Using Video in the Science Classroom:

Report on a four-month study of teachers' use of *DragonflyTV* videos and Educator Guides

2006

ROCKMAN *ET AL*

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Executive Summary

Starting in January 2006 ROCKMAN ET AL conducted a twelve-week study of the use of the PBS science series, *DragonflyTV*, in twenty middle grade science classrooms. *DragonflyTV* is a PBS science series that models science inquiry by presenting real children conducting inquiry investigations into their own science questions. The goal of the TV series is to illuminate the inquiry process and inspire viewers to conduct their own investigations. The participating teachers were provided with DVDs of 36 *DragonflyTV* programs, an index with National Science Education Standards correlations, and associated Educators' Guides. The teachers committed to using the videos each week, kept logs of their activities, and were surveyed and interviewed by the researchers.

The study focused on three primary research questions:

1) How and why do Middle School Science teachers use educational video in their classrooms?
2) How and why do Middle School Science teachers use *DragonflyTV* programs or segments, and the associated Teacher's Guides and Web in their classrooms?
3) What are the resulting impacts of video use on students?

General Findings

What was most striking about the study, even with its small population, was the great variety in how teachers used the video materials and in the effect those usage patterns had on their students. The most notable variations occurred in the timing and purpose of video and in the pedagogical techniques teachers used with the videos. Teachers used videos to introduce new content areas at the beginning of a lesson and also used videos to demonstrate or reinforce concepts at later points in instructional units. In both cases, students generally seemed to enjoy the opportunity to view videos, often preferring them to other instructional tasks.

Teachers' use of the *DragonflyTV* videos also varied significantly. Some teachers sought to capitalize on the videos' strengths for entertaining and engaging students – in these cases the videos were shown as a reward or as a means of motivating students. Some teachers built on the inherent, inquiry-based design of *DragonflyTV*, adopting an approach to viewing that engaged students in inquiry as part of the viewing experience. Teachers found the style of *DragonflyTV* program segments to be a particularly good fit with this active, or inquiry-based style of video use, particularly among students in the target audience for the program. Furthermore, teachers found this approach to be highly effective in fostering both engagement and science learning.

Trends in Video Usage
In spite of variations in how participants used videos, there were some consistent trends that emerged for outcomes of video usage. Study findings suggest that the use of shorter, more targeted video segments yields greater learning outcomes and maximizes the benefits of limited instructional time spent watching videos.

Teachers also expressed a need for supplemental guides and indexes to make television programs that are created for broadcast and viewing at home useful in the classroom. Videos should be correlated to science curriculum standards, at the local level if possible, and clear descriptions should be provided, either in a printed guide or on a Web site. Activity guides should be designed for ease of use and include student worksheets. A complementary Web site with additional content for students and for teachers is also of significant value in the classroom, to the degree time in school allows for Web use.

Strengths of *DragonflyTV*
The study also highlights unique strengths of *DragonflyTV.* Because children today arrive at school with strong preferences for commercially-styled video, *DragonflyTV* videos seemed to be particularly appealing. Students respond well to programs to which they can relate, and to those that incorporate up-to-date video style and *DragonflyTV's* fast-paced editing, innovative camera angles and popular music seemed to meet the expectations of today's media-literate students. Teachers consistently ranked *DragonflyTV* video segments higher than other videos that had been used during the week and teachers often commented on how engaged their students were while watching the *DragonflyTV* videos.

Teachers also offered praise for *DragonflyTV's* ability to teach and reinforce concepts related to the process of scientific inquiry. Several teachers noted long-lasting effects in how students approached inquiry exercises after viewing *DragonflyTV*. Furthermore, comments made by both teachers and students in this study suggest that students make connections between science and real life and that they grow more interested in science and scientific inquiry as a result of viewing *DragonflyTV*.

On a student survey conducted at the end of the study, 77% of students noted that *DragonflyTV* helped them with their science experiments. Students specifically commented that *DragonflyTV* had helped them do better science fair projects or science projects for class assignments. Teachers cited examples of students' answers on tests and assignments improving as a result of viewing *DragonflyTV*—explaining that students demonstrated a better grasp on the parts of the scientific process and wrote more complete and clear responses to open-ended questions that asked them to describe results of scientific investigations.

Introduction

In January 2006 upper elementary school (fourth and fifth grade) and middle school/junior high school science teachers from all over the country were invited, via emails and posts to several message boards for educators, to complete a survey on how they used video in their classrooms. Fifty-four teachers submitted responses, and from these, twenty teachers were invited to participate in a longer video usage study using videos and accompanying support materials from the PBS science series, *DragonflyTV*. ROCKMAN *ET AL* researchers selected teachers from several geographic regions of the US, representing a mix of grade levels and diversity of student populations (ethnicities and socio-economic levels). Participating teachers were given DVD sets that contained 36 *DragonflyTV* programs and additional support materials. The participants were then asked to complete a detailed log of their video use for twelve weeks.

Research questions:

Specific research questions proposed for this study included:

1) How and why do Middle School Science teachers use educational video in their classrooms?
2) How and why do Middle School Science teachers use *DragonflyTV* programs or segments and the associated Teacher's Guides and Web-based resources in their classrooms?
3) What are the resulting impacts of video use on students? In particular the study evaluated:
    - Students' engagement in/enjoyment of the learning process,
    - Students' understanding of science concepts,
    - Students' interest in science, and ability to do scientific inquiry
    - Gains in student achievement (as reported by teachers)

Participants

The twenty participants for the twelve-week study included three each from Minnesota and Ohio, two each from California, Oregon, and New Jersey and one each from Utah, Nevada, Florida, Alabama, Michigan, Texas, Georgia, and Connecticut. We specifically selected participants who demonstrated an inclination toward frequent use of video, and had easy access to video equipment, thus controlling for two variables we believed could significantly impact interpretation of the results of the study.

Methods

The participants were sent a DVD video library containing 36 half-hour episodes from the first three seasons of DragonflyTV and supporting materials including: an Educator's Guide, showlists that described the contents of the episodes, an index that listed episodes and segments according to topic and types of featured scientific investigations, and a document that listed the videos' alignment with the National

Science Education Standards. Participants were instructed to use at least one *DragonflyTV* segment for each of ten weeks during the twelve-week study.

The participating teachers were originally asked to keep a log of their video usage for ten weeks and report on up to five video segments that they had shown each week in class. Due to breaks for spring vacations and state and local testing, the study was extended for two additional weeks. During each of the twelve weeks, teachers were asked to answer a set of questions unique to that week, but were only required to submit video usage information for ten of the twelve weeks.

Weekly Logs

Teachers were also asked to provide the following information for each video shown:

- The day of the week it was shown
- The classes to which it was shown
- The program title, and title of the segment (if applicable)
- The format (DVD, VHS or Streamed)
- A brief description of the program
- An explanation for why they chose the program
- A description of how the program was used, including any related assignments
- A description of the students' responses to the video
- A description of anything they'd do differently in the future

We also asked the teachers to rate the following:

- The level of student learning that resulted (low, medium or high)
- The level of student engagement that resulted (low, medium or high)
- The overall quality of the video (low, medium or high)
- How well expectations were met (not met, met, exceeded)

Additionally, teachers were asked each week to indicate what days, if any, they were absent from school and whether or not the school was on spring break that week. During the second week of the study we also added an option for teachers to indicate whether or not their students had standardized testing during the week.

Teachers were given the option of keeping track of their video use in a paper log or using an online log, with most choosing the later option. Each week the online logbook presented a different set of thematic questions related to video usage. Even when teachers were not reporting on video usage, they were asked to respond to all other questions for that week. The table below indicates the theme for each of the twelve weeks.

Table 1: Weekly Question Themes

Week #	Topic	Dates
1	Class Schedule	March 13-17
2	Finding Resources	March 20-24
3	Incorporating Resources	March 17-31
4	Different Video Formats	April 3-7
5	Components of *DragonflyTV*	April 10-14
6	Loaning Materials	April 17-21
7	Pedagogy and Assignments	April 24-28
8	Previewing Practices	May 1-5
9	Integrating Video	May 8-12
10	DragonflyTV Website	May 15-19
11	Lesson Guides and Standards	May 22-26
12	General Video Usage Wrap-up Questions	May 29-June 2

Interviews

Participants were interviewed to gain additional information about their logbook responses and more detail about their use of video. The interviews were conducted during the last half of the twelve-week study. Four interviews were conducted onsite during classroom observation visits and twelve interviews were conducted by phone. Four participants could not be reached for an interview.

Classroom Observations

We observed four teachers as they were using video in their classrooms. In the observations, researchers observed the style of instruction and students' behaviors, including levels of engagement while video segments were being shown. These observations provided rich information about how teachers use video, what technical challenges can arise, and how students respond to video. Detailed sets of notes were taken during each observation and trends were coded for inclusion with other qualitative data in the final trend analysis.

Student Surveys

Toward the end of the twelve-week study, teachers were asked to administer student surveys to one or more of their classes. Eleven teacher participants returned student survey data. In all, 598 student surveys were collected and analyzed. The student data informed the findings related to student engagement and viewing preferences for videos in general and to *DragonflyTV* in particular.

Inquiry Worksheet Data

To provide additional insights into use of the *DragonflyTV* Educators' Guides, teachers were asked to try the pedagogical model incorporated into the Guides at least once during the second half of the study. An inquiry worksheet was created and

distributed to all participants outlining the following procedure, taken from the published Educator's Guides:

1) Pick one of the *DragonflyTV* investigation segments from the list of videos.
2) Show just the beginning of the segment to your class then pause the program after the students on the video identify the research question that they will be investigating.
3) Ask students how they would design an investigation to find the answer to the question posed by the children in the video. Have them write or discuss as a class what experiments or observations they would do. Ask them what tools/equipment they would need, how much time they would expect their investigation to take and what types of measurements or observations they would plan to do. This can be done individually, in small groups, or as a class. The inquiry worksheet can be used to facilitate this process.
4) Finish playing the segment.
5) Discuss: compare/contrast how your students' plans differ from those of the children on the show. What are the pros/cons of the different types of approaches to conducting the research? Again, the inquiry worksheet can be used to facilitate this process.

Teachers were asked to make a video or audio recording of their classes or take notes about this experience. At the end of the study we asked teachers to submit copies of the completed inquiry worksheets and any recordings or notes they had generated.

Other Data

At the end of the study teachers were sent a self-addressed stamped envelope in which to return copies of the students surveys and any of the following (if applicable): handwritten video logbook, copies of the inquiry worksheets that students completed, and any other lesson plans or examples of student work related to video usage.

Data Analysis

The twelve-week study produced an abundance of data, to which the evaluation team applied a mixture of quantitative and qualitative data analysis techniques. Descriptive statistics were run on all quantitative data and a coding scheme was developed and applied to all qualitative data.

Specific coding schemes were developed to identify different video usage trends among participants (based on pre-survey data, self-reported usage in the video usage logbooks, interviews, and a limited number of classroom observations). A set of common themes related to selection of videos, preparation to use videos, in-class usage trends, and follow-up or related-activities were also developed and used to guide data analysis. To the extent possible, the same coding scheme was applied across sets of qualitative data (e.g., logbook responses, participants' interviews, classroom observations, etc.).

Findings

Our findings are presented in three major sections. In the first section, we present findings related to the general research question that asked how and why teachers use video in their classrooms. Where appropriate, we include observations about *DragonflyTV* as well. In the second section, we focus specifically on the use of *DragonflyTV* and comparisons between *DragonflyTV* and other videos. The third section focuses on the impacts of video use.

How and why teachers use video in their classrooms

Research Question 1: How and why do middle school science teachers use educational video in their classrooms?

Our pre-survey provided a profile of how teachers use video in their classrooms. Among our 54 pre-survey respondents we found that most were using video programming either two or three times a month (36%) or about once a week (30%). Teachers reported using video programs of varying lengths but the length of programming used most often was 20-30 minutes (74% of respondents said they used this length of program "often" and three more respondents said that was a length they "always" used).

Among teachers' reasons for using video, we found the most important to be:

- Ability to present or repeat content/appealing to different learners (average = 4.67*)
- Ability to present things uniquely through video (average = 4.65)
- Helping students learn concepts better (average = 4.46)
- Engaging or motivating students to pay attention (average = 4.43)

*Average scores are based on a one to five scale where one is "not important at all" and five is "very important."

We found that access to technology for showing video programming seemed to make a significant difference in the way teachers used video. Teachers who had equipment in their room or shared equipment located nearby were more likely to use videos than those who had to reserve equipment through a centralized media center. Teachers who had access to streaming video libraries tended to make a more concerted effort to incorporate video in their lessons, as streaming video made it easier for teachers to find, acquire and show videos.

Why teachers use video in the classroom

Over the course of the study several trends in why teachers use video emerged. Among the most prevalent reasons for using video were its ability to effectively reach different types of learners (and/or reinforce concepts for all learners in different

ways), to effectively teach difficult concepts or present information that students wouldn't otherwise have access to due to time and cost constraints, and to engage and motivate students.

Appeals to Different Learning Styles – Helps Visual Learners:
Teachers commented on the highly media-centric world that today's students inhabit. Thanks to the proliferation of children's television programming and an abundance of popular video games, many students are arriving in school with strong preferences toward visual learning. The *DragonflyTV* videos seemed to be particularly effective at appealing to this audience. Examples of teachers' comments include:

- *The students love to watch movies and enjoy the chance to learn in a different way.*
- *Because kids are so visual and a well-made video that describes a science concept makes EVERYTHING more understandable.*
- *The students are exposed to other ways of learning the material. Some students are very visual and need a type of video to grasp the concepts. Videos are another way to reach students and their individual needs.*

Unique Opportunities and the Ability to Effectively Teach Difficult Concepts:
Several teachers noted that they could no longer take students on field trips to gain real-world learning experiences due to budget cuts and safety concerns. Teachers turned instead to videos as a means for providing students with access to real-world information without the need to venture into the real world. In one case a teacher actually went to a site and shot video footage that he brought into class. In more general terms, video is allowing teachers to do things that they otherwise wouldn't be able to do. Several teachers also noted that video eliminated the need for costly or time-consuming labs.

- *Benefits are that students may see something that is not possible to physically show them in the classroom. Especially real-life applications of science. It's also another way for students to learn, rather than reading it.*
- *Students see a topic that may be hard to explain or I might not be able to do a specific lab techniques because space and cost are prohibitive.*
- *Video gives them experiences they don't have…experiences I can't get to.*

Engagement
The motivational and engaging value of video cannot be overemphasized. Perhaps more so than a treat, as was the case for past generations of students, today's students take video for granted, sometimes even seeing it as a necessity. One teacher stated "I'm 54; when I was growing up we got our information from books and reading—kids today aren't used to doing that; that's why they have a hard time doing it."

Some video programming, however, is clearly more engaging than others. Students respond well to programs to which they can relate, and to those that incorporate

contemporary video styles. *DragonflyTV's* fast-paced editing, innovative camera angles, and popular music matched the expectations of today's media-literate students.

Students are engaged by subjects that are new to them. For students in Texas, a program about snow is particularly interesting. Likewise, programs about the oceans are interesting to students in the Midwest. While programs that contain novel subjects appeal to students and contribute to their subsequent engagement, students also seem to be engaged by programs that relate directly to their own lives. In several instances teachers noted that students responded particularly well to shows that presented topics that were closely related to something the students were about to or had just experienced (e.g., trips to amusement parks or 4H fairs).

Why teachers select certain videos

Teachers find and acquire educational video through various sources. They give preference to those sources that are convenient—particularly online sources that allow content searching, offer well-organized catalogs, and are recommended by their peers. United Streaming, provided by the Discovery Channel, was frequently noted as a valuable resource. Teachers also appreciated trusted sources such as local museums, libraries or television stations that offer educational programming, notably PBS stations, which broadcast *DragonflyTV*.

When selecting videos for classroom use, the teachers shared the following criteria:

- *Make sure the content of the video ties in with the topic of study and reinforces or introduces key concepts*
- *Video must be thoughtfully selected for content and quality. NEWER IS BETTER!*
- *Use only applicable segments*
- *Use video to educate, [not to kill time]*
- *Teachers must learn to make video an EXTENSION of their own voices, not a replacement for instruction*
- *Decide what parts of the video are going to be effective with the lesson that will be taught. Decide where in the lesson and when to show the video during class time.*
- *Preview the video [before playing it in class]*

Previewing

We found that teachers did not always have time to preview entire video programs, although about half of our participants noted that they intended preview video materials as often as possible. Most indicated that they typically previewed only the segments that they were planning to use with their classes.

Teachers offered arguments both for and against previewing videos. Some wished to evoke a more genuine response to the video by not reviewing it completely prior to in-class viewing. Others felt that it was necessary to view a program (or segment)

from start to finish so that they could plan discussion questions and activities. In both cases, however, the goal was to create a more active and engaging viewing experience for students. And, in both cases, teachers stated that the detailed descriptions of the program and its content, such as those provided by *DragonflyTV*, helped them make appropriate selections.

The following are criteria that teachers reported looking for when previewing a video:

- *Content*
- *Ties to current content. Interesting visuals that I can't easily produce myself in class*
- *Student level interest in terms of content*
- *I look for segments or ideas that we are addressing in class at the time. I also look for segments or ideas to use as a springboard for the class.*
- *Connections or extensions to our current topic*
- *Currentness, interesting for kids, grade level appropriateness*
- *I want to see if they are speaking slow enough so that the students can understand, that they just don't show concept after concept but put some depth into a few concepts (so the kids don't get over loaded), if it shows things I wouldn't or don't do in my class already, that it relates to what we are studying, and that it shows good science/scientific method being modeled in one way or another. I take notes and/or write questions for my students to answer when they watch the video.*

Pros and Cons of Streaming Video vs. VHS and DVD

Nine out of the twenty teachers in the twelve-week study were using streaming video and another eight had access to streaming video either in the classroom or elsewhere in their school (leaving only three participants who had no access to streaming video).

Teachers using streaming video appreciated the ease of searching, selecting, acquiring, and playing video content. However, technical difficulties made the use of streaming video more challenging for some of participants. Teachers cited firewalls, availability of projection units, bandwidth and storage limitations as specific challenges. They also noted the relative ease of leaving a DVD or VHS tape for a substitute teacher to play in their absence.

Patterns of video usage

Length of video shown

Many teachers showed entire video programs even when they admitted that only a portion of the video was directly applicable to their instructional goals. Other teachers used only the shortest, most meaningful clips to engage and instruct students. More than half of our respondents (53%) to the week seven logbook questions, focusing on Pedagogy and Assignments, noted that they most often play an entire program from start to finish during a single class period and a few more (18%) said that they broke videos up over the course of several days or class periods. This self-reported data

seems to be consistent with what we saw in the teachers' logbooks. Use of videos of thirty minutes or less seemed to be the norm among teachers responding to our pre-survey, with 80% stating that 20-30 minute videos were what they "often" or "always" used. One of the teachers who participated in the extended video usage study wrote:

> *For educational videos I seldom if ever show anything that lasts longer than 30 minutes....in fact I don't remember the last time I showed anything longer than Bill Nye or DragonflyTV.*

About a third (30%) of respondents on the pre-survey indicated that they typically played only selected segments of longer video programs. Among those who participated in the twelve-week study, teachers who used shorter clips tended to use video to get students' attention, to reinforce specific information, to provide examples that could spark class discussion, and as an introduction or review on a topic. Appropriate video clips, even those only a few minutes in length, could meld seamlessly with the curriculum and often provided students with new ways of looking at or thinking about the subjects being studied. Data on the results of video usage reported by the teachers suggest that the use of shorter, more targeted segments yields greater learning outcomes and maximizes the benefits of limited instructional time.

Timing of video usage

In addition to differences in *how much* of a video teachers tended to use, we also saw differences in *when* teachers chose to use video segments. We found that some teachers made more prevalent use of video to introduce concepts or specifically used video as a hook to get students interested in an upcoming lesson or unit. We found that other teachers were making more frequent use of video to help review information at the end of a unit, for example, presenting concepts in different ways to help solidify or check students' understanding before moving on. We also found teachers using video to present "just-in-time" information and examples at various points throughout instructional units. Additional comments from teachers using videos at different points during the instructional process are provided below.

> ***Before (Introducing Topics or Concepts):***
> - *Almost always the videos I use support what I'm teaching...usually used as an introduction to a concept/topic.*
> - *Help introduce and discuss new topics*
> - *[Used to] Access and assess prior knowledge*
>
> ***During***
> - *Great additions to class discussion after a new topic is introduced (Comment made about DragonflyTV specifically).*
> - *Show great examples of class content with a lot of details.*
> - *Support learning of complicated concepts and processes in a simple way.*

After (Reviewing or Reinforcing Material):

- *Sometimes I use it only after my students have learned the vocabulary and basic concepts. The video helps them to understand what they've read in the text.*
- *Reinforce concepts already discussed in class.*

In-Class Activities Related to Video Use

In reviewing the teachers' logbooks we saw a variety of in-class activities and teaching methods being used to help ensure that students were learning as much as possible. In our week seven logbook we asked teachers how often they did certain activities in class with their students when videos were being shown. Their answers are presented in the following table.

Table 2: Activities Teachers Do/Ask Students to Do While Viewing Videos

	Never	Sometimes	Always	Average
a) Take notes on their own	3	11	3	2.00
b) Complete a worksheet (or guided note-taking	2	14	1	1.94
c) Pause the program for discussion	0	9	8	2.47

Average responses were calculated by converting responses of "never" to 1, "sometimes" to 2 and "always" to 3. N=17.

Pausing the video for discussion was the most common in-class activity. Teachers elaborated on the importance of in-class discussion and explained some of the specific discussion strategies that they employ. One teacher noted that she had students discuss the video with a partner, in small groups, or with the whole class. Another stated that:

> *Discussion develops the kid's deep understanding of the material being seen. When they talk with each other they develop their own ideas to a greater depth.*

A few teachers noted that one of the challenges to using video was that students sometimes saw it as "free time" when they could choose to tune out. Some teachers used worksheets to ensure that students would watch more actively. When worksheets or in-class activities were closely tied to the core purpose of the video programming, students were more engaged than when the activities were only marginally related to the videos (e.g. instances where students were asked to list facts that weren't tied to the intended learning outcomes of the video segments). When specific assignments accompanied the video-viewing experience, students seemed more active and engaged.

We also asked teachers to share more information about how often they did, or had their students do, certain activities outside of the viewing experience (e.g. to prepare for viewing the video or as a follow-up to viewing the video). Their responses are presented in the table below.

Table 3: Activities Teachers Do/Ask Students to Do Before or After Viewing Videos

	Never	Sometimes	Always	Average
a) Complete a worksheet	5	12	0	1.71
b) Take a quiz or test on program content	3	13	0	1.94
c) Do a reflection paper or other writing assignment	1	13	2	2.06
d) Do a larger, multi-part project	2	13	1	1.94
e) Look up information (online, at the library, etc.)	6	8	2	1.75

Average responses were calculated by converting responses of "never" to 1, "sometimes" to 2 and "always" to 3. N=17 for "a" and 16 for items "b" through "e."

Most teachers asked students to do some type of assignment related to the videos. The most common activities were short quizzes (or worksheets) and short writing assignments where the students could reflect on what they saw or learned.

Interactivity

Many teachers in the study stressed the importance of using video as a tool to foster active engagement rather than allowing students to view passively. They specifically suggested:

- *Hands on activities and lessons to complement what is shown on the video.*
- *Stop the video and conduct lots of discussion*
- *Stop the video at key points and ask students questions or clarify something that was explained.*
- *Give the kids time to process and talk about what they saw so that they develop the deeper comprehension of what took place on the video.*
- *Make sure kids have been set up to be successful when watching the video. Set up quality functioning questions. Set up an inquiry/thinking approach to the video.*

Other factors and resources that contribute to successful video integration

Teachers were asked to comment on factors that enabled them to successfully integrate video into their teaching. Primary themes from these conversations are presented below.

Access to Content and Additional Information

Teachers stress the importance of having access to quality content and note that resources that aid in the search and selection process are helpful. Overviews of programming that make reference to particular content standards are especially helpful as are any features that enable teachers to find what they are looking for as quickly and accurately as possible.

Equipment and Technical Support
As one teacher put it, "it doesn't matter how much great content you have if you don't have working technology to play it on." Access to functioning, up-to-date technology is a must for successful video integration. Teachers commented on the value of LCD projectors and good sound systems to help ensure that all students can see and hear video programs.

Access to technical support in the case of equipment malfunction is also important. Some teachers noted a desire for additional training on how to use technology so that they can implement it effectively.

