

# ASSESSING THE VITAL RESULTS: A BEGINNING CASE

## SYNOPSIS

Student guided learning with adult support and facilitation is a "tall order" to deliver on. With learning focused on the Vital Results rather than concrete and specific content knowledge, the job is even more difficult. The question, "How can we assess the Vital Results, viewed through a wide variety of student-directed projects?" is challenging. This paper gives some suggestions for how to start thinking about an assessment system that highlights the Vital Results. Discussions from a student assessment group in Brattleboro, VT provide a beginning, meant to focus on a small piece of an overall assessment system to learn in-depth about a single aspect of the Vital Results standards and what that can tell us about designing an entire system.

From looking at work and observing students in action, it became obvious that the connection between curriculum processes, standards, and assessment were not strong enough at the Downtown Campus program for all students to attain the desired outcomes. While this paper primarily discusses the assessment process used to gain a sense of the Vital Results, I would also like to underscore the critical importance of establishing a clear path between the program goals and standards, the curriculum processes in place, and the assessment system used. Without an articulated path that functions for all students, we continue to deliver an inequitable education, even if it is done in a "student-centered" environment.

## BACKGROUND

In the fall of 1999, BUHS students and their technology teacher began exploring an idea called the Downtown Campus to show communication, problem solving, personal development, and civic responsibility set into action through community-based projects. The goals of the Downtown Campus are challenging to our sense of traditional curriculum development because the content of this program is not typical. For instance, in a social studies class, curriculum is defined as the specific content to be learned -- for example, learning about the types of economic systems used in the world and their impact on the environment. Rather than working with concrete, specifiable curriculum, the Downtown Campus needs to rely on curriculum processes that will evoke high school-level learning results in the areas of communication, problem solving, civic responsibility, and personal development. Paradoxically, achieving these types of learning goals requires more structure rather than less structure. Adopting an appropriate program structure achieves two aims: it ensures that opportunities to learn are provided, and it links the activities to outcomes.

Students in the fall term articulated a set of goals:

"The goal of our program is to have adventurous spirits:

1. learning from each other across age boundaries;
2. doing projects that demonstrate learning, encourage improvement, and are useful to the community;
3. with participants who specify and reach learning goals, some of which are stated beforehand and others that come through the surprise of pursuing an interest wherever it takes them;
4. who use basic technology communication tools;
5. who welcome visitors to enter whenever they like so that they can see Vital Results (communication, problem solving, civic responsibility, and personal growth) in action."

## METHOD OF DISCUSSION

Eight students from the Downtown Campus in Brattleboro, VT formed an assessment group with educational consultant Fern Tavalin to determine how assessment of the Vital Results might show attainment of the goals they had generated for their program. The group work consisted of: selecting standards, doing projects, revisiting the standards, learning assessment basics, and exploring one standard through looking at student work. Discussions were protocol-based in that they had formal structures designed for specific purposes, with time limits. All of the assessment discussions used student work as the focal point, moving from work of students in other schools to looking at their own.

## CONNECTION TO OTHER WORK -- STATE AND NATIONAL

The intention behind the development of Vermont's Framework of Standards and Learning Opportunities differed significantly from that of most other state standards adopted throughout the United States. Vermont educators and business community members identified overarching concepts like communication and problem solving as the larger purpose behind learning details in history, science, math, etc.

This distinction between memorizing facts and learning for a larger purpose gets lost in the current state/national debates about assessment, testing, and school accountability. Rather than opening up the learning environment in schools, fear of harsh consequences or confusion over contradictory demands paralyzes many schools or sends them to older models of education that do not work in today's world. The Downtown Campus vision runs counter to the system-level pressures that are currently being placed on our schools. If it (or any other Vital Results based program) is to withstand the political and educational pressures that counter its direction, its curriculum development and demonstration of effectiveness need to be as rigorous as more traditional methods.

There are many ways to construct rich learning environments that meet the goals established by the Downtown Campus. The basic ideas stated by the students in

Brattleboro already exist in highly successful out-of-school programs such as Plugged-In in Palo Alto and Street Level in Chicago, and in some school-based programs such as The Met in Providence, RI. Within our state, non-technology examples exist as well: the town of Montpelier houses a program run through U-32; Burlington sponsors a storefront class room; Mt.Abe and Twinfield build individualized programs for students who learn from community settings.

