	Students bring up whether or not it would work with home internet or cell phone access? J is not sure, but talks about BlueTooth and what it can do. Student asks for clarification on BlueTooth and another student offers up some connections to cell phone technology that uses BlueTooth. J: So, what are some problems? Cons? Students list: time consuming, easy to break, fights over use, mis-use, expensive, technology might now always work; too complicated, distractions – games, cheating, stealing, monitor use; J writes all this on the SmartBoard.
3:59	J: So, let's talk about what are some things you can do to help some of these cons. Putting proxies on internet to monitor. You can find grants to fund purchasing some of these. All the computer companies and software companies have grants for k-12 educators. After you guys leave here, I'll still have CSU email and I'll be around. If you want to write a grant, let me know and I can help you. We don't have time in class to deal with all that, but we can email. Grants can help. Look at that list and what are some things to facilitate. Student asks if you get insurance on them if the Palms break? J: I'm not sure. I'm sure you could at least get a warranty. Another students suggests using them in groups. J: What problems would that solve? Student responds that it might ameliorate the fights over the use. The teachers are more in control about who is using it and when. J: What do you guys think about being too complicated? Students reply: All tech is complicated, so need to use it; and they could teach each other; team them up; one student compares her knowledge to her own daughter and talks about the fact that her daughter self-taught about it; another brings up the generational differences

Record here events which may help in documenting the ratings.

Time	Description of Events
	J: What about things that we have not talked about….stealing, breaking… Student: Check them in and out. Lie about there being a tracking device insdie. *Class laughs*. J: One of the student teachers at Case Elementary was having a problem with students stealing calculators. They went from the teacher checking them in/out to having a student do the checking in/out. Why with a student in charge they didn't have a problem? Students offer up notions of peer pressure, trust factor, etc.
4:05	J relates this notion to other ideas about having students in charge and how students can help make up the rules; delegating responsibilities/tasks to students is a good thing overall J: Any other questions? One student asks if there are any classes that actually use them? J talks about some instances and mentions the video that they tried to see; that it talks about Fling-IT software that will toss webpages to Palms from a computer. Mentions Cooties simulation software that they can do over the Palms via beaming "to see the virus spreading; and you can track back where you got it from; there are many many other ones…. There's conversion software, moon-phases software, so there are lots of things like that. The website has teachers talk about that."
4:10	J: Other questions about the Palms? I have an assignment for you over the weekend. Take the Palms home over the weekend and do two things: Take 10 pictures of science. When you save it, save it as your last name and then the title of the picture. It could be Jackson cloud, Jackson leaf, whatever. The second thing I need you to do is tell me why those pictures are science. Why did you take a picture of that thing? If you can, reference the paragraph you write to the picture. I would come with ten pictures and then a word document that explains each picture.
4:12	One student asks for clarification and Dr. Jackson clarifies how to save and how to record the narrative about how to write the explanations; Reminds them that they "should take the power cord home just in case it loses power."

Reformed Teaching Observation Protocol (RTOP) TRAINING GUIDE Daiyo Sawada Michael Piburn External Evaluator Internal Evaluator and Jeff Turley, Kathleen Falconer, Russell Benford, Irene Bloom, and Eugene Judson The Evaluation Facilitation Group Arizona Collaborative for Excellence in the Preparation of Teachers Arizona State University ACEPT Technical Report No. IN00-2 The Reformed Teaching Observation Protocol (RTOP) is an observational instrument that can be used to assess the degree to which mathematics or science instruction is â€œreformed.â€ It embodies the recommendations and standards for RTOP scores predict student learning in mathematics and science classrooms at all levels. Analysis of the RTOP suggests that it is largely a uni-factorial instrument that taps a single construct of inquiry. A finer-scale analysis lends new meaning to the phrases "pedagogical content knowledge: and "community of learners." The instrument seems to be able to measure what it purports to measure, reformed teaching. An appendix contains the RTOP. (Contains 17 references.) (SLD). The Reformed Teaching Observation Protocol (RTOP) was selected as the instrument to measure reformed teaching. RTOP provides a standardized means for detecting the degree to which classroom instruction uses student-centered, engaged learning practice (see Lawson and others, 2002; MacIsaac and Falconer, 2002; Sawada and others, 2002). RTOP has been used to analyze the impact of the National Academies Summer Institute on biology instruction in large classes at research universities (Ebert-May, pers. comm.) as well as to better understand students experiences in introductory geology classes see G The Real-time Transport Protocol (RTP) is a network protocol for delivering audio and video over IP networks. RTP is used in communication and entertainment systems that involve streaming media, such as telephony, video teleconference applications including WebRTC, television services and web-based push-to-talk features. RTP typically runs over User Datagram Protocol (UDP). RTP is used in conjunction with the RTP Control Protocol (RTCP). While RTP carries the media streams (e.g., audio and video) Reformed Teaching Observation Protocol (RTOP):Reference Manual. @inproceedings{Piburn2002ReformedTO, title={Reformed Teaching Observation Protocol (RTOP):Reference Manual}, author={Michael D. Piburn}, year={2002} }. Michael D. Piburn. Published 2002.Â Peer observations among faculty in a college of education: investigating the summative and formative uses of the Reformed Teaching Observation Protocol (RTOP).