Time
Teachers need time to prepare for effective use of video, and they need actual instructional time in which to implement video content. With all the demands on their time, it can be a challenge for teachers to find sufficient time to preview video programs and prepare instructional resources. Given the intense curriculum demands, it can be challenging to show longer video programs; it is sometimes challenging to even carve out enough time for short video clips. One teacher wrote:

> *The greatest challenge in using video actually finding the time to include it as part of the curriculum. It takes time for me to find appropriate video, preview it, and create support material to go along with the video. It also takes up class time, when we already have a demanding curriculum.*

Professional Knowledge and Training:
Teachers acknowledge that effective integration of video involves much more than popping a tape in the VCR. Several suggested training, support, and modeling on how best to incorporate video. Specific recommendations included in-service training programs, support materials that enable better alignment with curriculum and standards, and examples of lessons that effectively incorporate video. One teacher noted that:

> *The biggest challenge is knowing when and where to use the video for the most effective impact on the students. How the video is used if of great importance.*

Administrative support
Some teachers expressed concern that parents and administrators did not consider video to be an effective instructional tool. One teacher expressed her frustration that an administrator in her school called it "death video," and several teachers brought up the misconception commonly held by some parents and administrators that you're not teaching if you're showing a video. Buy-in is necessary at all levels in order to foster an environment where video can be used effectively.

How and why teachers use DragonflyTV

Research Question 2: How and why do middle school science teachers use *DragonflyTV* programs or segments, and the associated Teacher's Guides and Web in their classrooms?

In this section we turn our attention to data and findings related to *DragonflyTV* in particular—building on what we learned about video use in general and expanding on it.

Why teachers use DragonflyTV

In the third week of our extended video usage study we asked teachers to respond to a set of questions in our online logbook that focused on how easily they were able to incorporate *DragonflyTV* into their teaching. Teachers who agreed that it had been easy commented on the series' alignment to standards and curriculum:

> *I teach science to three classes and the DragonflyTV episodes go right along with what I'm doing. Actually they expand from what I have.*
>
> *The video segments fit perfectly with my Science and Social Studies lessons.*
>
> *The DVDs have a variety of topics that apply directly to the Ohio standards at my grade level.*

Those teachers who were less certain about the ease of incorporating *DragonflyTV* segments into their instruction were concerned about the types of content available and the ability of different types of students to relate to the program in general:

> *There were no DragonflyTV videos that correlated with the topics that we were discussing this week.*
>
> *There aren't as many life science/biology lessons relative to what we are currently studying.*

…on the other hand:

> *The majority of the episodes seemed geared towards life sciences.*
>
> *Not many are involved with the Earth Science unit I am teaching.*
>
> *For some of my hardened urban 8th graders the programming is a little "too nice" though I see the edgy production values clearly.*

Engaging for Students
Several teachers commented on the motivational power of *DragonflyTV*. Students are motivated and excited about seeing real kids do real science. Comments from teachers suggest that the *DragonflyTV* programs engage students more effectively than traditional educational videos.

Fosters Understanding of the Scientific Process
Teachers and students quickly realized that *DragonflyTV* is largely about the process of conducting scientific inquiry. Several teachers commented that students are able to think in a more scientific fashion after viewing several segments or episodes of *DragonflyTV*. They also suggested that science class or science fair projects are ultimately more innovative and successful as a result of what students learn from the program. Furthermore, the specific connections that are made between science and everyday life on *DragronflyTV* are extremely powerful in fostering heightened interest in the scientific process in general.

Teachers noted in their logbooks that *DragonflyTV* episodes had the capacity to:

- *Help students to extend their own ideas about how to design an experiment*
- *Reinforce scientific investigations*
- *Help students visualize processes and predict the ending*
- *Show more ideas about the scientific process*

Alignment with Standards
Teachers from certain states found that the program aligned well with state standards, while others cited lack of overt alignment to their specific state standards as a reason not to use *DragonflyTV* segments more frequently. The following teacher planned to expand the prescribed curriculum alignment to include other parts of her school's curriculum:

> *I am making a list that will coincide with other science topics. I want to be able to align the videos with FOSS kits and other science resources people use through out the school! They are not only aligned with the grade standards but also with lesson we are already doing. The videos are a great resource for kids to apply concepts they are learning to real life activities.*

Segment Length
In addition to content that is generally a good fit with standards, teachers also like the length of *DragonflyTV* programs and segments. Some commented on how challenging it was to find video programs that were short enough to show in class but still educational. *DragonflyTV* seemed to meet both needs.

How teachers use DragonflyTV

Program vs. Segment

In the early stages of our research, we were surprised to find that more than half of our participants were showing entire programs rather than individual segments. While some admitted that they were using the video as a reward or motivator for their students (perhaps the justification for showing an entire program), others seemed to be doing so out of habit. A few teachers admitted that they didn't always have time to preview a program ahead of time so they made their selections based on the episode titles and then set aside time for students to view the entire program.

Other teachers showed only the portions of the programs that were related to what they were studying or to the activities they planned to conduct in conjunction with viewing. Teachers' descriptions of *DragonflyTV* use suggested that there was more time remaining in class periods for discussion and/or hands-on activities when only a portion of the program was shown. Some teachers, especially those in higher grade levels, seemed to strategically pick segments that featured older children or since they felt their students would be less interested in seeing younger children on the program.

The practice of "just enough" or "just right" video segment selection seemed to foster engagement and interest and deliver a manageable amount of information without bombarding students. This practice also seemed more prevalent among those teachers using streaming video but less common with those using programs on DVD or VHS.

Teachers' preference for different segment types

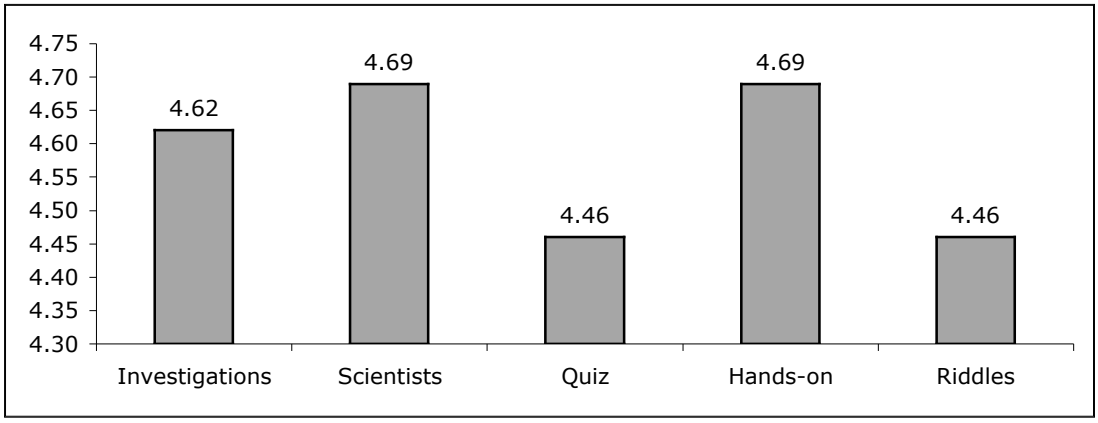
DragonflyTV's format includes several different types of video segments, in addition to the primary investigations, including profiles of adult scientists, riddles, and hands-on activities. While not all these formats were designed by the producers for classroom use, the study provided an opportunity to measure their relative value. During the fifth week of the study, teachers were asked to rate their preference for each of main types of segments in *DragonflyTV* programs using a response scale where 1 = "don't like it at all," and 5 = "like it a lot." The table and diagram below present our findings.

Table 4: Teachers Ratings of *DragonflyTV* Segments

	1	2	3	4	5	Average
1. Investigations (5-7 minutes)	0	0	0	5	8	4.62
2. Scientist Profiles (2-3 minutes)	0	0	1	2	10	4.69
3. Short Quiz Segments (1 minute)	0	0	0	7	6	4.46
4. Hands-on science experiments (1 minute)	0	0	0	4	9	4.69
5. Riddles/Questions (posed at the beginning of the program and answered at the end)	0	0	1	5	7	4.46

N=13

Figure 1: Teachers' Relative Preference for Different *DragonflyTV* Segments



In general, teachers preferred the more content-rich segments of the program, over the interstitial Quiz and Riddle segments. There was also a slight preference for the Scientist Profiles and Hands-On Activities over the Investigations, possibly because they are shorter and demand less work to link to classroom activities. Teachers in the upper grades often selected the Scientist Profile segments because they featured adults.

Teachers expressed strong appreciation for the fact that the investigations showed real kids doing real science. "Kids watching kids is powerful," noted one teacher. Others commented;

- *DragonflyTV shows students coming up with questions and carrying out the experiments themselves. It shows that the students can be scientists too.*
- *I like for my class to see real kids DOING REAL SCIENCE! It helps me encourage them to get involved in what they are studying in science and to see the relevance of what we are studying. It gives the kids ownership of their studies and increases their interest in science.*
- *The investigations show students that doing science can be fun, and helps them identify/ learn the steps in an investigation.*
- *The investigations that the children do really follow the problem solving procedures for a science investigation. The children are truly interested in gathering data and looking at results.*

On the whole, teachers enjoyed the investigation segments. The few critiques of the investigations noted the homogeneity of the child-investigators or the lack of equipment or resources to repeat these investigations with students. Teachers shared the following comments about the other types of *DragonflyTV* segments:

Riddles

- *The riddles are okay...but sometimes it seems by the time the answers have been given you've forgotten the question. This is coming from an old teacher's perspective...not my young nubile-minded children.*

- *The riddles seem disconnected and almost trivial. A riddle is similar to a joke in the minds of a 12-13 year old.*

Scientist Profiles

- *Sometimes I think the scientist profiles could be more in-depth and longer segments. And the riddles/question segments are sometimes too easy for my sixth grade students.*

Quiz

- *The quiz segments can sometimes be frustrating for them because at times they need more processing time to figure out the answer. Next year I will be able to pace the videos throughout the year and will be able to put in a break so the kids can have the processing time.*

Different styles for using DragonflyTV

Teachers took two main approaches to their use of *DragonflyTV* as an instructional resource. Some made their choices based on content, selecting segments related to subjects being studied in class. Others employed the program as a way of teaching the scientific process.

Several teachers had their students practice the inquiry process during viewing. Students were asked to make their own observations along with the children featured on the program. This allowed students to take part in a research experience without the teacher having to arrange for a lab or field trip. In some cases, teachers found that *DragonflyTV* effectively showed the relationship between science and everyday life, regardless of the specific science topic.

Inquiry-based viewing strategy

DragonflyTV publishes a companion Educator's Guide, copies of which were distributed to the teachers. The Guide offers a specific strategy for using videos to encourage authentic inquiry. However, many of the teachers in the study devised their own methods for using the videos.

In order to investigate the effectiveness of the pedagogy incorporated into the Educator's Guide, during the last half of the twelve-week study we asked teachers to try the model of video usage presented in the Guide. Specifically, we asked teachers to play the first part of one of the investigation segments and pause it at the point where the children state their research question. We then had the teachers ask students to develop their own investigation to answer the question. Once the students had designed their investigation, the teacher was asked to play the remainder of the segment and discuss how the students' approach compared with the *DragonflyTV* investigation. An inquiry worksheet was distributed to teachers to help support this approach to viewing.

Several teachers had already been using a similar approach from the beginning of the study. One teacher explained that even before the inquiry "assignment," she had

given her students time to tinker around with their own approaches to the *DragonflyTV* investigations. She continues to use this approach because it forces her students to think: “The average kid thinks ‘oh yeah, I can do that,” but “it’s good when they have to struggle and work past the easy answers.” For others, the inquiry-based viewing approach was a new way of using video programming in general and *DragonflyTV* in particular. The following are examples of logbook entries about this phase of the study:

> **Episode 311/Games:**
> *[Students] were investigating how to make more accurate shots on the basketball court and playing carnival games. This was a great program to play with for the data that is being gathered on how closely the kid's thinking, in the room, compare with the kid's thinking on the video. The kids then asked to have time to try and invent their own toys/games. Kids were shown the first part of the video [Inquiry Worksheet was used]. This worked out wonderfully. It follows the philosophy of developing deep comprehension using a video. The kid's papers were collected and then they were given the opportunity to watch the rest of the video to see if their strategies matched.*
>
> **Episode 210/Underwater:**
> *I told students that they can be involved in investigating their world just as the kids in the ROV segment are. We then had a discussion about the scientific process demonstrated in the segment. [The students were] very involved. Kids watching kids in powerful! In the future I would: Show the segment at the beginning of the “Strange Days on Planet Earth” (another video shown in class) experience, that way students will perhaps think about what they can go to investigate their world. I would also pause the segment and have students make predictions about what will happen and what the data shows.*
>
> **Episode 207/Sound:**
> *With the questions provided, the students seemed to be more engaged because they thought of other ways that sound could be tested or other properties of sound that are affected by music. In the future I would: have the students come up with a different experiment similar to this one that they could conduct themselves.*

The following is an example of how a teacher came to try the inquiry-based approach early on in the study, before we requested it.

Episode 103/Animal Behavior:
After film intro and theme establishment we paused. This time I asked the class to describe an animal intelligence test BEFORE we watched the film. There were many "rats in a maze" responses. We watched the film and the way in which the tests were done.

Another teacher described how she engaged her students in the inquiry process after viewing an episode of *DragonflyTV*:

Episode 206/Human Body II:
I shared the segment with the kids and we talked about what they observed in the video. Then we designed our own test. The kids were excited to repeat the activity with different variables. I followed the activity suggested in the teacher's guide. We took a 1 minute speed math test and scored the test. Half of the class read a book for five minutes while the other half of the class exercised outside. We took another 1 minute math test and the kids were surprised that they were all able to do more math problems. The exercise people increased from 119 problems completed as a group to 177! The kids were very excited!

Most teachers found the inquiry-based viewing approach to be highly effective. As evidence of its success, they cited particular anecdotes about students asking better questions or demonstrating deeper understanding of concepts after having been more involved in a process of co-investigation with the children in the video.

Use of supplemental print materials
In the second to last week of our extended video usage study we asked teachers to tell us how often they had used the Educator's Guide and other print resources that they had been given at the beginning of the study. Of the thirteen participants who responded to this question, four said that they used these resources frequently (i.e., once a week or more), three said that they used them occasionally (i.e., a handful of times since the study had begun), four used them rarely (i.e., only once or twice over the course of the study), and two reported that they had not used the resources at all.

Teachers who used the Educators' Guide and other print materials less frequently noted that their infrequent use was due to a lack of perceived value or sufficient time. They also noted the following reasons:

- *[They] weren't as user friendly as I would have liked. I would have liked a worksheet that I could have photocopied and just given to the students or a template to work from.*
- *What is in there may or may not reflect what I am currently doing. I am also on a very tight curriculum schedule and often I don't feel that I can do something extra*
- *For the segments that I showed, there were not always lesson guides for the segments. I also think the guides are too wordy. I like to see at a glance what the activity is about. I also thought that the activities were not all that practical to do in the classroom and in a reasonable time.*

Teachers also identified features that they liked about the Educator's Guide:

- *The guides were helpful. They supplied ideas and were clearly written. Helpful support with the programs.*
- *I used them to make sure the segment we were to watch fit the standard that I am teaching.*
- *[The Guides] gave me background on things I wouldn't have already known and it let me know how things were laid out in the program.*
- *Yes, they are a good intro and then an organized way to direct a discussion after.*

Teachers generally preferred anything that reduced the time needed to find and prepare appropriate resources—especially resources that were aligned with curriculum standards. They expressed appreciation and suggested continued inclusion of the following components in particular:

- Short program descriptions that provide information "at-a-glance"
- Information related to the inquiry-based approach
- Alignment of program content with science education standards

When asked to provide suggestions for improving the supplemental resources to make it easier for them to effectively and efficiently incorporate *DragonflyTV* segments into their teaching, teachers' suggestions included:

- More detailed descriptions of each episode and each segment (some teachers found the titles to be misleading)
- More suggestions for activities relating to each segment
- More reproducible pages/worksheets
- More traditional sample lesson plans, (i.e., step by step guides on how to show the video)
- Links to additional resources, (e.g., websites, additional reading, etc.)

Use of web-based resources

The *DragonflyTV* web site is part of the PBS web site for children, pbskids.org. The site is primarily designed for children, and the video programs direct viewers to the site for additional activities. Online copies of the Educator's Guides are also provided in a special section of the site designed for parents and teachers.

The teachers were invited to make use of the web site, but only a small portion of the participants used the site on a regular basis. By the fourth week of the study only a third of the participants had visited the *DragonflyTV* website. By the tenth week the study, only three participants reported returning weekly to the website.

Teachers had a variety of reasons for visiting the *DragonflyTV* website and did different activities once they were there, including:

- *Looked to see if there were any activities that I can incorporate into the lessons that I teach.*
- *Looked for additional info [about the videos]*

- *Looked for the answers to something brought up in the programs and checked on something for the students*
- *Checked for shows and content...looked at activities and experiments*
- *Looked for video connected to my present unit, looked at investigations, went to scilinks, looked at activities*
- *[Looked at]The DVD outline of what is covered*

One teacher also invited her students to review the materials on the website and make recommendations:

- *I explored the sections and had the kids explore the sections to make recommendations for use next year. They were asked to explore what segments would have helped them to learn more and better with all sections.*

The teachers in the study generally desired the program website to have usable resources that are easy to access and ready to use. They expect materials that describe existing episodes and also expect supplemental materials such as links to other sites or literature about topics presented on each program, interactive activities that can extend the learning experience, and specific ideas or steps on how best to integrate the programs/segments. The *DragonflyTV* site is designed with these objectives in mind, and the teachers who visited the site had no negative comments about it.

Comparing DragonflyTV to other programs

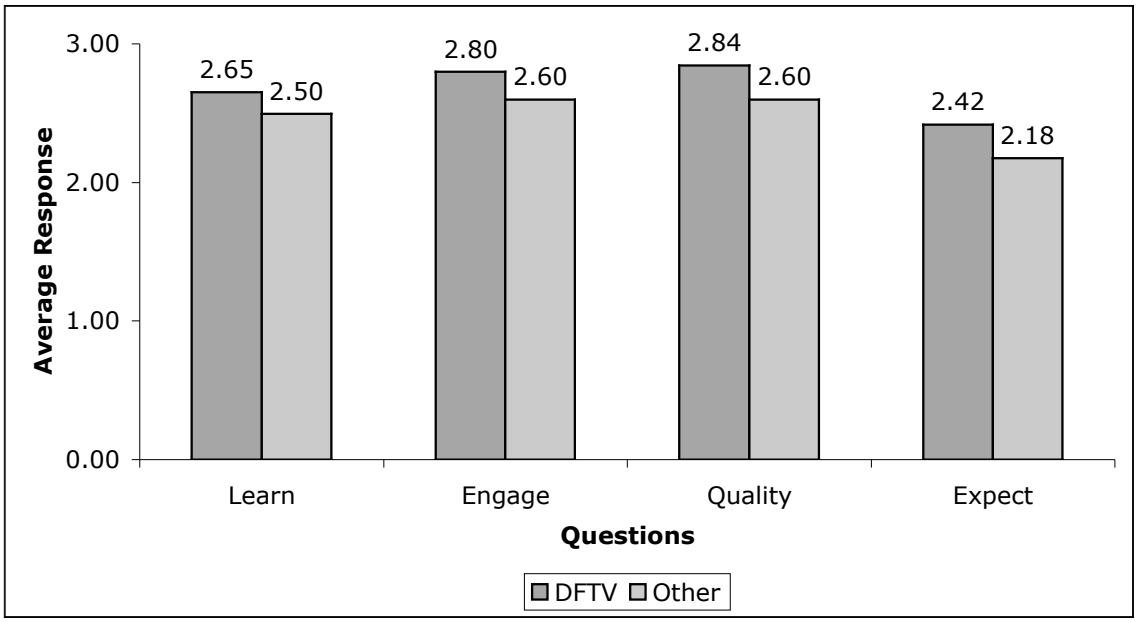
Over the course of the study, teachers showed 115 *DragonflyTV* programs/segments and 171 other programs or video clips. Based on logbook comments and interviews, *DragonflyTV* had the capacity to more actively involve viewers than other programs. The program supports an inquiry-based approach where students could discuss the research questions and findings as active participants rather than mere onlookers and passive consumers of information.

In the figure below, teachers' ratings of the *DragonflyTV* programming is compared to their ratings of all other programs used during the study. Questions included the following:

1) How would you rate the level of student learning that resulted?
2) How would you rate the level of student engagement that resulted?
3) How would you rate the overall quality of the video?
4) Were your expectations met?

The response scale and assigned numeric values for the first three questions were: 1="low, 2="medium," and 3="high." The response scale and assigned numeric values for the final question were: 1="not met," 2="met," 3="exceeded."

Figure 2: Use of *DragonflyTV* Compared to Use of Other Video Programs



In each rating category, the average scores for *DragonflyTV* were slightly higher than they were for other programs. Qualitative comments made by teachers in their logbooks and during interviews suggested they preferred *DragonflyTV* because of its ability to engage students and the innovative presentation of investigations conducted by real children.

The Impacts of Using Video and *DragonflyTV*

Research Question 3: What are the resulting impacts of video use on students?

Teachers shared many anecdotes about how video, and *DragonflyTV* in particular, helped them reach and teach their students. They cited the fact that students were engaged with the video and that engagement, in turn, paved the way for learning. They also cited video's ability to do or show things that couldn't otherwise be done in the classroom. Often, the videos aided teachers in showing students the connection between science and the real world. These strengths are discussed further below.

Students' engagement in/enjoyment of the learning process

Teachers often commented on how engaged their students were while watching videos, especially *DragonflyTV* videos. Several teachers even noted that they were as engaged as their students were while watching *DragonflyTV*.

For some teachers engagement meant active involvement in class discussion during and after viewing a video, while others reported students being "as quiet as church mice" as an indicator that they were paying attention during the videos. Other indicators of engagement reported by teachers included:

- Less goofing around
- Less off-topic talking
- More/better comments that indicate students are paying attention
- More/better discussion (Students want to stop the video and discuss)
- More eyes on screen
- More note-taking
- Better ability to communicate information about what was learned (verbally and in writing)
- High frequency of references to concepts learned in videos
- Better answers/responses on tests
- Students' preference for *DragonflyTV* videos over other science videos and even non-educational videos

A great example of the last point came from a teacher who told us that her students asked to watch a *DragonflyTV* episode on the last day of school. She was impressed that they selected *DragonflyTV* over the programs she typically shows at the end of the school year just for fun.

Students enjoy video. Most have a steady diet of it outside of the school day and they therefore find it a medium to which they can readily relate. Students commented that it was motivating to see children like themselves doing the investigations. They also noted their appreciation for specific components of the *DragonflyTV* production style including its fast pace, and the inclusion of appealing topics.

Teachers' Comments on* DragonflyTV*:

- *Kids are always highly interested in these programs. Lots of discussion and they build their ideas on what they have seen.*
- *[Students] showed high interest level and good, active participation.*

Students' Comments on* DragonflyTV*:

- *The kids [on DragonflyTV] made the show more exciting than normal videos, so this helped me pay attention more.*
- *I liked that kids were the hosts, instead of adults. Why, because it was sometimes getting boring with adults*
- *I really liked the bottle rocket experiment because we did those at our school but on TV they were cooler and I learned more about them. It was interesting*
- *I liked how it was really fast-paced and had a lot of energy and music.*
- *It keeps our attention because it moves fast and it's fun to watch.*

Students' understanding of inquiry process and other science concepts

Research on memory for video is mixed in terms of benefits to students' ability to recall information over the long-run. However, videos enable teachers to present content in new ways that helps students to make better connections—therefore fostering a deeper understanding and more substantive learning.

Teachers offered high praise for *DragonflyTV's* ability to teach and reinforce concepts related to conducting scientific inquiry. Several teachers noted long-lasting effects in how students approached inquiry exercises after viewing a *DragonflyTV* program, explaining that many students would refer back to something they had seen in the show. Teachers also reported more "out-of-the-box" thinking among their students after seeing *DragonflyTV*.