Regardless of the route selected, a program/course must show a direct link between its intentionally planned events or processes and the larger desired results. This establishes the support structures that most students need in order to learn and succeed at high school-appropriate, increasing levels of capability. Otherwise, those who can already achieve, do so and those who can't, flounder. The notion of setting paths from events to outcomes distinguishes the research-backed, project -based learning approaches of today\* from the laissez-faire environments that typified school reform in the 1960s.\*\*

Programs/courses that do not clearly establish a path from events to outcomes -- in assessment and research terms, a conceptual framework-- cannot demonstrate effectiveness. Operating without a clear conceptual framework is akin to navigating without a compass. There is no way to define whether the path being taken leads to the desired destination and no way to make informed adjustments along the way. The journey may be fun and exciting sometimes, but it is not a responsible way to chart a course.

\* Planned structures and processes placed purposefully in an environment lead to the development of critical thinking where specific content differs from student to student, but overarching goals are predictable.

\*\* The belief was that putting good kids with good materials allows magic to happen.

## USING STANDARDS AS A FRAME

The term "standard" has many different connotations. In weight and measurement or precision instrument building, a standard is rigid and unbending because the success of the instrumentation depends on accuracy. In the context of jazz, however, the same term implies an underlying structure that flows under the ideas of one musician to another, based on how the musicians are feeling the music at the time. When a student musician loses his/her place within the form, chaos results. In education, a standard carries both meanings; a mix of rigid and flowing standards leads to the structure and content of a solid, yet breathing, curriculum.

The assessment group looked at the standards selected for the DTC (see appendix). After review of the standards and an initial selection of a set that seemed pertinent to the DTC, students revised the set based on practice with real work. They then refined and reduced the original set to something that seemed manageable. Some of the standards were slightly modified or combined so that they would be better tailored to the program goals.

Some standards seemed best assessed through checklists or embedded informally into natural learning processes and curriculum structures, while workplace responsibilities might become matters of general record keeping (attendance, fulfillment of daily jobs, etc). With consultant input, the assessment group then identified an even shorter list of standards that would be a reflection of work over time and most appropriately suited to a portfolio.

## BACKGROUND INFORMATION ABOUT ASSESSMENT

Assessments vary from simple mental guidelines that apply informally as learning takes place, to the use of embedded assessments that come from natural points of critique of work-in-progress, to formal assessments that occur through written reflection, portfolio collections, checklists and traditional tests. Use of a tool clarifies how work is going to be viewed and lets everyone know beforehand how the work will be viewed. Having assessments clearly stated up-front and built with tools that align with the intended purpose changes the grading environment from one that feels arbitrary or biased to one that has predictability and a sense of fairness. Too often, the grade is used as a behavior management tactic against students. Even worse, many assessment tools that are improperly built are veiled substitutes for arbitrarily assigned grades. Frequently the language of "evidence" and "standards" acts as a vocabulary shift that is really talking about "the same old stuff." Those new to the ideas are impressed by the vocabulary and forget to look for substance.

Since the overarching standards for the DTC are lifetime pursuits for which there is always room for improvement or further development, like solving increasingly complex problems, it makes sense to talk in terms of making progress rather than meeting the standards. This being said, the standards give guides for what is high school-appropriate performance.

Example: an elementary student discovers through experience that planning is necessary. A high school student discovers through experience that certain methods of planning function better with certain types of projects than others. So, they begin to realize that concept mapping, story boarding, schedule building, outlining, etc. work better for some purposes than they do for others. The facilitator's job is to make sure that there is exposure to and practice with building different kinds of plans.

Because the overarching goals are long term achievements, interim assessments give the opportunity to check progress along the way. Interim assessments can be applied to activities such as group projects, daily jobs, individual skill building, etc. Interim products and activities and their assessment provide a foundation of artifacts so that every student is guaranteed a minimum amount of concrete work and experience to examine over time. From the minimum set, students can also collect additional examples so that they can establish a picture of meaningful, individual learning.

While interim assessments capture the details of any given activity, it is the accumulation of experiences that leads to a longer-term view and allows students to find personal meaning and connect learning from one event to another. Long term

assessments allow time to "take stock." A reflection portfolio is the primary assessment tool for showing this type of progress.