- *They are all very engaging for the students. They love it! This makes my job easier. They tend to retain more. They will say "Remember when..." a lot and refer to the video.*
- *The programs give them some structure/ideas with which to start. Sometimes that is the most difficult… Once they see how a problem can be approached they are willing to try other ideas. They also sometimes just need a model from which to base their thinking. The kids came back to the rockets DVD's many times this spring. I was very surprised with the details they caught from the DVD's.*
- *The students are understanding the scientific process much better after watching the Dragonfly series.*
- *Students definitely understand better and remember more when I am able to show a video segment. One Special Ed student especially will recall items from video.*

Several students confirm the comments that their teachers made:

- *I like how the kids do experiments in different ways than you would think because it helps me to realize that I can maybe do it someday.*
- *[DragonflyTV] helped me with my science fair project.*
- *I liked how they showed everything step by step and if I ever wanted to do one of those experiments, I could.*
- *DragonflyTV made concepts simple and easy to understand.*
- *It has facts and it teaches you new things. You get to see actual videos/pictures of what they are talking about.*
- *I learn a lot in a short amount of time.*
- *[DragonflyTV] helps you understand the things you're learning better.*
- *The part that I loved was that it was fun, and it helped me in science. Because it explained a lot and gave really good ideas. In conclusion, it inspired me to build a robot/learn about them.*

Students' interest in science and scientific inquiry

DragonflyTV is designed to establish and reinforce the connection between science and real life. The goal of the TV series is to stimulate students' interest in science and improve their ability to do scientific inquiry. Comments made by both teachers and students in this study suggest that students make connections between science and real life and that they become more interested in science and scientific inquiry as a result of viewing *DragonflyTV*.

Students surveyed at the end of the study reported a high level of interest in science and a desire to do more scientific investigations. Eighty-four percent of student survey respondents indicated that they liked science and 59% percent indicated a desire to do more inquiry activities. Teachers confirmed that students were generally more able to see the connection between science and their own lives and were more aware of the process for conducting scientific investigations after viewing *DragonflyTV*. One teacher noted:

> *[DragonflyTV] allows the kids to see other ways to set up an experiment and why data collection is very important. The scientific way of thinking is constantly modeled and reinforced along with thinking out how to set up the experiment to get the best results. Being able to let the kids see the use of everyday items to problem solve is great.*

Gains in student achievement

It is difficult to correlate *DragonflyTV* viewing with gains in student achievement based only on this study. However, we did gather data from teachers and students that suggest there is a relationship between students' academic performance in science and viewing *DragonflyTV*.

On the student survey, 77% of students noted that *DragonflyTV* helped them do science experiments. Students specifically commented that *DragonflyTV* had helped

them do better science fair projects or science projects for class assignments. Teachers cited examples of students' answers on tests and assignments improving as a result of viewing *DragonflyTV*—explaining that students demonstrated a better grasp on the parts of the scientific process and wrote more complete and clear responses to open-ended questions that asked them to describe results of scientific investigations.

In the long run it is not unrealistic to think that there may be additional gains demonstrated by students' scores on standardized science tests—especially since teachers in at least one state noted that they were moving toward a standardized testing format that will stress the importance of research and inquiry skills. As students take what they have learned from viewing *DragonflyTV* and apply it to their study of science and other subjects in the future there is evidence to support that they will benefit from a strong understanding of the inquiry process.

Participant Outcomes

We found that most participants in the extended video usage study had a very positive and professionally nurturing experience. Several appreciated the opportunity for reflection on their video usage strategies and some were introduced to new ways of using video. The following are comments made by teachers in their logbooks in the final week of the study:

- *I have the students do more activities related to the video than I did before. Before the video was for more information and notes, now it is to reinforce something as well as do or complete an activity.*
- *This study has made me realize how many valuable videos are out there that can enhance my teaching. This study has given me a "push" to consider more video in the future. I realize that I need to make time to do this.*
- *I've learned to use [video] in different ways and look forward to using some of my new ideas next year. I have also come to think about why and how I'm using the video more then I ever did before.*
- *I have come to appreciate the style of video in presenting information to students. They enjoyed the format of the Dragonfly videos more than the "dry" videos I sometimes use.*
- *I am able to choose the segments I want to use and place them into the curriculum where it is appropriate and most effective. I can show part of the video and have students raise questions, finish the study for themselves and compare to the DVD at the end.*
- *I use it more often. I don't know if I have benefited more than how much the kids have benefited.*

While it was not our intent to modify teachers' behavior as part of this study we found that several teachers tried and adopted new ways to use video and benefited from the opportunity to reflect on their practices as professionals.

Conclusions and Recommendations

Strengths of video and *DragonflyTV* as educational resources

Evidence suggests that video, when used properly in educational settings, can engage students and foster learning. In the case of programs like *DragonflyTV*, the old adage that "a picture is worth a thousand words" holds true. The value of enabling children to see others like themselves doing real science— and having fun doing it—is incredibly valuable for fostering an appreciation of science and a lifelong love of learning.

Based on the responses from the teachers in the study, we offer the following recommendations for broadcast programs that wish to extend their impact into the science classroom. Programs such as *DragonflyTV,* which are designed to compete in a broadcast environment, have singular appeal in the classroom. However, their impact can be enhanced by offering additional materials that make the videos easier for teachers to use.

Using video to demonstrate and further develop inquiry skills

We found that some teachers had naturally gravitated toward using *DragonflyTV* programs and segments to model inquiry strategies—making the viewing experience active and capable of sparking lively discussions of scientific topics and methods. For other teachers in our study, this represented a new way to use video. When teachers tried the inquiry approach we suggested, they reported finding heightened levels of engagement among their students. This is clearly a unique strength of *DragonflyTV*, so we suggest continued support to help teachers adopt an inquiry-based approach—including enhanced lesson plans and possibly model lessons on streamed video if funding and time permit.

Further support and resources for teachers

Teachers repeatedly noted having limited time and resources. They consistently expressed a desire for anything that could help them deliver effective instruction without requiring large investments of time or money. Some teachers suggested that having more information on programming, especially more detailed descriptions of segments within each episode, could help them select appropriate videos more quickly. Another suggestion is creating a short guide to the specific research methods used in each segment so that teachers could quickly find clips that demonstrate, for example, student investigators measuring speed, recording observations on animal behavior, or using bar graphs to present findings. Episode guides and teacher resources that make links to standards are also greatly appreciated by teachers struggling to survive in a world where "accountability" dominates their work in the classroom.

Content requests

A few of the 7th and 8th grade teachers who participated in our study commented on the content areas included in the *DragonflyTV* episodes, and specifically mentioned the absence of programs dealing with topics related to chemistry. One middle school teacher commented on the fact that the content (i.e., subject matter and topics) was well matched for 7th and 8th grade but the style of the program was sometimes better suited to children in lower grades.

In addition to the isolated requests for more chemistry-related programming, several teachers commented on a desire for a little more science content in general such as short explanations (e.g., two to three minutes) of specific facts, theories, or phenomena. Short clips of this nature might better position *DragonflyTV* for more extensive classroom use, although this might compromise its appeal to viewers at home.

Other components that may also be of value to educators, perhaps as web-based supplemental resources, are:

- Outtake clips that show examples of things not going perfectly according to plan in the investigations. This suggestion is in response to comments from several students that the investigations sometimes seem too perfect and scripted. They understand that the process of doing science is sometimes messy and imprecise and think that a program like *DragonflyTV* could better address this fact.
- Comments from scientists or teachers. This suggestion is an additional response for teachers' desire for more content. Having experts provide feedback on the process and/or outcomes of the investigations would better help viewers to understand the underlying science.

The importance of featuring real kids doing real science

Our research shows that having a variety of real children featured as investigators is a powerful, motivating and engaging feature of the *DragonflyTV* series. Students definitely show a preference for programs that show children like themselves or that feature people they can relate to. One participant in our study sent us a note after our onsite visit in response to a question we'd asked him about why more students weren't signing up to be on the show. His response offers some good food for thought. After visiting the *DragonflyTV* website to try getting some ideas on how his students could contact or contribute materials to the show he stated:

> *The kids are very concrete thinkers and really need to be TOLD that it is ok to sign up or participate. The kids would love to have the opportunity to do science on TV, the site just doesn't come right out and say it's a possibility. If they say something like "want to get your science on TV?" I'm sure they would get a better response. If it is in there I just can't see it*.

Being more explicit about the ability to submit an investigation idea to *DragonflyTV* and the process for doing so may ultimately increase the number of suitable applicants and help to ensure a diverse pool of children investigators upon which to call for future episodes.

In conclusion, our research demonstrates that *DragonflyTV* is a valuable educational resource that effectively engages children at a critical time in their lives when so many have started to tune out of science instruction. *DragonflyTV* succeeds in making science fun, and instilling a basic understanding of the scientific process that can serve as a foundation for future learning.

Appendices

Preliminary Teacher Survey – Findings and Instruments

Weekly Log Data

Student Survey Protocol and Data

Student Inquiry Worksheet

Interview Protocol

Classroom Observation Protocol

Preliminary Teacher Survey

Preliminary Findings and Data Trends

The online survey was open from January 31st through February 10th. Invitations to submit responses were sent to more than seventy teachers on the *DragonflyTV* emailing list and posted on discussion boards at Teachers.net, ProTeacher.net, and The Teacher's Corner (theteacherscorner.net) in threads targeted at appropriate respondents, (i.e., Science teachers in grades 4-8). Fifty-four teachers completed the survey.

Demographics

Approximately half the respondents (52%) teach multiple grades from Grade 4 to Grade 8 and just under one-third (30%) indicated that they teach multiple subjects. Almost half (43%) teach general (or all areas) science, followed by biology or life sciences (33%), Earth sciences (24%), physical sciences (17%), and chemical sciences (13%) (Respondents were allowed to indicate more than one subject area).

The majority of respondents (35%) were between the ages of 41 and 50, and most (75%) had between 5 and 20 years of teaching experience – evenly divided between 5-10 years and 11-20 years of experience.

On average, classes were comprised of 60% Caucasian students, 18% African-American, 16% Hispanic or Latino, 9% Asian, and 4% Other (Native American, bi/multi-racial, Filipino). Respondents reported having almost half (45%) of their students on free or reduced lunch programs.

Video Usage

Respondents were asked to indicate how often they used video with their students in a typical month during the school year. Their responses are summarized in Table 1 below.

Table 1: How many times per month do you use video with your students? (n=53)

	Number of responses	Percent of respondents
I don't use video	1	2%
Once a month	9	17%
Two or three times a month	19	36%
About once a week	16	30%
More than once a week	8	15%

Since the length of video segment being used could vary widely from teacher to teacher or class to class, we also sought further clarification on the frequency of use of different lengths of video programming. Findings are presented below in Table 2.

Table 2: How often do you show video programs or segments of the following lengths?

Rating	About 5 Minutes	About 5-10 Minutes	About 20-30 Minutes	About 45-60 Minutes	More than 60 Minutes
(1) Never	8	4	0	5	24
(2) Seldom	10	5	2	20	18
(3) Occasionally	13	19	9	19	5
(4) Often	18	24	40	8	1
(5) Always	2	1	3	0	0
Average rating	2.92 (n=51)	3.25 (n=53)	3.81 (n=54)	2.58 (n=52)	1.65 (n=48)

Many producers of educational video programs have created supplementary materials for educators. In our survey we asked respondents to indicate how often they used these materials (e.g., program guides or lesson plans). The findings are summarized in Table 3.

Table 3: How often do you use supplementary guides or lesson plans that accompany videos?

Rating	Number of responses	Percent of responses
(1) Never	0	0%
(2) Seldom	5	9%
(3) Occasionally	18	33%
(4) Often	26	48%
(5) Always	5	9%
Average rating	3.57 (n=54)	

Video Equipment

In addition to seeking information on teachers preferences and trends for use of video content we also sought to learn more about teachers' access to various technologies and equipment used for showing video programming.

Table 4: How do you show videos to your students? (n=54)

	Number of responses	Percent of respondents
VCR	52	96%
DVD	51	94%
Streaming Video	26	48%
Other*	3	6%

*"Other" included two computer-related responses (web links and computer whiteboard) and access to videos ("If I had them…").

Table 5: How do you have access to the following technologies? (Percent of respondents)

	VCR with TV/Projector (n=54)	*DVD with TV/Projector (n=54)*	*Computer with Streaming Video/Projector (n=51)*
I don't have access	0%	2%	16%
I have this in my school	20%	33%	43%
I have this in my classroom	80%	65%	41%

Since we hypothesized that having easier (i.e., in classroom/on-demand) access to video technology would increase teachers' use of video programming with their students we asked respondents to indicate whether or not in-classroom access to technology would increase the frequency at which they showed video programming to their students. Responses are summarized in Table 6 below.

Table 6: Does having, or would having, equipment in your classroom increase your frequency of video use? (n=53)

	Number of responses	Percent of respondents
Not at all	3	6%
Somewhat	10	19%
Very much	40	75%

Finding Video Programs

Teachers have access to many different types of resources for finding and selecting appropriate video programming. Table 7 below summarizes teachers' responses – indicating how they find video programming, (note: respondents could select multiple items).

Table 7: How do you find video programs for use in your classroom? (n=176)

	Number of responses	Percent of responses
Recommendations from other school/district media specialists	19	11%
Recommendations from other teachers	39	22%
Resource catalogs	33	19%
Library catalogues or browsing in the library	32	18%
Internet searching or browsing on the Internet	40	23%
Other*	13	7%

*"Other" included television programs and guides, other specialists' recommendations, NSTA recommendations, and the AEA.

Another set of questions helped us learn more about how teachers actually acquire the video programs that are used with their students. Responses are presented in Table 8.

Table 8: How do you obtain video programs for use in your classroom? (n=194)

	Number of responses	Percent of responses
Borrow from the library	40	21%
Borrow from other video lending programs	25	13%
Purchase at a video store or other retail store	35	18%
Purchase online	31	16%
Download for free online	22	11%
Record from television	34	18%
Other*	7	4%

*"Other" included purchasing from catalogues, as part of a school purchase order, borrowing material from other teachers or Educational Media Centers, or obtaining from the AEA.

Reasons for Using Video

In addition to learning about how teachers use video, we were also interested in learning why teachers use video programming.

Table 9: How important are each of the following reasons for using video with your students? (Number of responses and Average Rating, n=54)

	1	2	3	4	5	Average Rating
Ability to present things uniquely through video	0	0	2	15	37	4.65
Videos engage my students and motivate them to pay attention	0	0	6	19	29	4.43
Videos help my students learn concepts better	0	0	6	17	31	4.46
Ability to present or repeat content, appealing to different learners	0	0	3	12	39	4.67
Video is a good tool for teaching new concepts	0	3	10	0	21	4.17
Alignment of programming with specific standards	0	2	7	21	24	4.24
Availability of teacher resources that accompany the programs	0	3	14	19	18	3.96
To help provide instruction when I am out of the classroom	14	9	15	11	5	2.70

(Scale: 1=not at all important, 2=not very important, 3=neutral, 4=important, 5=very important)

Educational Video Usage for Science Instruction
Teacher Survey

We are seeking to learn more about the way that teachers of students in grades 4-8 use educational media. Your personal responses to these questions will remain confidential. If you have any questions or problems with the survey, please contact Jennifer at: 800-429-9371. Thank you in advance for your responses to the questions below.

I. Teacher Background

1. Grade levels taught: ***(check all that apply)***

4 5 6 7 8

2. Primary subject area(s) currently being taught: ***(check all that apply)***

- All Subjects/Self-Contained Classroom
- General Science (all areas)
- Earth Sciences
- Biology/Life Sciences
- Chemistry/Chemical Sciences
- Physics/Physical Sciences

Other:

3. Age Range:

- Under 30
- 31-40
- 41-50
- Over 50

4. Number of years teaching: (including this year)

- Less than 5
- 5-10
- 11-20
- More than 20

5. What percentage of your students are on free or reduced lunch programs?

%

6. What percentage of your students are:

African American %
Caucasian %
Hispanic/Latino %
Asian %
Other % Type:

II. Video Usage

7. In a typical month during the school year, how many times do you use video with your students?

- In a typical month, I don't use video
- Once a month
- Two or three times a month
- About once a week
- More than once a week

8. How often do you show video programs or segments of the following lengths?

a) About 5 minutes
b) About 10-15 minutes
c) About 20-30 minutes
d) About 45-60 minutes
e) More than 60 minutes

- Never
- Seldom
- Occasionally
- Often
- Always

*(*Note: for this question and the following question: Never=never, Seldom=only a few times ever, Occasionally=some of the time, Often=nearly every single time, Always=every single time)*

9. How often do you use supplementary guides or lesson plans that accompany videos?

- Never
- Seldom
- Occasionally
- Often
- Always

10. How do you show videos to your students? *(check all that apply)*

a) VCR
b) DVD
c) Streaming Video (United Streaming or equivalent)
d) Other:

11. How do you have access to the following technologies?

a) VCR with TV or projection unit
b) DVD with TV or projection unit
c) Computer with Streaming Video capabilities and projection unit

- N/A I don't have access
- I have this in my school
- I have this in my classroom

12. Does having, or would having, equipment in your classroom (i.e., not shared) increase your frequency of video use?

- Not at all
- Somewhat
- Very much

13. How do you *find* video programs for use in your classroom? *(check all that apply)*

- Recommendations from other school or district media specialists
- Recommendations from other teachers
- Resource catalogs
- Library catalogues or browsing in the library
- Internet searching or browsing on the Internet
- Other:

14. How do you *obtain* video programs for use in your classroom? *(check all that apply)*

- Borrow from the library
- Borrow from other video lending programs
- Purchase at a video store or other retail store
- Purchase online
- Download for free online
- Record from television
- Other:

15. What videos have you shown to your students in the past year? *(Please list program titles or show names.)*

16. How familiar are you with the program *DragonflyTV*?

- I have never heard of it
- I have heard of it but never seen it
- I have seen it
- I have shown at least one episode to my students
- I use this program on a regular basis with my students

III. Reasons for Using Video

17. How important are each of the following reasons for using video with your students?

a) The ability to present things that couldn't otherwise be presented or covered in class
b) Videos engage my students and motivate them to pay attention
c) Videos help my students learn concepts better

d) The ability to present or repeat content in a way that appeals to different learning styles
e) Video is a good tool for teaching new concepts
f) Alignment of programming with specific standards
g) Availability of teacher resources that accompany the programs
h) To help provide instruction when I am out of the classroom.
- Not at all important
- Not very important
- Neutral
- Important
- Very important

IV. Contact Info and Additional Research Participation

First Name: _____Last Name:_____

Email Address:_____

Your email will be used only to notify you if your name is selected during the prize drawing or if you qualify for the second phase of our study, wherein you would be given a set of DVDs and asked to keep track of your use of these DVDs, and other video programs, over the course of a 10-week period. As part of your participation you would be asked to show a minimum of two video segments per week during the study, answer a short set of online questions to help us track your video usage, administer student surveys, and complete a short phone interview at the end of the study.

Please select one of the following:
I *am* willing to participate in the second phase of this study if selected and have read the description of what my participation would entail.
I *am not* willing or able to participate in the second phase of this study.

School Name:
School Type:
- Elementary School
- Middle School/Junior High
- Other:

School Address:
Street: _____City: _____
State:_____ **Zip: _____**

Log Book Questions for Each Video Segment

Day Shown: M T W R F

Which class(es) was this shown to?

Program Title:

Type: DVD VHS Streamed

Title of Segment: (if applicable)

Amount Shown: minutes

Brief Description of Program: (if not a *DragonflyTV* Program)

Why did you choose this program/segment?

Describe how this program was used, including any assignments that were related to this video:

Describe your students' response to this video: (e.g., like/dislike, level of engagement, etc.)

What would you do differently in the future?

1) How would you rate the level of student learning that resulted? (low, med, high)

2) How would you rate the level of student engagement that resulted? (low, med, high)

3) How would you rate the overall quality of this video? (low, med, high)

4) Were your expectations met? (not met, met, exceeded)

Additional Weekly Logbook Questions

Week 1: Class Schedule – class title, grade(s), length, and days of the week

Week 2: Finding Resources

1) I have adequate resources for finding video resources.
SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

2) Which resources for finding and obtaining video programming do you value most and why?

Week 3: Incorporating *DragonflyTV*

1) The *DragonflyTV* resources have been easy to incorporate into my lessons.
SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

2) Please elaborate on your answer. (why/why not?)
What would help you to make better use of the DFTV resources you were sent?

Week 4: Different Video Formats

1) Please indicate your level of agreement with each of the following statements:
   a) The *DragonflyTV* DVDs are user-friendly.
   b) I am comfortable with using streaming video as an alternative to DVDs or VHS tapes.
   c) I have the technical capability to use streaming video as an alternative to DVDs or VHS tapes.

SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

2) Have you looked at any of the additional resources and videos available on the *DragonflyTV* website? Yes or No

3) Have you used any of the additional resources and videos available on the *DragonflyTV* website? Yes or No

4) What are the advantages of using streaming video en lieu of (or in addition to) DVDs or VHS tapes?

5) What are the disadvantages or challenges of using streaming video en lieu of (or in addition to) DVDs or VHS tape?

Week 5: Components of *DragonflyTV*

1) Based on the *DragonflyTV* programs that you've seen so far, please rate each of the following regular components of the show using a 1-5 scale where 1 is "don't like it at all" and 5 is "like it a lot":
   a) Investigations that the featured children do

b) Scientist Profiles
c) Short Quiz Segments
d) Examples of hands-on science experiments
e) Riddles/Question asked at beginning of program and answered at the end

2) Please explain why you like the components of the *DragonflyTV* programs that you rated highest.

3) Please explain what you didn't like about the components you rated lowest.

Week 6: Loaning Materials

1) Have other teachers borrowed videos from you since this study began?

2) In general, how often do teachers borrow video programs from you?
- Never
- Rarely (e.g. only once or twice a year)
- Occasionally (e.g. about once per month)
- Frequently (e.g. once a week or more)

3) Have you shared your video-based lessons with other teachers since this study began? Yes or No

4) What comments or requests related to video usage have other teachers shared with you since this study began?

Week 7: Pedagogy and Assignments

1) Which of the following do you typically prefer:
- Playing an entire video program from start to finish during a single class session.
- Playing an entire video program, broken up over the course of more than one class session.
- Playing only certain segments of a longer video program.

2) What do you do/have students do in class while a video is being shown?

	Never	Sometimes	Always
a)	Take notes on their own		
b)	Complete a worksheet (Guided note-taking)		
c)	Pause the program for discussion		

3) What do you have students do outside of the viewing experience?

	Never	Sometimes	Always
a)	Complete a worksheet		
b)	Take a quiz or test on program content		
c)	Do a reflection paper or other writing assignment		
d)	Do a larger, multi-part project		
e)	Look up information (online, at the library, etc)		

4) Is there anything else that you do or have students do before, during or after a video viewing experience?

Week 8: Previewing Practices

1) How often do you preview videos before you show them in class?
   Always, Most of the time, Occasionally, Rarely or Never

2) How much of the program do you typically preview?
   - Watch the entire program
   - Skim through the entire program
   - Skim through part of the program
   - Watch only the segments that I'm interested in
   - Don't typically preview

3) What do you look for or do when you preview a program?

Week 9: Integrating Video

1) Which of the following best describes your ability to integrate video programming into your classroom:
   - I am able to fully, and effectively integrate video in my instruction.
   - Sometimes my use of video is more integral to my instruction than it is at other times.
   - Videos feel like an add-on most of the time - there is little tie-in to my instruction.

2) What are the greatest challenges to integrating video more fully into your instruction?

3) What are the greatest benefits of integrating video more thoroughly?

4) What are the top three things that teachers need to do or have to integrate video more effectively for instructional purposes?

Week 10: *DragonflyTV* Website

1) Did you visit the DFTV website?

2) What did you do on the DFTV website?

3) How would you rate the DFTV website on the following components:
   a) Ease of Navigation
   b) Amount of Content
   c) Variety of Content
   d) Quality of Content
   e) Look and Feel

4) Did you know that segments of DFTV were available online?

5) Did you download any DFTV segments online?
If so, did you have any problems with the online video clips?

6) What would you change or suggest to make the online video offerings more useful to teachers?

7) Did your students download any DFTV segments online?

Week 11: Lesson Guides and Standards

1) How often have you used the *DragonflyTV* lesson guides that were provided
If no, why not?
If yes, Were they helpful – why or why not?

2) How valuable was the first section of each lesson guide (i.e. How would you investigate the question?)

3) How valuable was the second section of each lesson guide (i.e. Do it, Get to it!)

4) How valuable was the third section of each lesson guide (i.e. Take it Outside)

5) Did you create any resources to use in conjunction with a *DragonflyTV* video?

6) What types of resources do you use with other videos?

7a) To what extent do you adhere to the following standards:
Always, Occasionally, Never
7b) Is it Mandatory that you do so?
a) Departmental Standards
b) Building/School Standards
c) District Standards
d) State Standards
e) National Standards
f) International Standards

8) Which standards do you use that are mandatory – please spell out any acronyms if possible?