The portfolio is a popular tool that has been used in many different ways. When the education field began experimenting with the portfolio as an assessment vehicle, the tendency leaned toward what is now called "a refrigerator box." Educators asked students to "show all of their work in a portfolio." Because the "show me everything you've done" approach was not particularly meaningful, researchers in alternative assessment began to differentiate types and purposes of portfolios in the mid-nineteen nineties. In Vermont, the state began with reflection portfolios for math and writing that soon became accountability portfolios. The reflection components of the writing portfolios were dropped and the emphasis shifted to scoring and rater reliability. The nature of the portfolio work begun with DTC students was for the purpose of personal reflection of learning, based on the standards and evidence provided in the Vermont Framework. It is very important to keep accountability features isolated to other assessment tools. Mixing accountability and scoring reliability with personal reflection endangers the sincerity and personal meaning of a reflective experience.

## BUILDING A NOTION OF ASSESSMENT

In a program with complex learning goals such as those stated by the DTC, there are multiple points of assessment: individual learning, the progress made on specific projects, and then the learning that results from an accumulation of work over time. Each of these components requires a different type of tool and a different view of the work itself. Regardless of the assessment tools, certain fundamentals of assessment apply. These fundamentals include:

1. The assessments are directly linked to the goals (in this case the Vital Results standards) and stem from the work that students do.
2. The assessments are built from performance indicators (called evidence in the Vermont Framework).
3. The assessments are meaningful (they target the important aspects of the learning goals).
4. They are built with students, over time.
5. They show a development from one step to the next so that the "road map" is clear.
6. There is an accompanying set of examples, built over time, to show a range of possible student approaches to learning and demonstration of what the standards can look like.
7. In the case of standards like the Vital Results, assessments have built-in flexibility so that a "one size fits all" model does not apply.

After a session concerning the basics of assessments, three preparatory conversations (see appendix for details) were held with the student assessment group to: a) practice with the idea of protocol-based conversation, b) learn observation skills, using the work of others students, c) distinguish between actual evidence and "snap shot photos."

## CREATING AN ASSESSMENT TOOL

When looking at standards that are concrete and knowledge-based, it is best to begin with assessment tools that already exist. Usually, these tools have been established by people within a content area or within a given industry and point specifically to the steps involved in learning something new (examples abound for technology skills in particular).

Assessment tools for the Vital Results have been created for the Vermont Standards and Assessment Consortium. While helpful when assessing some aspects of the DTC, they did not serve a guide for the student assessment group's desire to look at problem solving over time. Therefore, a new tool had to be developed.

In order to build actual assessment tools, a look beyond global statements about standards is necessary. In assessment lingo, these more specific descriptions are called performance indicators. The performance indicators from the Vermont Framework were used as a starting point to create the first tool.

In the design of complex assessments, when no prior models or student work samples exist, it is inappropriate to assign a numbered score to measure the quality of work. When done properly, numbered scores come from years of study of actual work so that the range of performance is understood. In this respect, criteria-based assessment is supposed to differ from the older tradition of grading based on group norms. Discussions are rooted in descriptions about the degree to which the work represents the criteria set.

As a starting point, students identified Standard 2.2 as the one that most affected all their work and as the one they would like to spend time thinking about.

### **STANDARD 2.2 WITH PERFORMANCE INDICATORS**

Students use reasoning strategies, knowledge, and common sense to solve complex problems related to all fields of knowledge. This is evident when students in grades 9-12 identify a problem and:

- a. Critically evaluate the validity and significance of sources and interpretations.
- b. Evaluate approaches for effectiveness and make adjustments;
- c. Consider, test, and justify more than one solution;
- d. Find meaning in patterns and connections; and
- e. Select and apply appropriate methods, tools and strategies.
- f. Implement an approach that addresses the problem being posed; and
- g. Use manipulatives, sketches, webs, etc. to model problems.

From this starting point, students in the assessment group were given the guidelines below to help think about what Standard 2.2 might look like. The criteria were taken directly from the performance indicators in the Vermont Framework for the high school level. In an initial phase of tool development, these indicators serve as a frame of reference. They are examined against actual student work to determine whether the work elicits the criteria. At the same time, the tool itself is examined to determine the degree to which the performance indicators are helpful in assessing Standard 2.2.

The student sheet allowed for plenty of writing space between each criterion so that a descriptive look at student work would occur before deciding whether the criteria could be seen in the work sample. A rush to judgment, with either a numbered score or a Yes/No response, short-circuits a close look at what a student has actually done.

<b>Student review sheet for discussion of Standard 2.2</b>	
Evaluate source materials	Y N
Evaluate approach for effectiveness	Y N
Generate multiple solutions	Y N
See patterns and connections	Y N
Apply methods, tools, and strategies	Y N
Approach addresses the problem	Y N
Builds models to show problem/solution	Y N

## BEN'S CASE STUDY

Summary: Ben provided a personal reflection about a problem that he had to solve (see appendix for details). The group described what they saw in his reflection and the visual evidence that accompanied it. Time did not allow a full discussion of his work, examined against criteria, because the descriptive "first impressions" round took all the time that was allotted. As a result, Ben brought the group comments home and sorted them according to the performance. He was then able to analyze how his performance fit the criteria, where the group had questions about his work, and where he either needed to improve his performance or needed to further substantiate his evidence. In Ben's words,

"Putting the comments onto the worksheet helped me to sort out what had been said in the discussion and use it to gauge the effectiveness of my evidence. The list of yes/no questions that I sorted the comments into, helped me visually see how the group felt about my performance in a simple form. From the comments I could tell whether I had already achieved or still needed to work on the different aspects of representing my problem solving."

Although designed to be a discussion about assessment and Standard 2.2, this exercise provided Ben added practice with categorization, analysis, and improvement of his own work. This process of describing, analyzing, and improving can be used as the basis of a curriculum structure for complex activities of any kind. The discussion is improved when experts in the field in which the students are involved become members of the team.

### Student Comments about the Use of Overarching Standards

1. It's neat to go back after we have done things and notice that we have filled the spots
2. Let's you apply it to something.
3. Good to look before you start so that you know what you have to cover
4. Most things you work on include at least two standards. It's a mix of standards and that's good.
5. They are kind of flexible and there is almost always a standard to go with any project.
6. I find that the standards are nice guidelines and they help you keep track.
7. They seem very narrow if you just look at the numbers individually, but once you get into it there seem to be things that fit them.
8. Building your projects around standards does not work as well as building the standards around your projects.
9. Standards are easy to cover. If you have to go out of the way to cover it, then it's not worth it.
10. Some of the stuff doesn't fit into the standards, but it's still learning.
11. If you start a project, you can look at what you've done so far and see what applies, and what doesn't. There is a need for review.
12. Important not to stop the evaluation at the standards, but to go further.
13. You can't say that you have met a standard. You are always striving toward it. You can always do it better. As things evolve there will always be better processes. No matter how much you have learned, there is always more.

## CONCLUSIONS

This paper offers a beginning experience that looks at the "organic" aspects of the Vital Results through the assessment of student-generated projects and one Vital Results standard. Student discussions show that they have an intuitive understanding of what rests beneath the Vital Results standards and they also appreciate the structure that the standards bring to thinking about their work. While the paper does not give a lock-step, rubric driven guide to assessment, it does lay out a process that can be put into place for building Vital Results assessment systems that are program specific and yet reference the standards in a similar and systematic way.

The steps in the process found to be successful through the case example of the Downtown Campus Student Assessment Group include:

1. Articulate or re-articulate the program goals.
2. Select the standards that enhance those goals.
3. Design a curriculum structure that will elicit the opportunity to exhibit those standards.
4. Do some real work.
5. Revisit the program goals and standards (with real experiences at hand and in mind) to reduce the list of selected standards.
6. Decide which standards can be measured with interim assessments (direct feedback on specific projects) and which require a longer-term reflection across many experiences.
7. Take one long-term standard to explore in-depth before developing portfolio requirements.
8. Keep the sense of inquiry alive by engaging students in building or revising assessment tools.

# APPENDICES

Standards for the Downtown Campus

Preparatory Assessment Conversations

Ben's Case Study

Debriefing the Use of Protocols

## STANDARDS FOR THE DOWNTOWN CAMPUS

PLEASE NOTE THAT THESE STANDARDS CANNOT BE TURNED DIRECTLY INTO ASSESSMENT TOOLS. INCORPORATION OF THE PERFORMANCE INDICATORS (CALLED EVIDENCE IN THE VERMONT FRAMEWORK) IS NECESSARY.

## STANDARDS SELECTED FOR THE DTC

### Communications Standards

1.3 Students read for meaning, demonstrating both initial understanding and personal response to what is read.

1.13 Students listen actively and respond to communications

1.15 Students use verbal and nonverbal skills to express themselves effectively

1.18 Students use computers, telecommunications, and other tools of technology to research, to gather information and ideas, and to represent information and ideas accurately and appropriately.