9) Which standards do you use because you merely find value in doing so?

Week 12: General Video Usage Wrap-up Questions

1) During your participation in this study:
a) Do you feel that you have used more, less or about the same amount of video?
b) Has it gotten easier to incorporate video into your instruction?

c) Have you tried new things?

2) How often have you used video segments 5 minutes or less in length?
- 10-15 minutes
- 20-30 minutes
- 45-60 minutes
- more than 60 minute (more same less)

3) Rate the following factors in terms of their overall importance:
a) Length of a video program or segment
b) Topic of a video program or segment
c) Level of a video program or segment (vocabulary, concepts etc.)
d) Accuracy of the content
e) How information is presented in the video (overtly instructional vs. more narrative)
f) Something that the kids can relate to
g) Humor
h) Age of the video (how recent it is)
i) Accessibility (ease of obtaining the video)
j) Cost (of purchasing the video)
k) Quality video
l) Quality audio
m) Format of the video (DVD/VHS/Stream etc.)
n) Accompanying worksheets
o) Accompanying lesson guides or lesson plans
p) Additional resources (e.g. interactive materials online)
q) From a trusted source

4) Are there other factors that are important as well?

Weekly Log Report Data

Week One Log Data

March 13-17, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Breakfast/Tests	6	DVD
Teacher C	Forensics	30	DVD
Teacher E	Sports	30	DVD
Teacher I	Structures	30	DVD
Teacher J	Forensics	15	DVD
Teacher K	Habitats/Cave	10	DVD
Teacher L	Underwater/ROV	8	DVD
Teacher T	Plants	30	DVD
Teacher N	Animal Behavior	30	DVD
Teacher R	Space (w/ 4 classes)	30	DVD
Teacher S	Wind	15	DVD
Teacher C	Dogs (w/2 classes)	30	DVD
Teacher D	Plants	NS	DVD
Teacher K	Habitats/Reptiles	10	DVD
Teacher L	Habitats/Frogs	10	DVD
Teacher T	Rocks/Kayaks	30	DVD
Teacher M	Sound	30	DVD
Teacher K	Habitats/Frogs	10	DVD
Teacher K	Habitats/Biologist	3	DVD
Teacher K	Habitats/Experiment	3	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher B	Classification of Living Organisms	NS	VHS
Teacher D	Bill Nye (BN): Plants	30	VHS
Teacher F	Simple Machines	15	Stream
Teacher G	Artic Biomes	25	VHS
Teacher H	Body Story	25	VHS
Teacher M	OT: Making 13 Colonies	23	VHS
Teacher O	BN: The Earth's Crust	30	VHS
Teacher A	Strange Days on Planet Earth	10	DVD
Teacher B	Classification of Living Organisms	NS	VHS
Teacher F	Heat and Temperature	15	Stream
Teacher J	Genes, Genetics and DNA	24	Stream
Teacher O	The Elements	52	VHS
Teacher A	Strange Days on Planet Earth	43	DVD
Teacher B	OT: Shadow of Hate	43	DVD
Teacher A	Strange Days…	46	DVD
Teacher A	Strange Days…	46	DVD
Teacher F	OT: World Music	30	Stream

Comments about *DragonflyTV*

Thirteen teachers showed at total of 24 programs and/or segments of *DragonflyTV*. Ten whole programs were shown (and seven of the thirteen teachers who showed *DragonflyTV* showed a whole program in one setting). The following are excerpts from teachers' comments about the programs they used.

- Breakfast Science (#30009): 6 minutes
  The previous week was test week in the state of Ohio and this segment was about the affects of breakfast on test scores. I used the program as a way to reinforce the steps of the scientific process. [The students] were engaged because it applied to their current testing experience. [Next year I plan to] use the segment before testing week.

- Structures: 30 minutes
  I chose it because of the snow storms this weeks. We are an environmental school and using our environments to survive is something we connect to the students learning. I discussed the dangers that go along with snow storms. I talk about what happens if trapped in a car or trapped in isolated areas. What can people do to survive nature's dangers? each quarter we also talk about the scientific method and how that is used to identify and test questions scientists and other people have about their every day life. This fit perfectly this week with the weather. I also made up worksheet that they had to fill out while watching the DVD. Most of the questions were about the question and how it was tested. The first couple questions were prior knowledge question to get them thinking about the video and to see how much they already know about the area/subject. The students really enjoy Dragonfly TV. They are focused and have many questions about the science. [In the future] If possible, have more time for discussion. I would also find more resources and examples of structures relating to the environment.

- Wind: 15 minutes
  Students are studying experiments with air & weather. Both classes watched 2 investigations - kites and wind tunnels. 3rd graders wrote portions for a scientific investigation: idea, hypothesis, materials, results. 2nd graders discussed the experiments. Students were engaged, seemed to grasp the concept of doing an experiment, recording results and making a conclusion.

- Habitats/Caves: 10 minutes
  It goes along with our topic that I am teaching in class. It reinforces what I have taught in the past. The 5th grade teacher wants them to be proficient in taking notes so we practiced with this segment. We reviewed the concept of evaporation with how the rock formations formed in the caves. They had to find out what a spelunker is. The students loved it!

- Underwater ROV: 8 minutes
  We started a chapter on oceans and ocean discovery. I wanted to show the students how scientists use ROV's to explore the ocean. The video was used as reinforcement for discussion in class. The students liked and the film took place at Marine Lab in Key Largo where I had spent a week two years ago. So, I was able to include my experiences along with the tape! Do differently in the future: The show seemed more about corals and coral reef health. I would use this along with biome habitat and possibly a unit on pollution.

- Plants: 30 minutes
  We are studying the parts of plants and the inherited traits of plants. We are also studying the properties of soil and the ability to help give nutrients to the plants. I chose this program to show the students different types of plants that they normally do not see in East Texas. The students were amazed by the information in the video. They enjoyed learning that the weevils were helping the Florida panthers survive by eating the trees. Their favorite part was seeing all the animals that depend on the Kelp forest for survival.

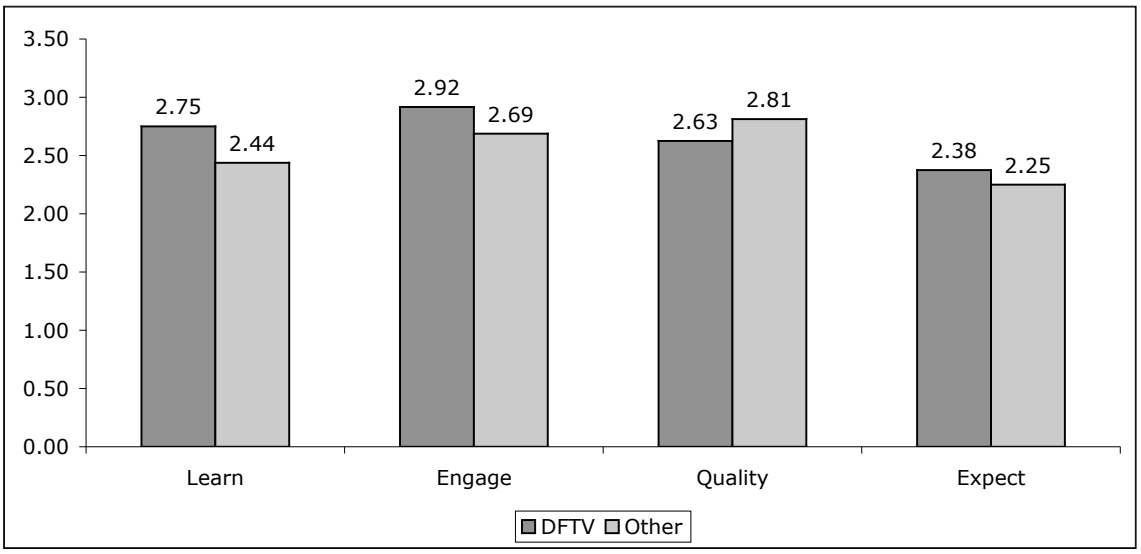
- Space/Astronomy: 30 minutes
  My class has been involved with research on their astronomy unit for the past three weeks. We have discussed what kinds of experiments get chosen to go to space, what weightlessness is like, and have discussed craters on the moon. I wanted this segment to encourage the kids to think about these concepts in order to develop their own experiments that they would like to try this spring. Possibly contacting NASA about with their questions. The kids took additional notes from the videos. They then were assigned research assignments to further explore experiments that have been done in space for kids (like how toys react in space). They also were assigned research questions and a web quest to find additional information on moon craters and zero gravity atmosphere. The kids were also assigned a web quest on the Amazing Space web site. The class and I stopped the DVD many times to pursue the questions they had while watching the DVD and to listen to their experiences and ideas. The class was excited and highly engaged with the DVD's this week. Next year I will be able to implement the DVD's at the exact time I we are discussing the topics. I used these DVD's later because they arrived after we had started the unit.

- Reptiles: 10 minutes
  Reinforces concepts taught earlier. The students are not tested on concepts learned earlier until 5th grade. The students took notes and we discussed it. They loved it.

- Sound: 30 minutes
  We are studying sound in science class. We used the video to explain and reinforce understanding of sound concepts as well as the inquiry process, such as observing and recording data. Students liked it and were very much

engaged, especially watching the dancing. Do differently in the future: Have them take notes on what parts of the scientific inquiry process they observed the girls doing.

DragonflyTV segments compared to other programs



Responses to weekly questions:

1) How would you rate the level of student learning that resulted? (1=low, 2=med, 3=high)
2) How would you rate the level of student engagement that resulted? (1=low, 2=med, 3=high)
3) How would you rate the overall quality of this video? (1=low, 2=med, 3=high)
4) Were your expectations met? (1=not met, 2= met, 3=exceeded)

Average scores from the responses to each question are shown in the chart below. The collective sum of responses relating to *DragonflyTV* segments for each of the four questions are compared to the collective sum of responses for all other programs. In most cases the responses are identical with the most noticeable difference being in response to the third question: "How would you rate the overall quality of this video?" where teachers reported that *DragonflyTV* seemed to be of a somewhat higher quality.

Week Two Log Data

March 20-24, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher B	Baby Animals	20	DVD
Teacher E	Sports II	30	DVD
Teacher K	Ecosystems/Salmon	15	DVD
Teacher P	Sound	30	DVD
Teacher R	Sound (w/ 2 classes)	23	DVD
Teacher S	Wind	15	DVD
Teacher B	Soccer	20	DVD
Teacher F	Animal Behavior	15	DVD
Teacher K	Ecosystem	8	DVD
Teacher L	Weather/Scientist	5	DVD
Teacher P	Rocks	20	DVD
Teacher R	Sound	23	DVD
Teacher A	ROVs	7	DVD
Teacher F	Animal Intelligence	15	DVD
Teacher K	Ecosystems/Dunes	15	DVD
Teacher P	Habitats	30	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Strange Days on Planet Earth	40	Stream
Teacher D	Plants	10	Stream
Teacher G	Artic Biomes	25	VHS
Teacher L	Ocean	30	VHS
Teacher N	Health/Foods	30	DVD
Teacher O	Elements	5	VHS
Teacher Q	Plate Tetonics	20	VHS
Teacher D	Plants	15	Stream
Teacher O	Nova: Killer Quakes	50	VHS
Teacher B	Continental Drift	22	VHS
Teacher F	Cell Transport	25	Stream
Teacher K	OT: State Quiz	60	DVD

Teachers Comments about *DragonflyTV*

Ten teachers showed *DragonflyTV* segments or programs during the second week of our study. Three whole programs were shown and fourteen partial programs or clips were shown.

- Baby Animals, 20 minutes:
  This video was used to finish off the bio lessons by pulling the ideas of growth and development, stimulus and response and so one. One more chance to go over activities of living organisms. We watched the video. Divided into groups and each presented a short report on different parts of the video. They were then given the evening to research the growth and development of different organisms. Next day; we made a chart of the animals and the gestation period the maturation ages and the life expectancy of each. The students were a little leery about it when we started because they knew they were going to have a report afterwards. They were highly engaged in the video itself and the reports were great. Do differently in the future: Not tell them the assignment until after. Have them just take notes; and then group their notes for the report.

- 102 Wheels, 15 minutes:
  It dovetailed very nicely with the current unit on simple machines. Skateboards have a high interest factor for the kids. As soon as the driving question was established, (does wheel size effect speed), I paused the video and asked the class to form and defend their own hypotheses. Some of the students spoke from personal experience. Interestingly, they disagreed and in the class discussion we established that our experiences must be tested experimentally to establish scientific validity. We continued with the DVD, pausing periodically to comment on what we were seeing. These 12 and 13 year old students try hard to show indifference. They are way too cool. So, I was happy that they enjoyed and engaged as well as they did. High interest level and good active participation.

- Sound, 30 minutes:
  On the Georgia QCC objectives there are at least two objectives that are on sound that relate to this DVD topic and the activities involved the scientific method. The students are now preparing science fair projects and the projects done on this video are clearly "out of the box" experiments. I used the video as an instructional tool and visual aide for the students to see how scientific investigations are done. The DVD enabled the children to make connections and discover attributes of sound such as soft and loud, fast and slow, and other characteristics of sound. The level of engagement was phenomenal. The students enjoyed the science experiments, they could recall the information learned such as; the loudness of sound is measured in decibels; their are many sources of sound, how technology usage can be integrated into a project; and the quality of the project presentation is important. If time permitted, I would

allow the students to come up with a class project on sound that everyone could participate in.

- 2007 Sound, 23 minutes:
  The students are bringing in their self designed musical instrument projects. I used it as a review for the sound/light unit I teach. The kids were given the task of building an instrument. They had to develop a brochure that explained how their instrument created the sound, how it was transmitted, explain the use of materials they chose, and design the brochure to sell the instrument to a particular audience while using the terms and explaining the concepts of sound. The students were again enthralled and are becoming more astute to how experiments are set up and data is collected. Again I will use these segments during the period which I teach these concepts. Since they arrived after the teaching was completed I am using them to connect to real life and for review.

- Rocks, 20 minutes:
  The students are studying rocks and minerals at this time. This DVD supported the Georgia QCC objectives on rocks and minerals and it reinforced the use of the scientific method. I used this program to demonstrate to students the level that science projects can be taken to when well planned and organized. I also wanted them to know that other science projects can be done besides "can an egg float in water..." I wanted to encourage them to think outside the box. I expressed to them that these experiments were done probably under close supervision of adults and with parent permission. The students liked it somewhat. Some enthusiasm was shown by some students. Their comments were, "Is that real? We can't do that. They were engaged but with skepticism.

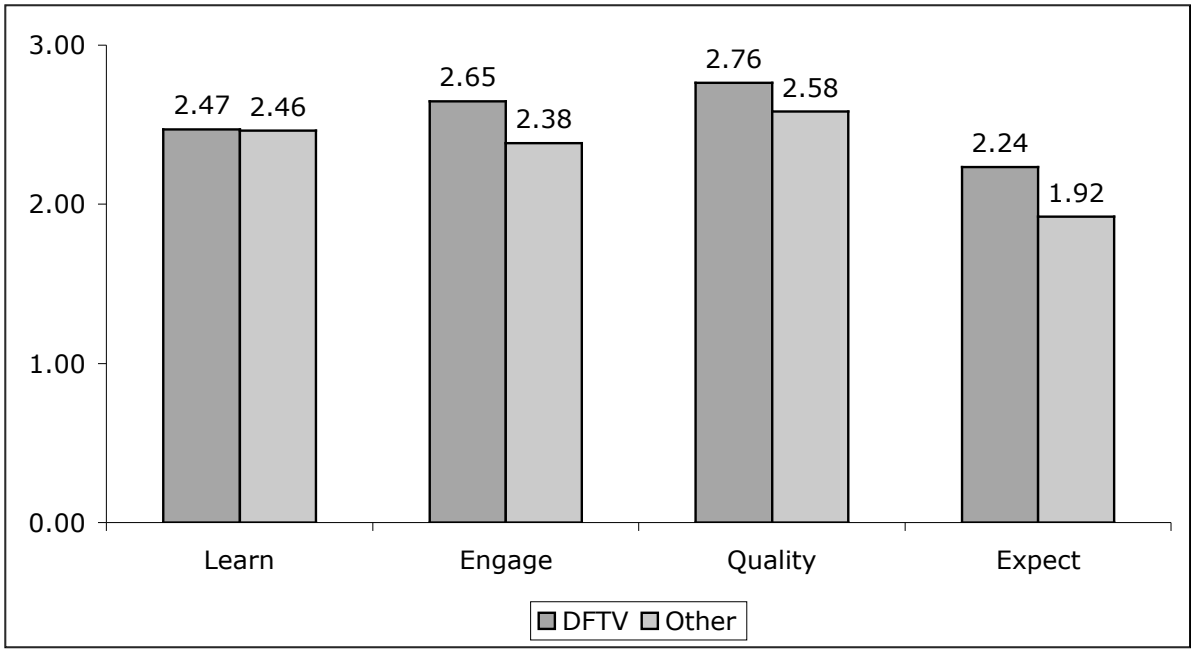
- 1003 Animal Behavior:
  Wanted to engage the class across a life science study. We have been focusing on atomic structure and I wanted to give them a break! After program intro to the question of animal behavior students discussed the kinds of behavior they had observed in their pets. We created basic categories of behavior and wrote them on the board. We continued and noted the behaviors that the DVD would focus on. (grooming, playing, sleeping, etc.) We paused again and discussed grooming behaviors in birds, cats, dogs, monkeys and so on. The conversation was very animated and excited. I was able to introduce the idea of naturalist studies as a possible career path.

- 1003 Animal Intelligence:
  After film intro and theme establishment we paused. This time I asked the class to describe an animal intelligence test BEFORE we watched the film. There were many "rats in a maze" responses. We watched the film and the way in which the tests were done. This film seemed a little "young" for this

group. They felt that the experiments were not that well thought out. Putting a biscuit under a blanket and timing how long each dog took to get it they decided had more to do with the dogs PHYSICAL attributes than their mental ability. This was a very good observation, so the film served indirectly as a good learning tool.

- Habitats, 30 minutes:
  The students are studying the Georgia QCC objectives on Habitats. This DVD supported these objectives and helped introduce the students further to the scientific method. Previously, I took the students outside to find worms (substituted with pasta) of different colors to help them understand how animals adapt and survive in their habitat. I used real worms as part of another experiment with them also. This video was a perfect extension of how science can be explored in the real world. The students were quiet and attentive for the first part of the video when the students went in the cave. They were slow to respond. When the reptiles, (lizards and snakes) were used they perked up and the level attention increased. They also wanted to tell me stories of frogs and lizards they had caught or that their parents had caught. We have a small trench in the back of the school that frogs breed in. During the spring, the students get containers and put the tadpoles in them and bring them to me all the time.

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:

I have adequate resources for finding video resources.
2 *SD=Strongly Disagree,*
1 *D=Disagree,*
1 *N=Neutral,*
6 *A=Agree,*
6 *SA=Strongly Agree*
Average: 3.81

Which resources for finding and obtaining video programming do you value most and why?

Convenience/Features

- Online resources such as PBS, Public Library, and Discovery.com that provide **email reminders** and **subject searches**.
- A catalog because it is a one stop shopping source. I teach science to grades 5-12 so I have many different topics to teach at any given time. A catalog organizes the subjects and I can have that one source instead of going to one source for earth science and another for marine biology and another for environmental science.
- I value other teacher's opinions the most because they are often on grade level and with the standards. However, I mostly find videos through catalogs. I order them and then view them to see if they are appropriate. Most of the time I am disappointed and return them because they talk to fast, are boring, or not grade/topic appropriate. I wish I had a better way of finding videos

Trusted Sources

- Our local 6 county education video outlet: "CUES" It is a constant source of excellent video with wide variety of subjects. They are ordered weekly and then returned. Own library mostly from Channel One tapings. **Wide variety** and easy access. Now I am enjoying the Dragonfly videos. **They are excellent and easy access.**
- Channel 30 here in Toledo provides lots of programming for teachers.
- The **local library** and other **science teachers**. I don't have any recent videos to do with earth science so I rely on both very much.
- I use the school tech lab and library. The libraries are interconnected and send requests pretty quickly. I also use PBS and anything I can legally get off of the internet.
- I don't have the opportunity to look for quality programming like I would like. I usually just use Bill Nye's videos for help with my science classes.
- The only videos I show and have a good collection of are : Bill Nye the Science Guy and Dragonfly. I do not buy videos through educational catalogs as many are outdated. I do buy DVD from the Science Museum of MN - many

of those are flat screen versions of IMAX films or are National Geographic films.

Streaming Video Sources

- video streaming, **easy to show short clips** of only the topic
- Our district has stopped providing a video check out library for us and is subscribing to United Streaming, which is OK, except for the **time it takes to download** all the ones I want to show...too much of my valuable time required. **I prefer to have videos on hand in my school library or that I own so that I can use them immediately when needed**.
- I was an early adopter of United Streaming. They seem to be the ONLY full length video resource available on the web. The science film library is extensive though **many of the films are older and of lower quality**. I assume that this is because they could get them cheap! United Streaming was purchased by the Discovery Channel last year and they have added quite a bit of good programming. **The cost per school is fairly high**.
- I use online streaming for most of my video programming because it **provides access to many topics** and is **provided free by my school system**. Our library is also a great resource because our librarian uses our recommendations in purchasing dvds and videos.

Week Three Log Data

March 27-31, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher E	Games	30	DVD
Teacher G	Frogs	10	DVD
Teacher T	Ecosystem	30	DVD
Teacher R	Structures	30	DVD
Teacher E	Technology I	30	DVD
Teacher F	Games (3011)	20	DVD
Teacher T	Space/Coconauts	30	DVD
Teacher O	Structures/Scientist	2	DVD
Teacher R	Structures/Snow Shelter	30	DVD
Teacher O	Earth Systems/Scientist	30	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher B	Genesis: Earth History	33	VHS
Teacher D	Parts of Flower	10	Stream
Teacher F	Sound/Hearing	10	Stream
Teacher H	Global Warming	45	DVD
Teacher J	Fossils	20	Stream
Teacher L	Seashore	30	VHS
Teacher M	OT: Don't Pick on Me	23	Stream
Teacher O	Cholrine	6	VHS
Teacher Q	Rock Cycle	18	VHS
Teacher B	Foces that Shaped the Earth	29	VHS
Teacher H	Breath of Life	22	Stream
Teacher J	When Dinosaurs Roamed the Earth	52	Stream
Teacher L	Australia's Great Barrier Reef	25	VHS
Teacher M	OT: Respecting Each Other	NS	Stream
Teacher Q	Stone Wall Secrets	45	DVD
Teacher B	Changing Knowledge/Changing Reality	50	VHS
Teacher L	Australia's Great Barrier Reef	30	VHS
Teacher M	OT: Bully Beware	3	VHS
Teacher M	OT: Flirting or Hurting	NS	VHS

OT: Off Topic/Non-science, NS: Not Specified

Teachers' *DragonflyTV* Comments:

- Structures/Scientist, 2 minutes:
  I used it as an introduction to an activity we were doing that day. During the clip I stopped the video and we talked about what was happening. Then the students tried to make earthquake proof houses out of spaghetti and marshmellows. They put them on shake tables to see the results. They liked it and understood it. Some had a hard time with understanding what he said because he spoke quickly and with an accent, BUT they really liked that he was from South America. That made a connection for them!

- Structures/Shelters, 30 minutes:
  The kids are investigating how to build the best economical green building. They are studying and researching conservation of resources. The kids were given a challenge to design a sustainable structure. This design needs to conserve resources and make the best use of all materials used in the building. This program gave the kids ideas of how to complete research to present findings to the class and myself. Their goal was to convince a city council to invest in building their sustainable structure. The kids had a high interest in the video as always. These are appealing to them because there are kids on the videos that are similar to them and they show them using materials that are accessible to the kids. This video fit in perfectly with the timing of the lesson. I will need to see the results of the students' projects before I make a decision on how to use this DVD differently.

- Structures, 30 minutes:
  The kids were given a challenge to design a sustainable structure. This design needs to conserve resources and make the best use of all materials used in the building. This program gave the kids ideas of how to complete research to present findings to the class and myself. Their goal was to convince a city council to invest in building their sustainable structure. The kids had a high interest in the video as always. These are appealing to them because there are kids on the videos that are similar to them and they show them using materials that are accessible to the kids.