### Reasoning and Problem Solving

2.2 Students use reasoning strategies, knowledge, and common sense to solve complex problems related to all fields of knowledge.

2.6 Students apply prior knowledge, curiosity, imagination, and creativity to solve problems. (See related standards 2.1, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12)

### Personal Development Standards

3.1 Students assess their own learning by developing rigorous criteria for themselves, and use these to set goals and produce consistently high-quality work.

3.10 Students perform effectively on teams that set and achieve goals, conduct investigations, solve problems, and create solutions (See related standards 3.3, 3.7, 3.11, 3.12)

3.14 Students demonstrate dependability, productivity, and initiative

### Civic/Social Responsibility Standards

2.13 Students design a high-quality product, project, or service to meet an identified need.

4.1 Students take an active role in their community.

4.2 Students participate in democratic processes.

4.3 Students demonstrate understanding of the cultural expressions that are characteristic of particular groups.

4.4 Students demonstrate understanding of the concept of prejudice, and of its effects on various groups.

## PREPARATORY CONVERSATIONS

Learning to Describe: From Inside Out

Learning to Distinguish Evidence

## Learning to Describe: From Inside Out

### Purpose:

1. to see an example of student production based on acquiring specific skills in a discipline and showing the vital results in action.
2. to look at this work for evidence of the vital results
3. to learn a structured protocol for looking at work

### The Protocol

Looking at work and deciding on evidence is easiest when a protocol is put into place. This keeps us focused on what the creators are trying to accomplish rather than having a random discussion based on the personal tastes and the independent expectations of the viewers.

### Ground rules

1. Every member contributes.
2. Give one comment at a time from each participant so that everyone has a chance to contribute.
3. Comments are rooted in direct observation. This means saying things that you can see and hear instead of passing judgments.
4. The time limit is obeyed.
5. Members follow-up the conversation with additional, outside work.

Step 1: Each person in the group gives an initial impression of the video. This impression is not bound by the lens of the "Vital Results." It is a first step, meant to acknowledge viewer response and the fact that the video as a whole stands for something larger than the Vital Results lens that we are about to use.

Step 2: Each person in the group gives specific comments about the video based on evidence that shows problem solving, communication, civic responsibility, and personal development.

Step 3: The facilitator summarizes group comments after each full turn of commenting.

Step 4: This process continues until all comments are exhausted or until the time runs out.

**After the session, students noted that a definition of "protocol" needs to be given. Also, they suggested the addition of Step 5: Wrap-up or reflection about what has been learned (3 minutes).**

## From Inside Out -- Observations

**Summary:** From Inside Out is a 1996 video about the experiences of a group of high school dance students from northern Vermont who work together to choreograph a piece. The video was produced in order to create an example of a project-based experience that elicits the Vital Results. Most of the video shows footage taken by the students as they created their dance.

### Downtown Campus Student Observations:

#### First Impressions

- Sounded a lot like the Harmony group -- the problems that came out in the circle. Talked about problems and resolved them.
- A lot like Harmony video. They wanted to portray themselves and that caused problems. Liked how they communicated through that. Liked how they compromised and brainstormed.
- Same small culture battles that we had.
- Each person had her own view of what she thought it should turn out to be. Tricky part is how to articulate your view and get something the group can agree on. That's the trickiest part.
- They had so many ideas. Had to work against a time frame. Group problems. Girl at the end didn't have as much experience as the others.. [They had to work with that.].
- Diverse opinions and different perspectives get you to figure things out.
- Problems go to all groups. So many different ideas. Responsibility of group to figure things out.
- Assignment was open-ended. Wasn't enough time. [Had to work within the timeframe anyway].
- I think it was that it was very structured. Plan the costumes. Plan the music. Given a process.

#### Links to the Vital Results

- Had a big problem choosing music. Solved it with compromise of individual and group music.
- Really helped them to solve problems and to bring in a third party (musician) expert.
- Some places where they were in a group. Could tell that a few of them were trying to take charge. Because they are going in with different expectations, kind of like a multiple intelligences type of thing.
- All developing personally. Can be seen through the improvisation part. Not about thinking what you were looking good at. Trying to learn new stuff.
- Seems like an emphasis on problem solving on video through the semi-circle discussion.
- A lot of the people in the group wanted it to be successful and they wanted to learn. That's important. Some didn't know improvisation and wanted to learn.
- Use of technical vocabulary -- spoken and in movement.