- Space/Coconauts, 30 minutes:
  We had studied space earlier this year and I wanted the kids to see the experiment with the coconuts in space. The kids had studied the earth, sun and moon earlier in the year. I wanted them to make connections from earlier lessons with what they saw in the video. We had made a model of the sun and planets earlier. Students had researched the moon and we compared the characteristics of the moon with the characteristics of the sun. They were excited about the "Coconauts" and wanted to know if they could do experiments like the ones they have seen. We have the NASA

Balloon Base here in Palestine and the kids are interested in doing some experiments with the facility in the future.

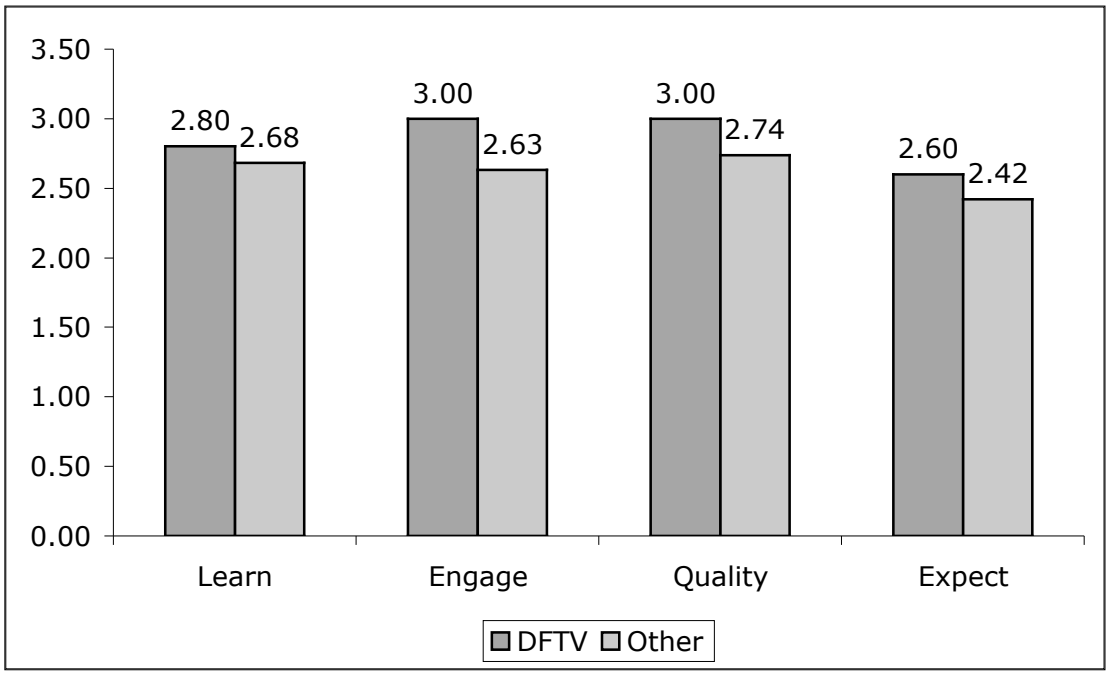
- Games: 30 minutes:
  Trying to get my physics in sports unit finished up and saw this DVD. Thought it would be a great addition. It was! I don't have the time to preview videos/dvds. I just showed it to my first class (my homeroom) and that's my preview. What my students say about it and what I glean from it helps me in the next two classes. They love these shows! They remain enthralled with each of them. All three of my classes are as quiet as church mice when the dvd is on. Before I show it next year I'm going to have purchased the WaterBall gun to show them how to shoot the balls of water. Think I enjoyed that part as much if not more than my students!

- 3001 Games: 20 minutes:
  First, we began by talking about the fact that there are actual careers in gaming and game design. Next, we brainstormed types of games i.e. guessing, strategy, word games , luck, etc.
  We then watched the film. For the first segment on basketball, we talked about the mechanics of trajectory. The film looked at different shooting styles but we were able to discuss the physics of the sport.
  The second part on midway games allowed us to talk about the way that such games are often rigged and the need to understand HOW the midway depends on "rubes" to take in money.
  After watching and discussing we decided that we would try our hands at game design at our next meeting in two days.

- Technology I, 30 minutes:
  We've begun our study of energy (we had reviewed electricity and kinetic and potential energy in preparation for the state testing but this is the real study now)and the different energy sources (solar powered and the Lego rovers) in the Tech I show were perfect for what we're discussing.

- Season 3 Malformed Frogs, 10 minutes:
  I had the students go through the scientific method while watching the video. They filled out a report as if they were doing the experiment. They liked it and it was very easy to follow for them.

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:

The following section summarizes teachers' responses to the added questions to the week three log. The extra questions for this week focused on what teachers thought specifically about the *DragonflyTV* resources that they had been given.

The *DragonflyTV* resources have been easy to incorporate into my lessons.

0 *SD=Strongly Disagree,*
2 *D=Disagree,*
5 *N=Neutral,*
3 *A=Agree,*
3 *SA=Strongly Agree*
Average: 3.54

Please elaborate on your answer. (why/why not?)

Respondents who said "Agree" or "Strongly Agree":

- The ones that apply to our curriculum at this time have been easy to use and I can see that others will work next year. We have an integrated curriculum. Many of the segments will be used during a full year of study.
- I teach science to three classes and **the Dragonfly episodes go right along with what I'm doing. Actually they expand from what I have.**
- they are simple short clips that either enhance a topic in my class or introduce a

topic and **get the students interested in learning more**.
- The video segments fit perfectly with my Science and Social Studies lessons. They are interesting and **keep my students engaged in learning**.
- The DVD's have a variety of topics that **apply directly to the Ohio standards at my grade level.** Even though I have taught some of these topics earlier the kids are completing projects or are being assigned new projects and inquiry questions/essential questions. **The DVD's present real kiddos that appeal to the students in my class**. They are quickly observing how to do things and are **gaining insight on different types of technology**.
- I was able to **find the segment easily** and used it to show the scientific process

Respondents who were neutral or did not feel that the *DragonflyTV* resources had been easy to incorporate into their lessons commented mostly on the types of content or topics presented in the programs. Specific responses are summarized below.

Respondents who said "Neutral":
- The segments are great but not always as content driven as I would like. I need to spend more time at the web site but I am hoping there are links to show related content. **For some of my hardened urban 8th graders the programming is a little too "nice" though I see the edgy production values clearly**. The 6th and 7th graders enjoy the material much more
- **There aren't as many life science/biology type lessons** relevant to what we are currently studying...we are studying human body systems right now--specifically the respiratory system.
- **Not many are involved with the Earth science** unit I am teaching

Respondents who said "Disagree":
- There were no Dragonfly TV videos that correlated with the **topics** that we were discussing this week.
- I've found I few things for 6th grade, but I mostly teach 8th grade. Right now we are doing **chemistry** and there doesn't seem to be anything that would fit or enhance my curriculum. The DFTV episodes I'd use with 8th graders would go with physics (I teach that first) or astronomy (I teach last). The majority of the episodes seemed geared towards life science.

What would help you to make better use of the DFTV resources you were sent?

Content/Topics
- Continue the variety, so we can continue to incorporate the segments into the curriculum.
- Maybe a higher number of life science topics...
- To have video topics on fossils or geologic time.
- I need to move to a different area of my curriculum.

Teacher Resources

- **REPRODUCABLE PAGES!** I know that it is asking a lot but it would be good if there was a little more intensive reading content. This would activate a third "intelligence". **Group and individual reading exercises can really reinforce video programming in a deep way**! The problem is that someone needs to write it.....
- More in depth **lesson plans with additional worksheets**, longer videos with better descriptions about what is covered in the videos. Some of the titles are deceiving and the topics may not be what I expect when I have the students watch them.
- A more traditional **lesson plan** format for each episode.
- Next year I will be able to implement many of the DVD's at key points in the instruction. I am connecting websites to the information that is presented in the clips. If the short printouts would include **connecting web sites** that would be fabulous. Presently, I am doing research through the Ohio Resource Center to get these connections.

Week Four Log Data

April 3-7, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher E	Technology II	30	DVD
Teacher N	Speed (w/ 2 classes)	30	DVD
Teacher A	Air	30	DVD
Teacher E	Sound	NS	DVD
Teacher J	Habitats/Malformed Frogs	10	DVD
Teacher M	Sound/Hip Hop	10	DVD
Teacher Q	Rocks/Climbing	15	DVD
Teacher C	Forensics	45	DVD
Teacher F	Habitat	30	DVD
Teacher L	Weather/F-Scale	8	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Air Aware	25	DVD
Teacher B	Earth's Crust	NS	VHS
Teacher C	Bacteria	45	VHA
Teacher D	World of Fungi	20	Stream
Teacher F	Erosion and Weathering	NS	NS
Teacher G	OT: They Made America	50	DVD
Teacher H	Real World Science	22	Stream
Teacher J	Life Science: Charles Darwin	15	Stream
Teacher L	Blue Planet	50	VHS
Teacher M	OT: Always Changing	21	DVD
Teacher O	Periodic Table	20	VHS
Teacher Q	Volcanoes of the Deep	45	DVD
Teacher B	OT: Writing on the Wall	NS	NS
Teacher C	OT:?	30	VHS
Teacher D	Protist and Fungi	7	Stream
Teacher F	Blue Man Group	NS	NS
Teacher G	OT:?	50	DVD
Teacher L	Erin Brochovich	135	VHS
Teacher O	Ring of Fire	50	VHS
Teacher B	OT: Body Hygiene	NS	NS
Teacher L	Bill Nye	30	VHS
Teacher F	OT: Colliseum	NS	NS
Teacher L	Raging Plane	25	VHS

Teachers' *DragonflyTV* Comments:

- Air, 30 minutes:
  [I chose this segment because of] standards alignment for 7th grade in Ohio. I prepped the students by reading the segment overviews and had them answer 2 questions about the Lonnie Johnson in the "scientist" segment. They were very excited about the Lonnie Jonson scientist segment and the water soaker. However, this episode featured younger children and my 7th grade students faded in and out of interest. [In the future I would] use only the "scientist" segment from this episode.

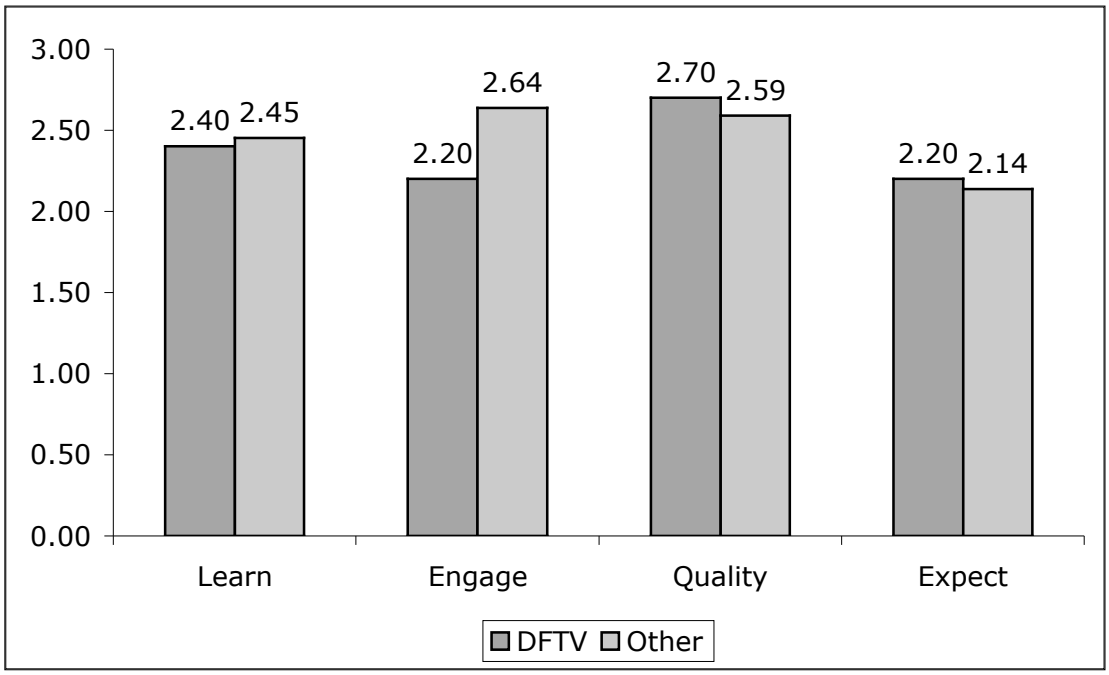
- Habitats – Malformed Frogs, 10 minutes:
  We had been talking about mutations, and this segment had a great example of malformations in frogs. This was used as support to our mutation discussion. [The students] loved it!

- Habitats 3010, 30 minutes:
  Used as intro to unit on life processes. Watched all the way through. Then short lecture on Biomes with note taking

- Sound – Hip Hop, 10 minutes:
  Had students identify the Question(s), Hypotheses, procedures, data collection techniques, results and conclusions the girls made. Students were very enthused. They commented how much they liked it. Were interested in the dancing and the age of the kids in video was appealing to them. In the future: we'd try the experiment ourselves.

- Weather – F-Scale, 8 minutes:
  We are completing a chapter on the weather. [The video] helped to reinforce and review how damaging tornadoes are and how they are measured. I compared this to how we on the East coast measure hurricanes. We also made our own tornado tubes. SO this tied in nicely. [The students] liked it but were hoping for more video footage of the various kinds of tornadoes. Do differently in the future: Explain to them that this also shows how a scientist may recreate tornadoes in the lab to study them.

***DragonflyTV* Segments Compared to Other Programs**



Reponses to weekly questions:

Responses to the additional questions for the week (focusing on ease-of-using *DragonflyTV* and other video resources) are summarized below.

Please indicate your level of agreement with each of the following statements:

1) The *DragonflyTV* DVDs are user-friendly.

0 *SD=Strongly Disagree,*
0 *D=Disagree,*
0 *N=Neutral,*
2 *A=Agree,*
16 *SA=Strongly Agree*
Average: 4.89

2) I am comfortable with using streaming video as an alternative to DVDs or VHS tapes.

1*SD=Strongly Disagree,*
3 *D=Disagree,*
4 *N=Neutral,*
4 *A=Agree,*
6 *SA=Strongly Agree*
Average: 3.61

3) I have the technical capability to use streaming video as an alternative to

DVDs or VHS tapes.

0*SD=Strongly Disagree,*
4 *D=Disagree,*
4 *N=Neutral,*
4 *A=Agree,*
6 *SA=Strongly Agree*
Average: 3.67

Have you looked at any of the additional resources and videos available on the *DragonflyTV* website?

6 Yes
12 No

Have you used any of the additional resources and videos available on the *DragonflyTV* website?

4 Yes
13 No

What are the advantages of using streaming video en lieu of (or in addition to) DVDs or VHS tapes?

- No hard copy needed.
- Easy to pick just the clips you want and play, can save to a **play list** for easy reference.
- Easy **access** when I need it.
- More **topics** are available and a **search feature** is available for United Streaming.
- up to date, **variety**
- Quick, easy , **volumes of short clips** to show students.
- Very short, to the point and you **don't have to fast forward** to get to the part that you want
- less media to keep track of or get damaged; easy access and **organization**; usually searchable by topic
- It depends on the stream. With United Streaming you can **advance section by section.** The stream will stop every three minutes or so if you do it that way and the class can discuss. Most DVD's do this as well. VHS DOES NOT!
- Teacher can look up what they need and download it the night before, **don't have to purchase or order** from a central media library.

What are the disadvantages or challenges of using streaming video en lieu of (or in addition to) DVDs or VHS tape?

- School **firewall** and **projector availability**.
- not every category has a lot of **clips** to pick from
- The reason I can't use it now...not enough **bandwidth** and elementary schools in my county are at the bottom of the food chain so there's no rush to help us out (because all we do is play).
- They cannot be used as easily in my absence. **DVD's are easier to leave for a**

substitute to use.

- Getting the equipment **and setting it up.**
- The biggest problem with Streaming is SOMETIMES IT IS **GLITCHY**! Then the server goes down or some goblin gets in the machine it can be very bad!
- limited technology or limited access to streaming
- **previewing** available material **(Too much content)**
- Our connection at school is really bad. I think if everyone was using it, it would be really **slow**. Our school is also WAY behind with technology.
- I would think that one disadvantage would be if the **website is down** for when you want to use it in the classroom.
- Takes **long time to download**, even with a high speed connection. Need to be able to burn saved files to DVD to show on a TV because few people have LCD projectors to hook up to their computers.

Week Five Log Data

April 10-14, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher K	Weather/F-Scale	10	DVD
Teacher N	Wind	30	DVD
Teacher A	Weather/Tornadoes	15	DVD
Teacher E	Flight	30	DVD
Teacher E	Propulsion	30	DVD
Teacher M	Human Body/Memory	10	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Inquiring Minds	11	VHS
Teacher B	BN: Rocks and Soil	NS	VHS
Teacher E	BN: Electrical Currents	25	VHS
Teacher H	Magic School Bus	25	DVD
Teacher J	Measurement	20	Stream
Teacher T	City Boy	NS	VHS
Teacher M	OT: Girl to Woman	26	VHS
Teacher O	Eyewitness Volcano	30	VHS
Teacher Q	States of Matter	20	VHS
Teacher R	OT: How to say no	30	VHS
Teacher S	BN: Blood and Circulation	30	VHS
Teacher B	OT: Writing on the Wall	NS	VHS
Teacher M	OT: Boy to Man	28	VHS
Teacher R	OT: How to say no	30	VHS
Teacher S	BN: Blood and Circulation	30	VHS

Teachers' *DragonflyTV* Comments:

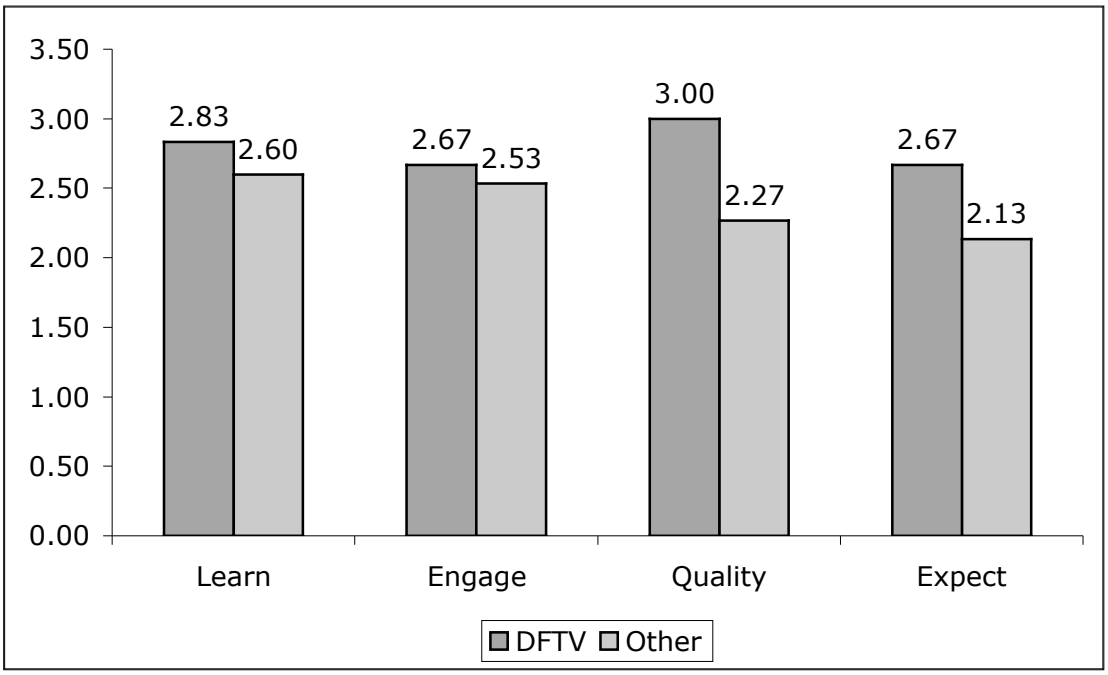
- Flight, 30 minutes:
  Starting unit on Flight....wonderful segue into it! We began making paper airplanes with modifications right after the dvd was shown.

- Weather,15 minutes:
  I chose this program segments due to its alignment with Ohio Standards. I used this video to connect the "air pressure" unit to tornadoes since we are entering the season! I am finding that some segments in each program feature students much younger than my 7th graders and that is causing a credibility/attention issue. In this show, I skipped segments where it was obvious that the featured students were much younger than 12-13. Students liked tornadoes and the scientist segment and the segments with similar aged students really helped the students focus! Do differently in the future: I might have the students practice the tornado safety drill before the lesson/DVD begins---a fun safety hook!

- Human Body – Exercise and Memory, 10 minutes:
  [I chose this video because it] relates to scientific method learning and to discussions of learning and the brain we are currently studying. [Had students] Identify the question, hypothesis and methods of the girl's experiment. [Students] Enjoyed, interested and wanted to try it themselves. Do differently in the future: Assemble objects and have student try it right after the video.

- Wind, 30 minutes:
  We did paper airplanes outdoors and it was very windy. Compared the medium of air to water and studied the kite unit and made a compare/contrast chart on our study. [The students] loved it.

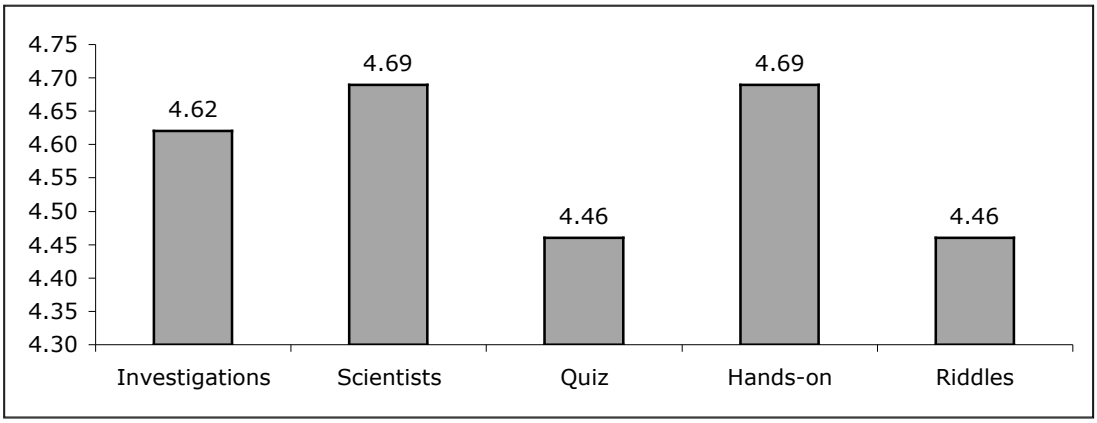
DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:

Based on the *DragonflyTV* programs that you've seen so far, please rate each of the following regular components of the show using a 1-5 scale where 1 is "don't like it at all" and 5 is "like it a lot":

	1	2	3	4	5	Average
1. Investigations that the featured children do	0	0	0	5	8	4.62
2. Scientist Profiles	0	0	1	2	10	4.69
3. Sort Quiz Segments	0	0	0	7	6	4.46
4. Examples of hands-on science experiments	0	0	0	4	9	4.69
5. Riddles/Questions at the beginning of the program (answered at the end)	0	0	1	5	7	4.46



Please explain why you like the components of the *DragonflyTV* programs that you rated highest.

- I like to show my students as many examples of **students doing real-life, hands-on experiments.** Dragonfly TV has great examples of these. Dragonfly TV shows students coming up with questions and carrying out the experiments themselves. It shows the that **students can be scientists too**.
- I like for my class to **see real kids DOING REAL SCIENCE!** It helps me encourage them to get involved in what they are studying in science and to see the relevance of what we are studying. It gives the kids ownership of their studies and increases their interest in science.
- The investigations show students that **doing science can be fun**, and helps them **identify/ learn the steps in an investigation**.
- They are **kid-oriented** and they understand them in a logical way.
- I think they are well done, at a pace that isn't slow and boring, but not too fast to understand, have **kids their age**, and a variety of things to keep their interest. The background music is good and current, and it also provides some humor for the kids.
- The kids are taken with the DVD's. **They see kids about their age that are engaged in problem solving situations**. The kids like this because they are taught in that manner. They want to be actively engaged.
- The investigations that the children do really follow the **problem solving procedures** for a science investigation. **The children are truly interested in gathering data and looking at results.**

- They are all very **engaging** for the students. They love it! This makes my job easier. They tend to **retain more**. They will say "Remember when..." a lot and refer to the video.
- The programs give them some structure/ideas with which to start. Sometimes that is the most difficult part for the kiddos. Once they see how a problem can be approached they are willing to try other ideas. They also sometimes just need a model from which to base their thinking. The kids came back to the rockets DVD's many times this spring. **I was very surprised with the details they caught from the DVD's.**

- Applicability to the unit I am teaching. I marked segments that I will be able to use at different times for other units of study. Right now for chemistry there are limited topics I can use.

Please explain what you didn't like about the components you rated lowest.
Riddles
- The riddles seem disconnected and almost trivial. A riddle is similar to a joke in the minds of a 12-13 year old.
- The riddles are okay...but sometimes it seems by the time the answers have been given you've forgotten the question. This is coming from an old teacher's perspective...not my young nubile-minded children.

Scientist Profiles
- Sometimes I think the scientist profiles could be more in-depth and longer segments. And the riddles/question segments are sometimes too easy for my sixth grade students.

Investigations
- Sometimes the experiments were shown so fast it was hard for students to understand the concept. But it was a good way to introduce an experiment and try it in class. Some of the experiments we couldn't do because we don't have the equipment.

Quiz
- The quiz segments can sometimes be frustrating for them because at times they need more processing time to figure out the answer. Next year I will be able to pace the videos throughout the year and will be able to put in a break so the kids can have the processing time.

General
- I haven't seen a lot of ethnic variety in the children. I would like there to be more diversity.
- Sometimes the level of the presentation is too young for 8th grade.

Week Six Log Data

April 17-21, 2006

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Science Fiction/Raindrops	2	DVD
Teacher E	Rocks	30	DVD
Teacher H	Human Body/Martial Arts	12	DVD
Teacher T	Animal Behavior	30	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher B	Erosion and Weathering	NS	VHS
Teacher D	World of Protists	20	Stream
Teacher G	OT: They Made America	45	DVD
Teacher J	March of the Penguins	80	DVD
Teacher M	OT: American Revolution	40	DVD
Teacher R	Smith Mountain	40	DVD
Teacher S	Insects: See how they grow	30	VHS
Teacher A	Storm Stories	15	DVD
Teacher B	OT: Civil Rights	NS	VHS
Teacher D	Killer Alage	5	Stream
Teacher E	Narnia	NS	DVD
Teacher T	OT: The Mighty Pawns	58	VHS
Teacher M	The Living Cell	20	Stream
Teacher R	OT	40	DVD
Teacher S	BN: Blood and Circulation	30	VHS
Teacher B	OT: Many Voices	NS	DVD

Up until this point we were struggling to get timely logbook entries completed by participants. To combat this problem we announced a drawing for a $20 Amazon.com gift certificate as an incentive for this week's logbook entry. We found this incentive to be an effective motivator for timely responses with thirteen respondents replying by Monday April 24th. We continued this incentive program though the end of the study.

Teachers' *DragonflyTV* Comments:

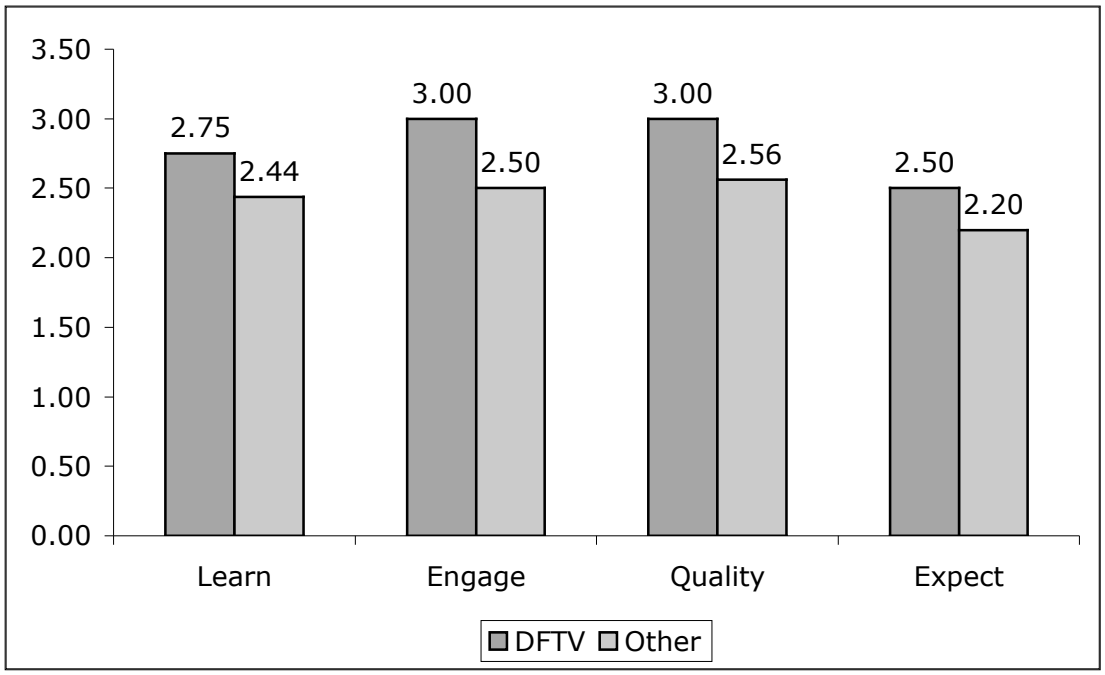
- Science Fiction, 2 minutes:
  To set up science fact vs science fiction(misconceptions) for an upcoming unit. I asked several students to draw a raindrop on the board. Every student drew a teardrop shape--a science misconception. I then prompted the students to look for the 3 shapes that raindrops really are and then showed the DVD clip. [Students were] amazed!

- Rocks, 30 minutes:
  In the teacher notes there was a bit about the weight of rocks changing when immersed in water. Seeing as we're beginning the study of matter (and changes in matter) I thought it would be applicable.

- 1013 Human Body – Martial Arts I/II, 12 minutes:
  It correlated to a scientific investigation we are doing with heart rate and exercise. We viewed the program as an example of conducting a scientific inquiry and experimentation. Students enjoyed this program esp. the action shots. Do differently in the future: maybe stop and review scientific method as the program was shown.

- Animal Behavior II, 30 minutes:
  My students were interested in penguin after a class discussion about penguins and the movie "The March of the Penguins." We have studied animal behaviors in science and the students often observe our class aquarium which contains a gold fish, a red-ear slider turtle and snails. They often talk about the animal behaviors in the tank as they compete for space and food. I felt that the 3007/Animal Behavior II DVD would give the students a better understanding of different animal behaviors. The aquarium in the classroom is in the science center and most of the time students just sit and observe and discuss their observations. Some students draw what they see or write their observations in a personal journal. I asked the students to compare the animal behaviors from the DVD with the animals they observe in the classroom or at home. How are they alike and how are they are different. The students have the theme song memorized and can't wait for the next DVD. They really enjoy the shows! If I had more time with my class I would have them research their favorite animals and find out the behaviors of that animal. Do differently in the future: I would go a lot further with the research.

***DragonflyTV* Segments Compared to Other Programs**



Responses to weekly questions:

1) Have other teachers borrowed videos from you since this study began?

7 Yes
8 No

2) Have you shared your video-based lessons with other teachers since this study began?

10 Yes
5 No

3) What comments or requests related to video usage have other teachers shared with you since this study began?

- The other 7th grade science teacher is anxious to use Dragonfly TV as soon as her student teacher finishes.
- There's only one other person who would be able to use these videos and that's the other science teacher on my grade level. She's not seemed interested. The problem with being in the highest grade is that if I share it with the other grades then the kids when I get them say, "I've already seen this." and miss out on any potential learning.
- I am making a list that will coincide with other science topics. I want to be able to align the videos with FOSS kits and other science resources people use through

out the school! They are not only aligned with the grade standards but also with lesson we are already doing. **The videos are a great resource for kids to apply concepts they are leaning to real life activities.**

- My 6th grade colleague was asking me if I had any equipment, videos or activities on earth science and/or force and motion. I gave her some toys I have for force and motion and shared the Dragonfly DVD's and teacher guides that would cover the topics she was looking for: skateboarding, model airplanes & rockets, soccer, yo-yos, hovercraft.
- 6th grade science teacher showed an earth science segment and commented that his students were attentive and engaged.
- I told everyone in my department about the DVDs and copied the index listing for them. They seemed excited, but no one has asked to borrow any. We have a large dept. video library and a check out system. Most have worksheets or lessons and I think **at this point in the year they don't have time to design something new. When I gave them something I made last year, they did use the DFTV sample that I had received.** I have a feeling that as I move to use them more and share what I've already developed, they will use them too.
- All of the teachers are highly interested in using the DVD's. The use of these was brought up in our district science meeting. The teachers like having the resource available when they need it and l**ike being able to highlight the sections they want to teach from for the day.**
- **Special Needs Students:** I have let our autism class use them and they like them, they do not do any paper work with them but they enjoy watching them

Week Seven Log Data

April 24-29

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher D	Structures	30	DVD
Teacher I	Plants/Kelp	30	DVD
Teacher N	Earth Explorers	30	DVD
Teacher N	Engineering	30	DVD
Teacher R	Games	30	DVD
Teacher D	Structures/Engineering	30	DVD
Teacher A	Hurricanes/Scientist Profile	5	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	The Day After Tomorrow	23	DVD
Teacher B	All About Rocks	NS	VHS
Teacher E	BN: Phases of Matter	26	VHS
Teacher H	Heart and Circulatory System	15	Stream
Teacher J	Physical Science	18	Stream
Teacher L	Tornadoes	30	VHS
Teacher M	OT: American Revolution	20	VHS
Teacher O	BN: Chemical Reactions	30	DVD
Teacher Q	Chemical Building Blocks	3	VHS
Teacher A	The Day After Tomorrow, cont.	28	DVD
Teacher B	Formation of the Continents	NS	VHS
Teacher E	BN: Chemical Changes	NS	VHS
Teacher L	Sharks	60	VHS
Teacher M	Human Reproduction	23	Stream
Teacher O	Prentice Hall: Designing Fireworks	3	VHS
Teacher A	The Day After Tomorrow, cont.	28	DVD
Teacher L	BN: Space Exploration	30	VHS
Teacher O	Prentice Hall: Endo/Exothermic Reactions	3	VHS

Teachers' *DragonflyTV* Comments

Only six teachers showed *DragonflyTV* this week. Four showed whole episodes (two teachers showed two whole episodes). The sixth teacher showed a five minute clip. We continued to stress the importance of showing at least one *DragonflyTV* segment each week during the study but we found that by the mid point we were typically seeing just under half of the teachers doing so consistently.

- Structures, 30 minutes:
  We talked about different types before hand, had them think outside the box and then see if it was shown. We were amazed by the snow hut (we live in Las Vegas).

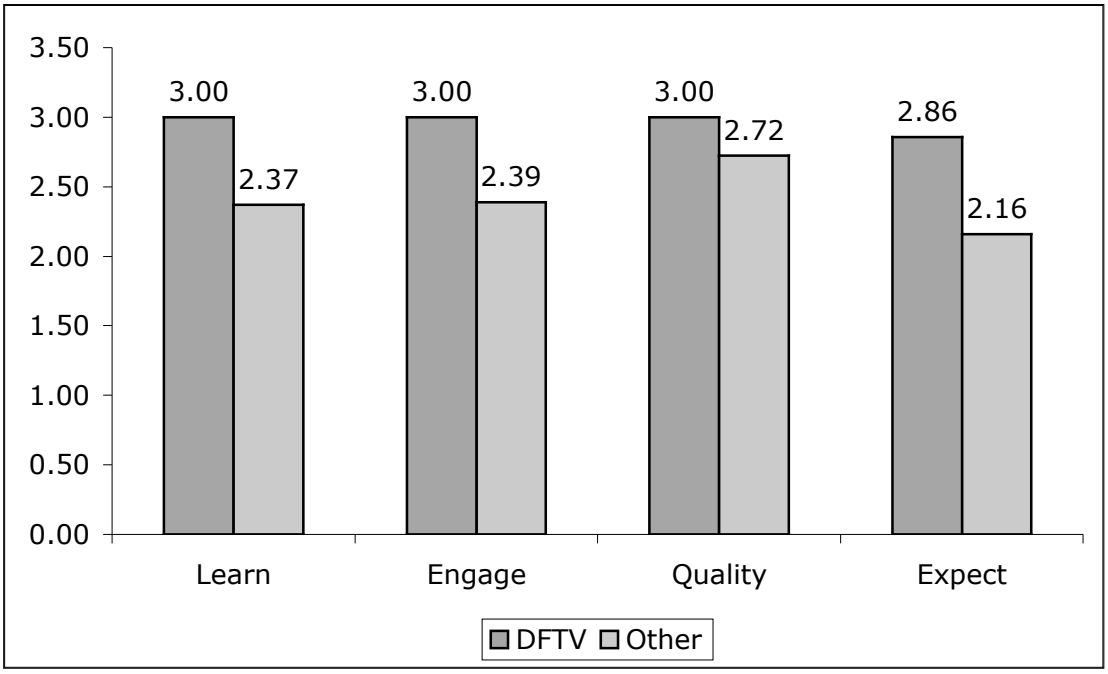
- Plants, 30 minutes:
  They learned about the Kelp Forest, Everglades, and leaves. They looked at different environmental factors they influence the plants and animals that are part of the habitat. Our 5/6 graders are getting ready to go on an environmental trip. We have been looking at our environment and how each animal is part of a larger web. When one thing is missing it throws off the entire ecosystem. The students looked at the virus stories in the video and talked about the balance of nature and how the balance can be thrown off. The students than thought of examples from our own environment and how it can be affected both positively and negatively. Again, they really get a lot out of the dragonfly videos. They look forward to watching a video. It brings the points home...so to speak. I will be more intentional on how I use the videos in the years to come.

- Earth Explorers, 30 minutes:
  We did the diving tube lab and a field trip to look for sinkholes by the creek. My kids loved this DVD.

- Engineering, 30 minutes:
  This covered hovercraft and milk carton derby. In the 6-7 we concentrated on the moving water, our study topic this week. [The students] loved it.

- Games – Shooting Baskets, 30 minutes:
  Kids were developing toys/inventions. They were investigating how to make more accurate shots on the basketball court and playing carnival games. This was a great program to play with for the data that is being gathered on how closely the kid's thinking, in the room, compare with the kid's thinking on the video. The kids then asked to have time to try and invent their own toys/games. Kids were shown the first part of the video [Inquiry Worksheet was used]. This worked out wonderfully. It follows the philosophy of developing deep comprehension using a video. The kid's papers were collected and then they were given the opportunity to watch the rest of the video to see if their strategies matched. Kids are always highly interested in these programs. Lots of discussion and they build their ideas on what they have seen.

***DragonflyTV* Segments Compared to Other Programs**



Responses to weekly questions:

The questions that we asked participants during week 7 focused on pedagogy and the types of assignments that were used in conjunction with video programming. Based on their responses to previous logbook entries we already had an idea of how videos were being used (this information helped us to create our set of questions), but we wanted teachers to offer some personal reflections as well.

1) Which of the following do you typically prefer:

	Number (%)
Playing an entire video program from start to finish during a single class session:	9 (53%)
Playing an entire video program, broken up over the course of more than one class session:	3 (18%)
Playing only certain segments of a longer video program	5 (30%)

2) What do you do/have students do in class while a video is beings shown: (Never=1, Sometimes=2, Always=3)

	Never	Sometimes	Always	Average
a) Take notes on their own	3	11	3	2.00
b) Complete a worksheet (or guided note-taking	2	14	1	1.94
c) Pause the program for discussion	0	9	8	2.47

3) What do you have students do outside of the viewing experience?

	Never	Sometimes	Always	Average
a) Complete a worksheet	5	12	0	1.71
b) Take a quiz or test on program content	3	13	0	1.94
c) Do a reflection paper or other writing assignment	1	13	2	2.06
d) Do a larger, multi-part project	2	13	1	1.94
e) Look up information (online, at the library, etc.)	6	8	2	1.75

4) Is there anything else that you do or have students do before, during or after a video viewing experience?

Question of the day that will bring up back ground knowledge **before** starting
Compare to a chapter read in textbook.
Talk about how the topic relates to their life
Discuss with partner, in small groups and with whole class
Discussion develops the kid's deep understanding of the material being seen. When they talk with each other they develop their own ideas to a greater depth.
Sometimes I'll give them particular things I want them to **look** for.
For educational videos I seldom if ever show anything that lasts longer than 30 minutes....in fact I don't remember the last time I showed anything longer that a Bill Nye or DFTV. Almost always the videos I use support what I'm teaching...usually used as an introduction to a concept/topic. Sometimes I use it only after my students have learned the vocabulary and basic concepts. The video helps them to understand what they've read in the text.

Week Eight Log Data

May 1-5

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher J	Hot Air Balloon	8	DVD
Teacher M	Plants/Leaves	10	DVD
Teacher N	Space and Astronomy (3012)	30	DVD
Teacher Q	Structures/Snow and Straw	20	DVD
Teacher R	Whitewater Rafting (3006)	30	DVD
Teacher D	Sport Science/Wake Boarding	30	DVD
Teacher J	Structures/Snow (2002)	15	DVD
Teacher A	Plants in Space/Scientist	3	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Sites Unseen: The Crib	3	DVD
Teacher D	Genes/DNA	25	Stream
Teacher F	Mixtures and Solutions	NS	Stream
Teacher H	BN: Circulation	25	VHS
Teacher L	BN: Seasons	30	VHS
Teacher S	Medieval Seige	39	DVD
Teacher A	Wally Waterdrop	23	DVD
Teacher F	Roller Coaster Physics	NS	Stream
Teacher L	The Expanding Universe	30	VHS
Teacher M	OT: THE American Revolution	20	VHS
Teacher F	Roller Coaster Physics, cont.	NS	Stream
Teacher F	Mysterious Life of Caves	NS	VHS

Teachers' *DragonflyTV* Comments:
Seven teachers showed *DragonflyTV* during the 8th week. We saw a nice mix in terms of the length of different program segments that were shown.

- Air – Hot Air Balloon, 8 minutes:
  We're studying density and temperature. It was a good example of temperature's affect on density. [Students] were engaged and participated in the discussion afterwards, but it wasn't real clear in the video about the students' data and conclusions. There was some confusion among students. Do differently in the future: Discuss and explain more about the data in the video. Maybe even try graphing some examples of our own.

- Plants - Leaves, 10 minutes:
  This covered hovercraft and milk carton derby. In the 6-7 we concentrated on the moving water, our study topic this week. [The students] loved it.

- Space/Astronomy, 30 minutes:
  Chosen because it matched the 8th grade state standard. Video segments were shown intermittently between this week's projects and launching rockets. Students love it.

- 2002 Structures – Snow Shelter, 20 minutes:
  [Used] to emphasize properties of substance and reinforce scientific investigations. After the research question was identified the video was stopped, students worked in small groups to devise an experiment to answer the question. The video was shown. We discussed. They liked it, seventh grade much more enthusiastically than eighth. With the 7th grade I also had time to show the invention clip. We just finished an Invention Convention so they enjoyed seeing that. Do differently in the future: Show it in the winter so we could do some experiments with snow.

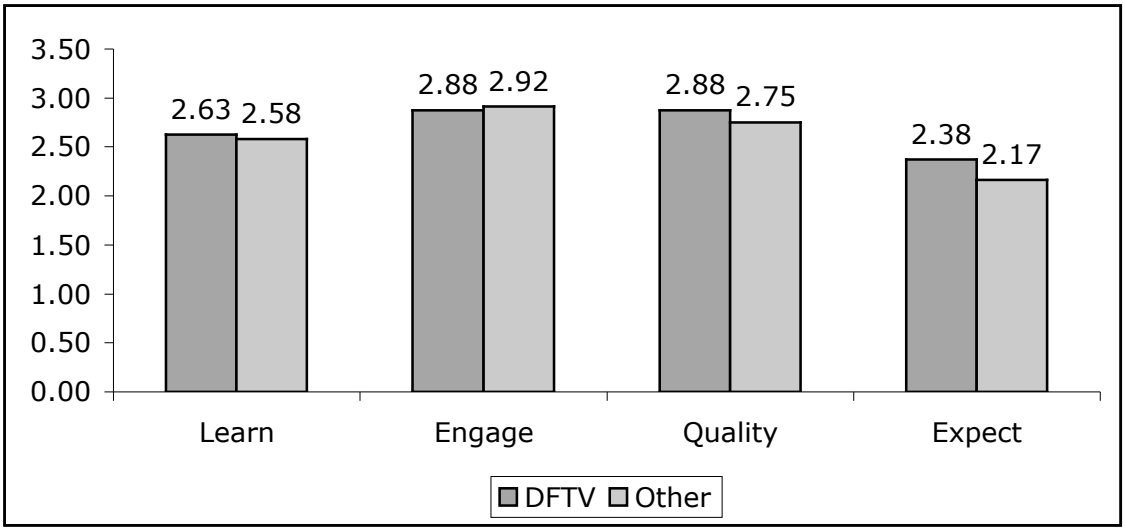
- Geography – Whitewater Rafting, 30 minutes:
  The classes are reading Down River by Hobbs. Many have not seen or experienced whitewater rafting. They watched to see if the character's decisions in the book were good decisions. This video was used in connection with a literature assignment. The kids researched what rafting/whitewater was and how the lay of the land can affect the flow of water. Kids followed up the video with research on the computer. Discussions also followed watching the video. High interest [among students] and the video created many questions from the kids. ***good example of interdisciplinary use.***

- Structures – Snow Shelter, 15 minutes:
  We have been discussing heat and temperature, so I felt that this would be a good real-life application example of temperature. It also helped us begin a discussion of matter - particles and empty (air) spaces. I had them do the Dragonfly TV Elements of Inquiry Worksheet with this video segment. Then we

discussed it as a class. They were amazed that the students slept in the quinzhee. They were engaged and I think they liked it.

- 1009 Scientist, 3 minutes:
  I am giving the students a lab on plants filtering pollution in water and the video mentions the process. Used to reinforce that plants filter water and to show an actual scientist practicing the concept. [Students were] Very attentive and interested.

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:
During the 8th week we asked participants questions about their previewing practices in response to the different trends teachers were reporting in interviews and logbook entries. Scores associated with each response, for data analysis purposes were as follows: 1=Never, 2=Rarely, 3=Occasionally, 4=Most of the Time, 5=Always.

	Never	Rarely	Occas-ionally	Most of the time	Always
1) How often do you preview videos before you show them in class?	0 (0%)	1 (6%)	1 (6%)	8 (50%)	6 (38%)

2) How much of the program do you typically preview?

0 Watch the entire program
0 Skim through the entire program
1 Skim through part of the program
7 Watch only the segments that I'm interested in
8 Don't typically preview

3) What do you look for or do when you preview a program?

- Content
- Ties to current content. Interesting, visuals that I can't easily produce myself in class
- Student level interest in terms of content
- I look for segments or ideas that we are addressing in class at the time. I also look for segments or ideas to use as a springboard for the class.
- connections or extensions to our current topic
- Currentness, interesting for kids, grade level appropriateness
- I want to see if they are speaking slow enough so that the students can understand, that they just don't show concept after concept but put some depth into a few concepts (so the kids don't get over loaded), if it shows things I wouldn't or don't do in my class already, that it relates to what we are studying, and that it shows good science/scientific method being modeled in one way or another. I take notes and/or write questions for my students to answer when they watch the video.