## LEARNING TO DISTINGUISH EVIDENCE



"My first goal was to learn how to use different tools to make projects more successful. The first thing that I did was to join the harmony group where I knew I would be working with video cameras and digital editing, which I did master these tools and used them for the Harmony Video project. "

The photo above has been placed in a rough draft of a portfolio as evidence of learning to use a video camera. What do you notice about the photo? What does it tell you about what the person has learned?

- She is holding a camera.
- Interviewing \_\_\_\_\_.
- Cannot tell anything about the functions of the camera.
- Using an angle.
- Interviewee is looking at the camera.
- Looking into the correct end of the camera.
- Taking away power from the interviewee.
- Looking down gives a double chin. Maybe trying to avoid double chin.
- No care taken in lighting.
- Seems casual.
- No external microphone.
- Background is varied.
- In a workplace setting.
- No tripod.

What does this exercise tell you about finding evidence to support your statements?

- Evidence tends to be something you look at that is actually completed and relates to a goal.
- Should be documented well while the process is being done. Posed photographs are not evidence of work.
- It's not like we can video on the spot. Would help if we went around and had a documenter to collect evidence.

### Consultant Comments:

This simple exercise seemed to drive home many important points: images can be read for information about learning, documenting takes focus, time and attention, and posed photos are not a good way to show evidence of learning. In this posed photo, the student's physical grasp on the camera would actually prevent videotaping. I was also struck by the absence of basic camera principles and technical vocabulary as displayed in the student comments. This observation is consistent with videotaped discussions with students about their other work. Following the group exercise, a conversation about technical vocabulary ensued. Most students were not convinced that they should be learning vocabulary, even though they noticed that the use of vocabulary (movements and words) made the learning of the dancers in *From Inside Out* seem stronger. Acquisition of basic skills and basic vocabulary seem to be an ongoing issue at the DTC. The student who attended the Digital Video Program was not in this response group, although most of the students present had used videotaping in their DTC projects.

## **BEN'S CASE STUDY**

**Learning Reflection**

**Protocol and Group Notes**

**Student Review Sheet**

Ben's Reflective Statement about Solving a Problem  
(the group described the part underlined in blue)

Reflection 1

Luckily, a few days later I had a machine to install Linux on that wasn't supported but the company claimed would work. Well, it didn't. I went around the Internet searching for tips. As it turns out LinuxPPC another Linux port to the mac is much more popular than Yellowdog, and free download. I downloaded it and worked on figuring out how to mount the disk image. For some reason, no computer could recognize it as something that could be mounted. Finally, Mike had the idea of burning it to CD. This seemed to work and I was able to start to install it. It kept freezing, though, and I got lots of weird errors. After a few days of battling it I wrote: "This is the week I officially retired from my until now, tireless attempt at getting Linux to function on a low end PowerPC computer. Throughout this process I have had to test many of my troubleshooting abilities. One example was trying to figure out why one computer I tried to install Linux on was getting weird errors about one of its drives. After deducting different types of problems, I discovered the error was in the empty zip drive. Linux wasn't smart enough to realize the zip drive was a removable media drive and that the disk was not in it. I popped in a blank zip. Stupid Linux.

Ben's Analysis

Consultant's Question: What, if anything, did you get from doing the problem solving assessment activity? Did you learn anything new about assessment? About problem solving? About expressing your ideas?

I took from the exercise a heightened awareness for showing not just what I did, and how I did it, but why I took the steps that I did towards solving the problem. For instance in the paragraph we examined, as students brought to my attention, I identify the problem rather loosely (“..getting weird errors..”), then I vaguely mention that “After deducting different possible problems...” I came (seemingly by luck) over a working solution. I did not explain why I chose trial and error as my number one method for solving the problem, nor why that method ended up working. A later revision of the example would have identified the problem more precisely (demonstrating the knowledge I had learned during the process of solving it) clearly laid out each step I took towards finding the solutions, and why that solution actually worked (based on the follow up research I did on the problem).

## PROTOCOL AND GROUP NOTES re. BEN'S WORK

### TODAY'S PURPOSE --

1. TO EXAMINE WHAT CONSTITUTES EVIDENCE SO THAT WE CAN SELECT EVIDENCE TO REPRESENT THE STANDARD 2.2
2. TO USE THIS INFORMATION TO FINETUNE THE PERFORMANCE STANDARD AND BEGIN FORMING AN ASSESSMENT TOOL

### TODAY'S PROTOCOL (20 MINUTES)

1. SELECT ONE PIECE OF EVIDENCE
2. GIVE FIRST IMPRESSIONS
3. IN TURN, DESCRIBE EVIDENCE IN TERMS OF THE STANDARDS CRITERIA BELOW

### NEXT STEPS (10 MINUTES)

4. LIST WHAT IS REPRESENTED AND WHAT IS MISSING
5. BRAINSTORM WAYS OF DEALING WITH "MISSING" INFORMATION
6. HELP IMPROVE THE DIRECTIONS ON THIS SHEET

### Student conversation:

#### What is observable?

Addressed the problem and talked about his problem solving.

Used vocabulary (moveable media drives)

Says that he deduced different problems, but problems not mentioned.

Stated the problem. Stated thought about it. Stated how fixed it and why that worked.

Seems that kind of looked at connections and patterns. Realized that it was the zip drive.

Applied methods and strategies.

Hard to understand what he's talking about if you are a non-techie.

#### What is there and what is missing?

Connected to vocabulary, you can read his problem but would be easier to understand what is was solving and what the problem was if there were a visual, or some other kind, of example.

Maybe a link that gives an explanation.

Screen shot of the error message might help.

Did you use reference books like Linux?

Knowledge is definitely there, but the solution is there and not the how of the discovery.

Doesn't seem like a huge problem to solve.

Student descriptions allowed for first impressions and some discussion, without time to categorize according to the criteria given for problem solving. Ben took the comments home to analyze according to the criteria. Suggest that this become part of the protocol in the future.

## Student review sheet for discussion with Ben's categorization of comments inserted

### 2.2 Students use reasoning strategies, knowledge, and common sense to solve complex problems related to all fields of knowledge.

In grades 9-12, this is evident when students identify a problem and:  
 aaa. Critically evaluate the validity and significance of sources and interpretations.  
 bb. Evaluate approaches for effectiveness and make adjustments;  
 cc. Consider, test, and justify more than one solution;  
 dd. Find meaning in patterns and connections; and  
 ee. Select and apply appropriate methods, tools and strategies.  
 f. Implement an approach that addresses the problem being posed; and  
 g. Use manipulatives, sketches, webs, etc. to model problems.

Evaluate source materials Y N

Did you use reference books about Lynux?  
 Was the Internet his main reference tool?

Evaluate approach for effectiveness Y N

Seemed that he kind of looked at connections and patterns. Realized it was the Zip drive.  
 Stated the problem; what he thought about it; how he fixed it and why that worked.  
 Addressed the problem and talked about his problem solving.

Generate multiple solutions Y N

Says that he deducted different problems, but problems not mentioned.

See patterns and connections Y N

Seemed that he kind of looked at connections and patterns. Realized it was the Zip drive.

Apply methods, tools, and strategies Y N

Applied methods and strategies.  
 The knowledge is definitely there. The solution is there, but not the how of the discovery.

Approach addresses the problem Y N

Addressed the problem and talked about his problem solving.

Builds models to show problem/solution Y N

Screen shot of the error message might help.  
 Maybe a link that gives an explanation.  
 You can read his problem, but it would be easier to understand what he was solving and what the problem was if there was a visual, or some other kind of example.

## DEBRIEFING THE USE OF PROTOCOLS

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Holding focused conversations is a different way of communicating than you are used to. Now that you have had some experience using protocols, what have you noticed?

- Nice that everyone gets a turn to talk.
- Not dominated by teacher or one student.
- Not spending the whole time talking.
- Have a time limit and so it's easier to sit and listen.
- The conversation does not get stuck on one thing.
- Nothing gets too dragged out.

What are some of the drawbacks?

- Don't get to say everything you want to say.
- When there is a blank spot, we sit there until someone finally speaks. It's kind of eerie.
- Sometimes there isn't enough time.

### Consultant's Comments

Listening to the students' remarks about protocol-based conversation, I noticed that the first two impressions concerned equity -- who gets to speak and how much they get to say. Their comments about lack of time point to adjustments that need to be made in the protocols themselves. Focused conversation is the most efficient way to convey ideas in an equitable manner. While I think they should be used as the primary vehicle for "harvesting knowledge" and making decisions, it is important to have causal unfocused discussions from time to time to make room for the element of surprise.