Week Nine Log Data

May 8-12

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Plants in Space/Scientist	5	DVD
Teacher I	Water Slides	30	DVD
Teacher K	Weather/Hurricane Scientist	10	DVD
Teacher N	Propulsion	30	DVD
Teacher R	Human Body II	30	DVD
Teacher B	Ecosystems	NS	DVD
Teacher O	Space/Astronomy (3012)	30	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher B	OT: Place at the Table	NS	NS
Teacher D	Brain Pop: Genetics	7	Stream
Teacher E	BN: Atom	26	VHS
Teacher F	Life of Mammals	NS	NS
Teacher J	Elements, Compounds and Atoms	17	Stream
Teacher L	Sun	15	VHS
Teacher O	NASA: Infrared	15	VHS
Teacher P	Science in Action	18	VHS
Teacher S	Medieval Siege	NS	NS
Teacher D	Brain Pop: Heredity	7	Stream
Teacher E	WKRP – Atom	NS	Stream
Teacher F	Life of Mammalls	NS	NS
Teacher J	Discover that Atom	15	Stream
Teacher L	BN: Moon	30	VHS
Teacher P	Magic School Bus: Seed	30	VHS
Teacher B	Biomes	NS	VHS
Teacher D	BP: Twins	7	Stream
Teacher F	Mammals	5-10	DVD
Teacher O	Pioson Dart Frogs	25	DVD
Teacher D	BP: Growth and Development	NS	Stream

BP: Brain Pop

Teachers' *DragonflyTV* Comments:

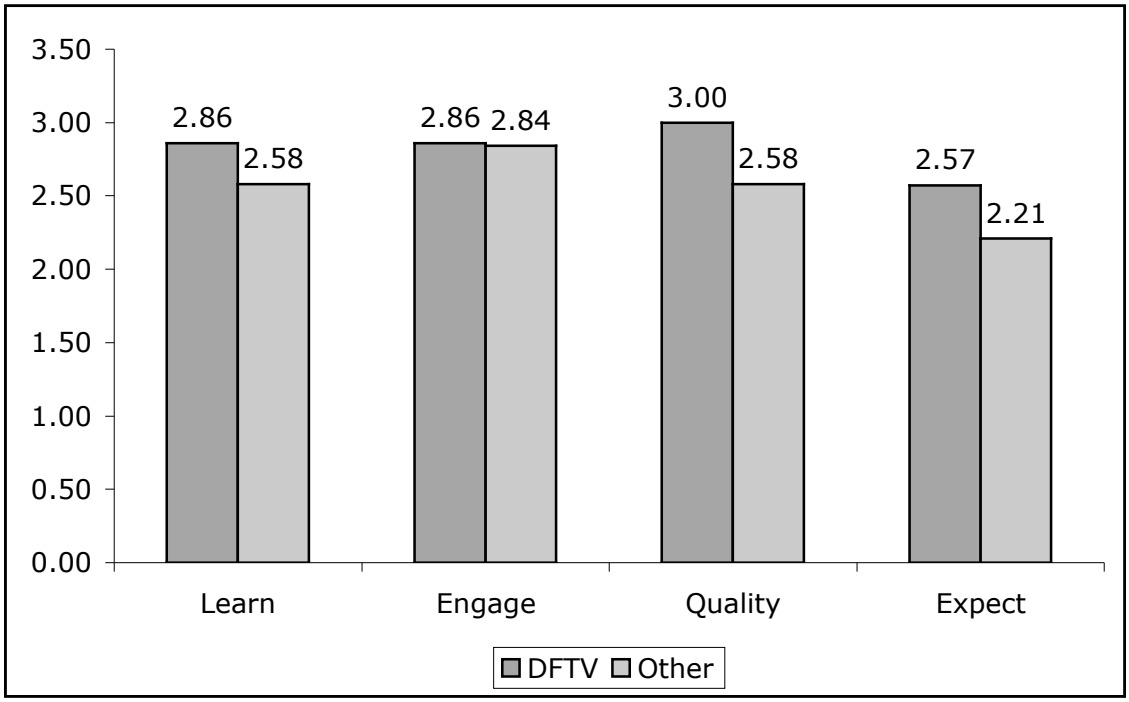
Seven teachers showed *DragonflyTV* during the 9th week.

- 1009 Plants – Scientist Profile, 5 minutes:
  The short segment was used to reinforce the concept that plants filter water and to show that scientists study that concept. The segment mentally prepared the students for our science experiment involving celery and water filtration. [Students were] very engaged and focused.

- Waterslides, 30 minutes
  It is summer and the students like water slides. I thought they would enjoy connecting science with "fun in the sun" activities. I wanted the students to identify the variables and what the students did to test their questions. The students are understanding the scientific process much better after watching the Dragonfly series. They enjoy seeing how the students use "fun" activities and make it into a scientific question. I am hoping they will also think of some cool science experiments.
  good example of real-world connection

- Human Body II, 30 minutes:
  UV testing with chemical colored water bottles, REM movement during spinning - what helps an individual to keep their balance, and career-ice cream developer, also wart removal myths. The kids are also taking aerobics in PE class and found the exercise/memory program interesting.
  The kids are developing their own ideas they would like to submit to DFTV. They are also developing ideas they would like tested in space by NASA. We tested UV beads from Educational Innovation earlier this year. It was interesting to see how similar their ideas were to test these ideas. Highly interested and many questions. A lot of talk about how you keep your balance when you are riding an amusement park ride. Is it the same kind of reaction with your eyes?

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:

During the 9th we asked teachers to reflect on their ability to integrate video effectively into their instruction.

1) Which of the following best describes your ability to integrate video programming into your classroom:

5: "I am able to fully, and effectively integrate video in my instruction."
12: "Sometimes my use of video is more integral to my instruction that it is at other times.
0: "Videos feel like an add-on most of the time, there is little tie-in to my instruction"

Based on what was observed, we felt that there were a handful of others who were fully and effectively integrating video programming into their instruction but did not self-report that this was the case.

2) What are the greatest challenges to integrating video more fully into your instruction?

Finding the Right Content

- Finding grade level/content level video and finding the time to hunt down the resources.
- Find ones that hit all that you want/need it to

- Finding appropriate materials and more time. Making it more meaningful.

Time:

- The greatest challenge in using video actually finding the time to include it as part of the curriculum. It takes time for me to find appropriate video, preview it, and create support material to go along with the video. It also takes up class time, when we already have a demanding curriculum.
- Knowing the resources that are available before doing the lesson. Time to plan out how the video will be part of the overall unit is key to success.
- We have 30 minutes a day to teach science therefore we have to stretch out a lesson from one video over the course of a week or so.
- Having the time to come up with worksheets that may go along with the video to determine if students understood all of the concepts.
- Time to search, review and download the videos.
- Finding appropriate level video and content tie-ins.

Technology/Equipment:

- Getting a working lcd projector for using the dvds. Our televisions are so old that you can't hook up dvd players to them. If I can't get the projector my greatest challenge is working with the television in my room that has a volume button that doesn't work (unless you've got the remote which seems to have legs); and a vcr that doesn't display the time so when a video has to rewound to a particular point I have to stand and watch the tv/vcr as the tape rewinds.
- The technology - I now have a laptop and an Epson projector to show DVD's

Administrative Constraints:

- Lack of enlightened administration and constraints of scripted science curriculum (FOSS) They have LOUSY video!!!
- availability of relevant content; time; not seen as an instructional tool by parents or administrators
- The administration calls it "Death by Video." I explained to them that because of the time constraints from testing and Spring Break that I needed to show videos.

Style of Use:

- The biggest challenge is knowing when and where to use the video for the most effective impact on the students. How the video is used if of great importance. The kids need to be taught to think and challenge themselves to compete against the kiddos on the video. Use of questions and types of questions used with the videos to get the greatest impact is the biggest challenge. Getting more practice as we go. Also knowing how much of the video to show to each group. This can be different depending on the skills of the kids in each class.

3) What are the greatest benefits of integrating video more thoroughly?

Appeals to Different Learning Styles – Helps Visual Learners:

- Helps visual learner.
- The outside photography and narration for the students to learn from another source.
- the students love to watch movies and enjoy the chance to learn in a different way
- Because kids are so visual and a well-made video that describes a science concept makes EVERYTHING more understandable.
- Engages kids. Repeats major concepts in a different voice. Can help guide questioning and instruction.
- The students are exposed to other ways of learning the material. some students are very visual and need a type of video to grasp the concepts. Videos are another way to reach students and their individual needs.
- The discussions that we have with students and the visual versus lecture or bookwork

Effectively Teach Difficult Concepts:

- Can show difficult concepts.
- students live in an electronic media world and are used to being entertained by tv or video games so video is a way of capturing their attention and showing concepts that otherwise couldn't be shown or demonstrated
- Benefits are that students may see something that is not possible to physically show them in the classroom. Especially real-life applications of science. It's also another way for students to learn, rather than reading it.
- That students see a topic that may be hard to explain or I might not be able to do a specific lab techniques because space and cost are prohibitive.
- More specific examples of concepts and events than can be shown through reading.
- Students definitely understand better and remember more when I am able to show a video segment. One Special Ed student especially will recall items from video.

Enforces Real-World – Science Connection:

- Brings a "real world" view into the classroom.
- Students can see things they can't see in the classroom and it is another way of them learning the material. It often shows real world applications to what we've been learning in class.
- Reinforces science concepts.
- The children enjoy and learn from the other students they see acting out and participating in the different activities shown on the DVDs. they have really gotten excited about science since they have been viewing the DVDs.
- The videos give the kiddos a great visual experience to relate to the concept we are investigating. It allows the kids to see other ways to set up an experiment and why data collection is very important. The scientific way of

thinking is constantly modeled and reinforced along with thinking out how to set up the experiment to get the best results. Being able to let the kids see the use of everyday items to problem solve is great.

Engagement
As echoed in many of the comments above:

- The kids are truly engaged

4) What are the top three things that teachers need to do or have to integrate video more effectively for instructional purposes?

Need to Have/Helps to Have:

Access to content and info about it:

- Easy accessibility
- Easily accessible indexes for videos that include age range, specific topics, curriculum standards, and length of video.
- Videos aligned by content standards.
- Summaries of videos, so that in case there is little time to preview it, then teachers could get the main idea of the video quickly.
- have quality videos
- access to an abundance of video material relevant to curriculum

Equipment and Technical Support:

- Have the proper equipment readily available and working.
- Access to up-to-date equipment.
- Have a tech person or librarian that makes sure that ALL of the projectors, tvs on carts with vcrs and dvd players are kept in working condition for the 50+ teachers in my school.
- Have access to quality video....ranked third because if you don't have the equipment to show it then it doesn't matter if you have 39 high quality science programs for kids on dvds that are screaming out to be played
- Have a projector so that the entire class can see

Time:

- Time/Flexible Schedules
- Time to plan
- time to watch all the choice and pick the ones they want
- Uninterrupted teaching times during the month, especially when you only see students once or twice a week. If the teacher is out the videos can be shown to enhance the teaching of the lesson. If the students are out or miss class they can't see the DVD or receive the instruction.

Professional Knowledge and Training:

- understanding of the grade standards and teaching content
- inservices on how to use them correctly, not just show a video
- Have the equipment and training to use it - many teachers are afraid of new technology

Support Materials:

- ideas of how to incorporate videos. Maybe examples of lessons and lesson plans that include videos
- Materials to supplement the video (i.e. worksheets, activity sheets, quizzes.)

Administrative support

Need to Do:

Select wisely:

- Choosing the right content
- make sure the content of the video ties in with the topic of study and reinforces or introduces concepts that are critical
- Video must be thoughtfully selected for content and quality. NEWER IS BETTER!
- Preview the video
- I only use applicable segments
- Use video to educate-----don't abuse video to kill time.
- Teachers must learn to make video an EXTENSION of their own voices, not a replacement for instruction
- Decide what parts of the video are going to be effective with the lesson that will be taught. Decide where in the lesson and when to show the video during class time. **(*Right content at the right time)**
- Use video as an interactive experience

Incorporate Interactive Elements:

- Hands on activities and lessons to complement what it shown on the video.
- stop the video and conduct lots of discussion
- I tend to stop the video at key points and ask students questions or clarify something that was explained.
- Give the kids time to process and talk about what they saw so that they develop the deeper comprehension of what took place on the video.
- Make sure kids have been set up to be successful when watching the video. Set up quality functioning questions. Set up an **inquiry/thinking approach** to the video.

Week Ten Log Data

May 15-19

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher K	Underwater/ROVs	30	DVD
Teacher L	Space/Astronomy/Mars (w/ 4 classes)	15	DVD
Teacher N	Spinning	30	DVD
Teacher O	Ecosystems	30	DVD
Teacher R	Human Body/Perception on Coasters	20	DVD
Teacher A	Ecosystems (Just for Fun)	25	DVD
Teacher L	Space/Astronomy/ Microgravity	10	DVD
Teacher B	Kelp and Weevils (109)	20	DVD
Teacher L	Sound/Hip Hop	10	DVD
Teacher L	Sound/Extreme Sounds	10	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Lake Erie Home Video	NS	VHS
Teacher B	Wildlife for Tomorrow	NS	VHS
Teacher E	Monsters Inc.	NS	VHS
Teacher G	Predators	30	DVD
Teacher H	BN: Bones and Muscles	25	VHS
Teacher J	Chemical Reactions	18	Stream
Teacher Q	Atoms and Elements	15	VHS
Teacher B	Protecting Endangered Animals	NS	VHS
Teacher J	The Busy Busy Planet	11	VHS
Teacher O	Prentice Hall: Bonding	3	VHS

Teachers' *DragonflyTV* Comments:

We saw a slight rise in the number of *DragonflyTV* segments being shown this week and a drop in the number of teachers showing entire programs – perhaps related to the inquiry exercise that they were asked to complete. A total of ten *DragonflyTV* programming segments were shown during the 10th week.

- Underwater – ROV, 30 mintues:
  I have been reading Pagoo by Holling Clancy Holling to my class. This brought the ocean to life. Many students have not been to the ocean. I showed the segment. I then read some of the book. We then, for the rest of the week, conducted an "experiment" on the depth of the ocean and mapped the seafloor. [The students enjoyed it] I think I will develop a whole unit around this lesson. I believe that I can do so much more with it. I think I will spend some of my time this summer doing that.

- Space/Astronomy – Mars, 15 minutes:
  Starting a final chapter on the planets. Wanted the video to discuss Mars but it really discussed how scientists are trying to find water on the planet using IR. Introduction to the planets and how astronomers study other planets besides telescopes, used a worksheet provided by DFTV. Students seemed to like the video. They were engaged and stimulated additional questions.

- Space/Astronomy – Microgravity, 10 minutes
  Thought it would be a nice connector to the space topics we have been discussing in class. [Students] thought it was cool because they wanted to see how you could try the experiment with other objects from different heights.

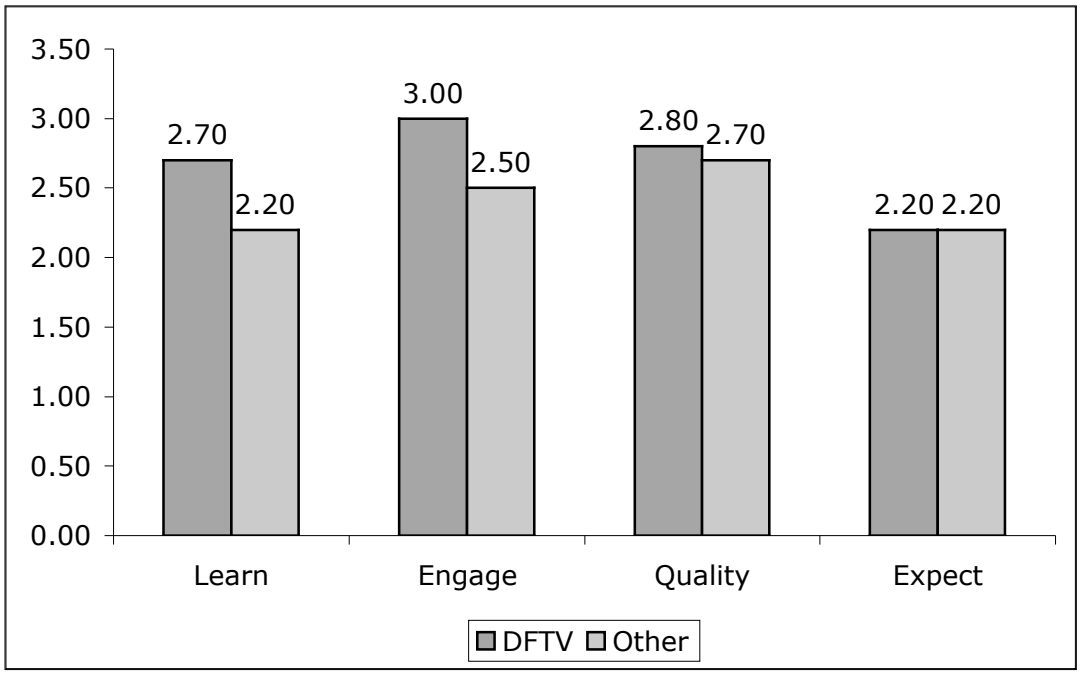
- Ecosystems – 30 minutes
  We did the DFTV investigation sheet. This time the kids were more able to answer the questions, but they still needed guidance. Most have never thought through how to do a good experiment before. [Students] liked it and found some of the sound effects to be funny!

- Ecosystems – 25 minutes
  We have visited ecosystems in many learning experiences throughout the year. Thought this episode would really "connect" with the kids. I wanted to the students to just "enjoy" the program. The school year is winding down and I want them to learn how to just enjoy a good science program. I hope that they watch Dragonfly TV and other programs relating to science over the summer. They enjoyed the episode. A quality show. Kids love the shows featuring animals!!!!

- Human Body – Perception, 20 minutes
  This program was chosen because I wanted to see if the kiddos would carry some of these questions with them on their trip to Kings Island. The chorus

*which includes almost the entire fifth grade attended a competition at Kings Island on May 20. They sing at 12 and are free to enjoy the park the rest of the day. I wanted to implant a few thoughts in their heads before leaving on the trip. I will catch info. from parents and teachers who attended the trip on the conversations that were had. I will also catch conversation from the kids. Kids were asked to rate rides using their pulse while at Kings Island. (This was a bonus assignment for anyone who completes it. It will be interesting to see the results. My prediction is most of the kids will have the data. The kids loved this one. They were getting ready to leave for their King Island trip on Saturday, May 20. They were hyped. It will be fun next year to require this assignment as a grade. I will ask the kids if it is feasible. If they felt like they were too distracted then I will rethink what to do with this assignment. The kids were still very tuned in to the video. We also have many soccer players so it was interesting to hear what they notice on a field while they are playing and what they don't notice**. ***Good real-world tie in example.***

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:
During the 10th week our questions focused on the *DragonflyTV* website and online teacher resources.

1) How often have you visited the *DragonflyTV* website since this study began?

3 At least once per week
0 A few times
7 Only once
2 Never

2) What did you do on the *DragonflyTV* website?

- Investigated Discover DFTV, Do It, Games, and explored the GPS site. The discussion site was nice. However, students at our school are unable to access this site with the internet blocks. I explored the sections and had the kids explore the sections to make recommendations for use next year. They were asked to explore what segments would have helped them to learn more and better with all sections.
- Mainly just searching around getting to know the site and looking for material to enhance the classroom. I think the web site is a wealth of information for teachers and students.
- Skimmed the site to see what is offered
- Looked to see if there were any activities that I can incorporate into the lessons that I teach.
- Looked for additional info, helped students find the site for info.
- Looked for the answers to something brought up in the programs and checked on something for the students (can't remember what it was though).
- checked for shows and content...looked at activities and experiments
- looked for video connected to my present unit, looked at investigations, went to scilinks, looked activities
- The DVD outline of what is covered

3) How would you rate the *DragonflyTV* website on the following components:

	1	2	3	4	5	Average
a) Ease of Navigation	0	0	0	4	5	4.56
b) Amount of Content	0	0	2	5	2	4.00
c) Variety of Content	0	0	2	4	3	4.11
d) Quality of Content	0	0	2	4	3	4.11
e) Look and Feel	0	0	1	3	5	4.44

Participants liked the way that the site looked and generally found it simple to navigate, however, some expressed a desire for more and different types of content.

4) Did you know that segments of *DragonflyTV* were available online?
Only four participants realized that segments of *DragonflyTV* were available for download online.

5) Did you download any *DragonflyTV* segments?
Three participants downloaded clips of *DragonflyTV* from the website.

What they downloaded:

- Meet a scientist segments. Easy for me to preview before showing DVD
- several from the matter and motion section to see if I could use them in my classes
- I was able to access the video segments using one computer and a projector for the whole class to see. The kids explored different ones such as flight,

rockets, caves, etc. They also tried to watch the videos in the computer lab, but our lab computers froze and it became frustrating for the kiddos. Kids did investigate site at their homes. Half of the kids in my classes have home computers. They liked exploring the site and gathering items.

6) What would you change or suggest to make the online video offerings more useful to teachers?

- Links to external web sites to extend science content.
- Have additional lesson plans and/or worksheets available to teachers to print out for the videos and activities.
- Larger size (print?)
- I like having the written guide to explain exactly what is on each video. It might be helpful to supply a link to these guides for teachers to read and save time when trying to locate a video. However, it was interesting that usually there was something on the video you watched that could be used in class somewhere. The questions that the kids ask and how they show their approach to gathering the data is great. It has been a great support and scaffold for my kiddos.

7) Did your students download any *DragonflyTV* segments online?
No teachers were aware of any of their students downloading segments from home.

Week Eleven Log Data

May 22-26

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher A	Games (30011)	30	DVD
Teacher D	Creepy Crawlies	30	DVD
Teacher J	Structures/Coral Castle (3004) (w/4 class)	7	DVD
Teacher K	Dogs/Colorblind (w/ 2 classes)	15	DVD
Teacher N	Habitats	30	DVD
Teacher R	Mammals/Seal Feeding	30	DVD
Teacher J	Simple Machines/Kart Racing (2005)	7	DVD
Teacher K	Sports Science	10	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher Q	Powers of Ten	20	DVD

Teachers' *DragonflyTV* Comments:

Eight *DragonflyTV* segments were shown this week by six of the study participants. There was a mix of whole program vs. segment use.

- 3004 Coral Castle, 7 minutes
  We were reviewing simple machines and this segment had great examples of simple machines at work. Used only as a discussion for various uses of simple machines. They liked it. We even got onto a discussion about mysterious man-made structures, like the pyramids. We discussed how humans were able to build these using simple machines.

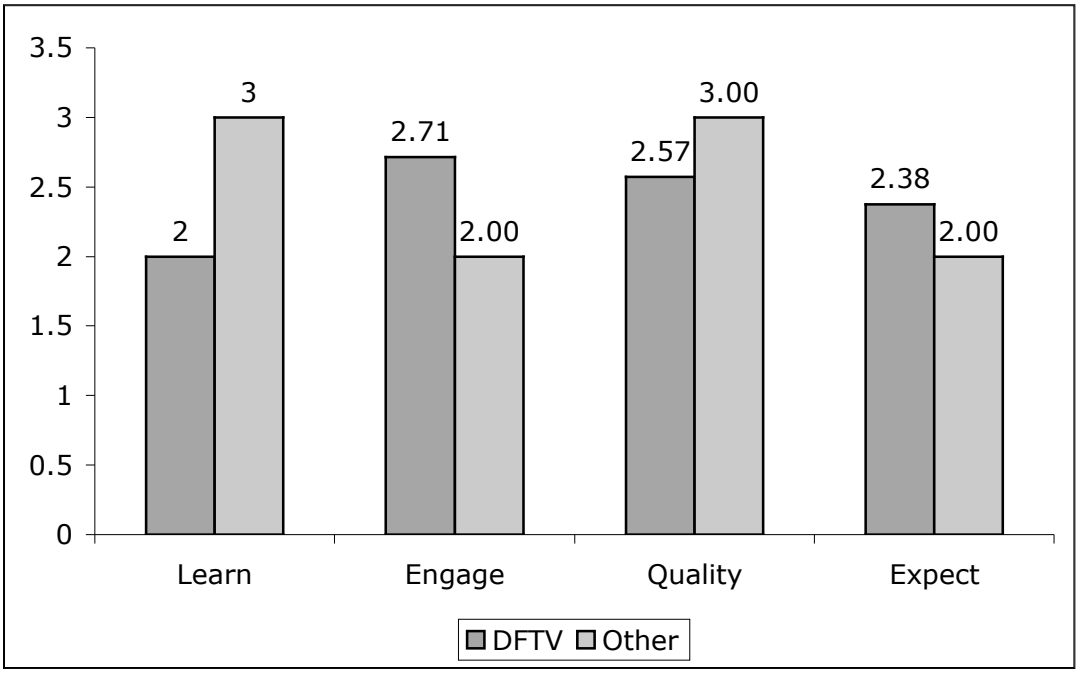
- Dogs – Colorblind, 15 minutes
  It is the end of the year and I thought it would be fun. I have a dog that I bring to school (Sofi) and thought that this would be a good tie in. We did the activity that you e-mailed me. They liked the video but it was a hard video to do this type of activity with. Do differently in the future: Choose a different video.

- Mammals – Feeding Seals, 30 minutes
  The kids are highly interested in animals, the fairs are coming up for the 4Her's. This program hopefully gave them some ideas to use or made them think about other ideas to explore for their projects. I used this program for the inquiry DFTV sheet. I wanted to see how the formatted form compared to the unstructured method of answered the same types of questions. Kids enjoyed the video and it held their attention. It got them to think about projects they may want to explore. Do differently in the future: Use the film earlier in the year with our life science unit. See if the kids could develop other projects to explore ***Good example of real-world connections.***

- 2005 – Kart Racing, 7 minutes
  I chose this because it had "simple machines" listed as a key concept in the subject index of our Dragonfly TV binder. We used it as a follow up to our simple machine discussion. Students were given worksheets afterwards where they had to identify simple machines in each picture. They liked watching the kart racing. They really didn't get engaged in the concept being discussed - gears. Do differently in the future: Maybe show this after talking more about gears, speed, power, etc.

- Sport Science – Soccer, 10 minutes
  I thought it would be a fun one to do. We did the lesson that you e-mailed me. It was ok. Some did not like it because it related to sports. The sports lovers liked it. Do differently in the future: I might pick a topic that everyone likes.

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:
The questions for week 11 focused on the *DragonflyTV* print resources and Standards.

1) How often have you used the *DragonflyTV* lesson guides that were provided?

2 Never
4 Rarely (only once or twice)
3 Occasionally (a handful of times)
4 Frequently (often, e.g., once a week or more)

If no, why not:

- Weren't as user friendly as I would have liked. I would have liked a worksheet that I could have photocopied and just given to the students or a template to work from.
- I integrate it into what I am doing in the classroom. What is in there may or may not reflect what I am currently doing. I am also on a very tight curriculum schedule and often I don't feel that I can do something extra
- Applicability to the unit on chemistry I am teaching
- didn't use the videos as much because lessons weren't relative to what we were studying at the time

If yes, did you find them helpful, why/why not?

- For the segments that I showed, there were not always lesson guides for the segments. I also think the guides are too wordy. I like to see at a glance what the activity is about. I also thought that the activities were not all that practical to do in the classroom and in a reasonable time.
- They were helpful with the topic. They were a little vague.
- Very helpful.
- Helpful in reinforcing the scientific method. The kids enjoyed the presentation - not as "dry" as some videos I use
- The guides were helpful. They supplied ideas and were clearly written. Helpful support with the programs.
- For the segments that I showed, there were not always lesson guides for the segments. I also think the guides are too wordy. I like to see at a glance what the activity is about. I also thought that the activities were not all that practical to do in the classroom and in a reasonable time.
- I used them to make sure the segment we were to watch fit the standard that I am teaching.
- Gave me background on things I wouldn't have already known and it let me know how things were laid out in the program.
- yes, they are a good intro and then an organized way to direct a discussion after
- I usually use an activity to support instructional video. I used the activity that best met my needs. Sometimes it was from DFTV and sometimes from other sources. DFTV lesson guides were helpful.

2) How valuable was the first section of each lesson guide (i.e., How would you investigate the question?)

3) How valuable was the second section of each lesson guide (i.e., Do it, Get to it!)

4) How valuable was the third section of each lesson guide (i.e., Take it Outside)?

	1 low	2	3	4	5 high	Average
1: How would you investigate the question?	0	1	3	5	2	3.73
2: Do it, Get to it!	0	2	2	6	1	3.55
3: Take it Outside	1	1	3	4	2	3.45

5) Did you create any resources to use in conjunction with a *DragonflyTV* video?

- Yes, I have the students follow and fill out a scientific method sheet while watching the segment, that way it is reinforcing that part of my curriculum as well as giving them good practice.
- Question and answer sheets, modified version of the investigation sheet
- Research question outlines for the kids. I am designing UbD lesson plans to go with some of the programs so that they may be used more effectively.
- Worksheet; and note taking guide
- I came up with some of my own questions
- I just incorporated the Dragonfly into what I had already.
- Not yet, haven't had the time.
- no because it was the first time to see them (didn't preview them due to lack of time)

6) What types of resources do you use with other videos?

- I create hands-on activities and web quests to support video.
- question sheets for them to watch
- comprehension checks
- question sheets
- Games, cloze handouts, video quizzes, and demonstrations.
- Worksheets and connection to websites and lectures.
- Other labs to reinforce the concepts
- a video reflection sheet
- graphic organizers, questions to guide viewing
- Computer websites like the GEMS connections on their site. Leveled books for reading. Dinah Zikes' resource books for info on many areas of science. I also use her paper folding techniques to get the kids to review and help them retain the info.

7) To what extent do you adhere to the following standards: (always, occasionally, never)

	Always	Occasionally	Never	Mandatory?
a. Departmental Standards	11	0	1	5
b. Bldg./School Standards	11	1	1	7
c. District Standards	11	0	0	8
d. State Standards	12	1	0	10
e. National Standards	3	7	2	3
f. International Standards	1	3	8	0

Which mandatory standards do you use and why?

- Our district, school, and department standards are based on the Michigan Curriculum Framework.
- Our state standards overlap the national standards.
- I teach in a private school and do not have to follow any standards. I have developed my curriculum based on the state standards and adhere to them as closely as possible.
- Oregon State Standard
- Mainly, the California State Standards for Science
- Ohio Standards for Fifth Grade Science. See ODE.com or ORC.org websites for listing of standards.

Which optional standards do you use and why?

- I find value in all of them
- Any of the science standards from the state.
- State and District
- California State Standards and sometimes the National Standards
- state standards because they guide what will be tested in grade eight
- The Ohio Standards seem to encompass the national standards. There seems to be value in both. More importantly is the way in which you approach teaching the lesson.

Week Twelve Log Data

May 29-June 2

DragonflyTV			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher G	Technology/Solar Power	20	DVD
Teacher T	Exercise and Memory	10	DVD
Teacher N	Dogs	NS	DVD
Teacher T	Air/Balloons	10	DVD
Other Programs			
Teacher Name	**Program/Segment**	**Time**	**Format**
Teacher F	Among the Wild Chimps	15	DVD
Teacher F	Teen Species: Girls	30	DVD
Teacher Q	Inventions	15	VHS
Teacher F	Among the Wild Chimps	15	DVD
Teacher F	Teen Species: Girls	30	DVD
Teacher F	Among the Wild Chimps	NS	DVD
Teacher F	Jane Goodall	NS	VHS
Teacher F	Light and Lenses	NS	Stream

Teachers' *DragonflyTV* Comments:

At the end of the study we found fewer people showing *DragonflyTV* programming as several participants had already met their ten-week video usage reporting minimum. It is promising to note that no whole programs were shown during the final week, rather, teachers all selected shorter segments that were most interesting or potentially most appealing to their students.

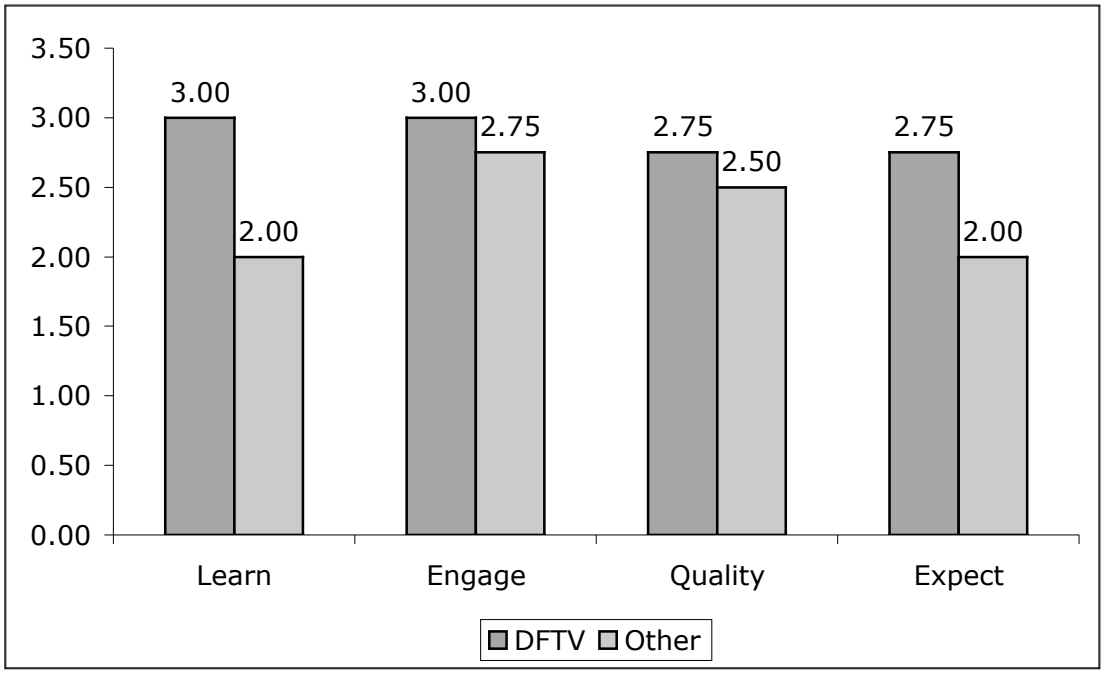
- Technology, 20 minutes
  The program discussed solar power and we are working on energy resources. This time they watched for different types of energy resources They liked segment on how cows can create energy and the part about the Santa Monica Pier Ferris Wheel because we all live so close.

- Human Body – Exercise and Memory, 10 minutes
  Our state standards for 3rd grade health include the following and I felt this was a good segment and activity to do with my class: (1) Health behaviors. The student explains ways to enhance and maintain health throughout the life span. The student is expected to: (A) explain how personal-health habits affect self and others; (B) describe ways to improve personal fitness; (4) Health information. The student names the basic structures and functions of the human body and explains how they relate to personal health throughout the life span. The student is expected to: (A) list and explain the stages of growth and development; (B) name and locate major components of the body systems; and (C) explain the interrelationships of the body systems. I shared

*the segment with the kids and we talked about what they observed in the video. Then we designed our own test. The kids were excited to repeat the activity with different variables. I followed the activity suggested in the teacher's guide. We took a 1 minute speed math test and scored the test. Half of the class read a book for five minutes while the other half of the class exercised outside. We took another 1 minute math test and the kids were surprised that they were all able to do more math problems. The exercise people increased from 119 problems completed as a group to 177! The kids were very excited! I would have the kids design their own tests. My class is a lower level group of kids and I have to walk them through a lot of different activities in science**. *good examples of connections to standards and repeating investigations***

- Air – Hot Air Balloons 10 minutes
  *This weekend we are having a Hot Air Balloon Festival in our town. This was a great way to get the kids interested in the festival and explain how the balloons work. I showed the segment, then we flew a model balloon that I made from tissue paper. They were really interested in the balloons. They loved it**! * good example of real-world connection***

DragonflyTV Segments Compared to Other Programs



Responses to weekly questions:

1) Compared to your use of video before this study, during the study:

	Less	About the Same	More
a) How often have you used video in general?	1	8	6
b) How often have you used video segments:			
…about 5 minutes or less in length?	1	9	3
…about 10 to 15 minutes in length?	1	9	4
…about 20 to 30 minutes in length?	0	10	4
…about 45 to 60 minutes in length?	5	5	0
…more than 60 minutes in length?	5	7	0
c) How challenging has it bee to incorporate video into your instruction?	4	10	0

2) Please rate the following factors in terms of importance when you are selecting a video to use with your students:

	1 low	2	3	4	5 hi	Average
a) Length of a video program or segment	2	1	2	7	3	3.53
b) Topic of a video program or segment	0	0	0	0	15	5.00
c) Level of a video program or segment (vocabulary, concepts, etc.)	0	0	0	5	10	4.67
d) Accuracy of the content	0	0	0	1	14	4.93
e) How information is presented in the video (overtly instructional vs. more narrative)	1	0	0	8	6	4.20
f) Something that kids can relate to	0	0	1	4	10	4.60
g) Humor	0	3	6	6	0	3.20
h) Age of the video (how recent it is)	0	2	3	5	5	3.87
i) Accessibility (ease of obtaining the video)	0	0	1	3	10	4.64
j) Cost (of purchasing or renting the video)	3	1	4	0	7	3.47
k) Quality video (has high-quality production values)	0	0	3	3	9	4.40
l) Quality audio	0	0	2	4	9	4.47
m) Format of the video (DVD/VHS/Stream etc.)	5	0	3	4	3	3.00
n) Accompanying worksheets	3	2	4	6	0	2.87
o) Accompanying lesson guides or lesson plans	2	3	5	4	1	2.93
p) Additional resources (e.g. interactive materials online)	2	2	6	2	3	3.13
q) From a trusted source or producer	1	0	4	3	6	3.93

3) Please list any other factors that are important in your video selection and usage decisions:

- How the video related to the Ohio Academic Content Standards.

- Relevant topics to the Ohio standards is extremely important. These videos meet the criteria.
- Long Term Value: I look at videos that will be beneficial from year to year. I like to have high quality resources hand that will last more than one year.
- Comprehensibility: That the narrator speaks slowly enough for them to understand and that they don't try to cram too much info in at the expense of the kids really understanding.

4) As a result of this study, have you come to use video differently? If so, how and how have you benefited?

- I have the students do more activities related to the video then I did before. Before the video was for more information and notes, now it is to reinforce something as well as do or complete an activity.
- This study has made me realize how many valuable videos are out there that can enhance my teaching. This study has given me a "push" to consider more video in the future. I realize that I need to make time to do this.
- I have used the segments to introduce concepts and to conclude units of study.
- I've learned to use it in different ways and look forward to using some of my new ideas next year. I have also come to think about why and how I'm using the video more then I ever did before.
- No, but I have come to appreciate the style of video in presenting information to students. The enjoyed the format of the Dragonfly videos more than the "dry" videos I sometimes use.
- I am able to choose the segments I want to use and place them into the curriculum where it is appropriate and most effective. I can show part of the video and have students raise questions, finish the study for themselves and compare to the DVD at the end.
- Yes, I use it more often. I don't know if I have benefited more that how much the kids have benefited.
- Just having the Dragonfly segments was wonderful.
- Still a dedicated multimedia user!

Student Survey Instrument and Data

Student Survey

1. How much do you <u>like</u> Science?

❍ A lot ❍ Some ❍ Not much ❍ Not at all

2. How much would you like to do a Science project on your own in the future?

❍ A lot ❍ Somewhat ❍ Not much ❍ Not at all

3. When doing a Science project, how <u>important</u> is it to:				
	Very important	Sort of important	Not really important	Not important at all
a. Repeat the same experiment several times?	❍	❍	❍	❍
b. Write down whatever happens in your experiment?	❍	❍	❍	❍
c. Change only one thing in your experiment at a time?	❍	❍	❍	❍
d. Put what you find out in a chart or graph?	❍	❍	❍	❍

4. What video programs did you watch in class this year?

a) Write down as many as you can remember.

b) Circle your favorite one.

5. a) Did you watch *DragonflyTV* at school this year? ❍ yes ❍ no

b) Which shows or parts do you remember seeing?

c) Circle your favorite one.

6. Have you ever watched *DragonflyTV* at home? ❍ yes ❍ no

7. How much would you like to see another episode of *DragonflyTV*?

❍ A lot ❍ Some ❍ Not much ❍ Not at all

8. How much do you agree with the following statements?				
	Strongly Agree	Sort of Agree	Sort of Disagree	Strongly Disagree
a. *DragonflyTV* helps me understand how to do a Science experiment.	❍	❍	❍	❍
b. *DragonflyTV* is fun to watch.	❍	❍	❍	❍
c. The kids on *DragonflyTV* are just like me.	❍	❍	❍	❍
d. The topics on *DragonflyTV* interest me.	❍	❍	❍	❍
e. Other kids my age would also like *DragonflyTV*.	❍	❍	❍	❍
f. I want to be on *DragonflyTV*.	❍	❍	❍	❍
g. I think I could be selected to be on *DragonflyTV*.	❍	❍	❍	❍
h. I believe that the kids on *DragonflyTV* actually came up with their experiments.	❍	❍	❍	❍
i. I like *DragonflyTV* more than other programs I watch in school.	❍	❍	❍	❍
j. I learn more from *DragonflyTV* than other programs I watch in school.	❍	❍	❍	❍

9. In the space below, write down what you liked best about *DragonflyTV* overall.

List what you liked, and explain why you liked it.

10. In the space below, write down what you liked least about *DragonflyTV* overall.

List what you didn't like, and explain why you didn't like it.

Thanks for your help!

Student Survey Data

Ten teacher participants submitted student survey data for a total of 598 students. Despite the fact we were unable to get survey data back from all 20 participants we feel that the 10 participants who did submit survey data represent a good mix of the larger set of study participants in terms of grade levels taught and student ability levels. Findings from the student survey are presented below.

Table 1: Respondents

Teacher	Student Respondents by Grade					
	4	5	6	7	8	Total
A				91		91
D			143			143
H				57		57
J			44			44
K	39					39
M		17				17
N			26	12	22	60
O			71			71
P		28				28
R		48				48
	39	93	(6=213+) (7=103+) (8=22+) 466			**598**

Table 2: How much students like Science (n=591)

	1	2	3	4	Average Rating
How much do you like Science? (All)	29	65	280	217	3.16
Teacher N (Grade 6)					3.17
Teacher O (Grade 6-8)					2.70
Teacher D (Grade 6)					3.16
Teacher H (Grade 7&8)					2.95
Teacher J (Grade 6)					3.30
Teacher P (Grade 5)					3.43
Teacher M (Grade 5)					2.80
Teacher K (Grade 4)					3.00
Teacher R (Grade 5)					3.54
Teacher A (Grade 7)					3.42

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”not at all,” 2=”not much,” 3=”some,” and 4=”a lot.”

Table 3: How much students want to do Science projects in the future (n=588)

	1	2	3	4	Average Rating
How much would you like to do a Science project on your own in the future? (All)	80	160	228	120	2.66
Teacher N (Grade 6)					2.70
Teacher O (Grade 6-8)					2.23
Teacher D (Grade 6)					2.73

Teacher H (Grade 7&8)	2.44
Teacher J (Grade 6)	2.76
Teacher P (Grade 5)	3.07
Teacher M (Grade 5)	2.33
Teacher K (Grade 4)	2.56
Teacher R (Grade 5)	3.07
Teacher A (Grade 7)	2.71

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”not at all,” 2=”not much,” 3=”somewhat,” and 4=”a lot.”

Table 4: Students’ views on the importance of various components of the scientific process

	1	2	3	4	Average Rating
When doing a science project, how important is it to:					
a) Repeat the same experiment several times?	44	95	173	278	3.16 (n=590)
b) Write down whatever happens in your experiment?	14	16	111	451	3.69 (n=592)
c) Change only one thing in your experiment at a time?	32	71	219	267	3.22 (n=589)
d) Put what you find out in a chart or graph?	29	92	203	266	3.20 (n=590)

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”not important at all,” 2=”not really important,” 3=”sort of important,” and 4=”very important.”

We asked students to write down the names of the video programs they had viewed in class and circle their favorite ones. *DragonflyTV* was often mentioned and frequently listed as a favorite. Programs and clips from *Bill Nye the Science Guy, Mythbusters,* and *the Magic School Bus* were also popular among students as were programs on specific topics such as Pompeii and dinosaurs. Specific *DragonflyTV* segments that rated highest among student respondents were those related to animals (e.g., deformed frogs, turtles, etc.), sports, carnival games, music/dance and the scientist segments in general.

Less than ten percent of student respondents had seen *DragonflyTV* at home (9.2%). However, fifty-eight percent said that the would like to see another episode of *DragonflyTV* (as indicated by a response of “some” or “A lot” to the question: How much would you like to see another episode of *DragonflyTV*?)

Table 5a: Agreement with statements about *DragonflyTV* (n=577)

	1 SD	2 D	3 A	4 SA	Average Rating
DragonflyTV helps me understand how to do a Science Experiment.	62	73	287	155	2.93
Teacher N (Grade 6)					2.64
Teacher O (Grade 6-8)					2.69
Teacher D (Grade 6)					3.19
Teacher H (Grade 7&8)					2.38
Teacher J (Grade 6)					3.09
Teacher P (Grade 5)					3.57
Teacher M (Grade 5)					2.76
Teacher K (Grade 4)					3.10
Teacher R (Grade 5)					3.60
Teacher A (Grade 7)					2.48

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

Table 5b: Agreement with statements about *DragonflyTV* (n=579)

	1 SD	2 D	3 A	4 SA	Average Rating
DragonflyTV is fun to watch.	93	129	170	187	2.78
Teacher N (Grade 6)					2.53
Teacher O (Grade 6-8)					2.07
Teacher D (Grade 6)					3.20
Teacher H (Grade 7&8)					2.30
Teacher J (Grade 6)					2.70
Teacher P (Grade 5)					3.79
Teacher M (Grade 5)					2.29
Teacher K (Grade 4)					3.38
Teacher R (Grade 5)					3.63
Teacher A (Grade 7)					2.17

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

As expected, we find that students in lower grades find the program more fun to watch. This finding is repeated in observation data, teacher interview data and teacher survey data. Some sixth grade students are still engaged by the program by interest clearly starts to taper off after grade six (and remains generally much higher in grades 4 and 5).

Table 5c: Agreement with statements about *DragonflyTV* (n=576)

	1 SD	2 D	3 A	4 SA	Average Rating
The kids on *DragonflyTV* are just like me.	241	132	158	45	2.01
Teacher N (Grade 6)					1.63
Teacher O (Grade 6-8)					1.59
Teacher D (Grade 6)					2.29
Teacher H (Grade 7&8)					1.91
Teacher J (Grade 6)					2.00
Teacher P (Grade 5)					2.64
Teacher M (Grade 5)					1.65
Teacher K (Grade 4)					2.13
Teacher R (Grade 5)					2.77
Teacher A (Grade 7)					1.62

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1="Strongly Disagree," 2="Sort of Disagree," 3="Sort of Agree," and 4="Strongly Agree."

It is interesting to note that students' responses to this question seem to be more positive among those in lower grades as compared to those in higher grades. Comments from teachers support another general finding – i.e., that younger students tend to be more engaged while viewing *DragonflyTV*. Several teachers hypothesized that their older students were loosing interest because the children appearing in the experiment segments on *DragonflyTV* were younger than they are.

Table 5d: Agreement with statements about *DragonflyTV* (n=573)

	1 SD	2 D	3 A	4 SA	Average Rating
The topics on *DragonflyTV* interest me.	84	107	241	141	2.77
Teacher N (Grade 6)					2.55
Teacher O (Grade 6-8)					2.36
Teacher D (Grade 6)					3.02
Teacher H (Grade 7&8)					2.15
Teacher J (Grade 6)					2.77
Teacher P (Grade 5)					3.67
Teacher M (Grade 5)					2.31
Teacher K (Grade 4)					3.03
Teacher R (Grade 5)					3.67
Teacher A (Grade 7)					2.34

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1="Strongly Disagree," 2="Sort of Disagree," 3="Sort of Agree," and 4="Strongly Agree."

Again we find interest highest among 5th and 6th graders and somewhat lower for 7th and 8th graders. Some teachers also commented on the fact that the topics in the program seemed to be a better fit with some of the lower grades' curricula.

Table 5e: Agreement with statements about *DragonflyTV* (n=571)

	1 SD	2 D	3 A	4 SA	Average Rating
Other kids my age would also like *DragonflyTV*.	139	156	180	96	2.41
Teacher N (Grade 6)					2.18
Teacher O (Grade 6-8)					1.89
Teacher D (Grade 6)					2.71
Teacher H (Grade 7&8)					2.02
Teacher J (Grade 6)					2.34
Teacher P (Grade 5)					3.52
Teacher M (Grade 5)					2.13
Teacher K (Grade 4)					2.61
Teacher R (Grade 5)					3.46
Teacher A (Grade 7)					1.75

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

The pattern of greater agreement among students in lower grades holds for this question as well. Students in grades 7 and 8 have two of the lowest average scores in response to this question.

Table 5f: Agreement with statements about *DragonflyTV* (n=575)

	1 SD	2 D	3 A	4 SA	Average Rating
I want to be on *DragonflyTV*.	263	83	84	145	2.19
Teacher N (Grade 6)					1.62
Teacher O (Grade 6-8)					1.69
Teacher D (Grade 6)					2.47
Teacher H (Grade 7&8)					1.66
Teacher J (Grade 6)					2.14
Teacher P (Grade 5)					3.33
Teacher M (Grade 5)					1.94
Teacher K (Grade 4)					2.90
Teacher R (Grade 5)					3.40
Teacher A (Grade 7)					1.57

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

With the exception of Teacher M’s students, interest in being on *DragonflyTV* is highest among students in fifth grade and lowest for students in grades seven and up.

Table 5g: Agreement with statements about *DragonflyTV* (n=569)

	1 SD	2 D	3 A	4 SA	Average Rating
I think I could be selected to be on *DragonflyTV*.	213	125	124	107	2.22
Teacher N (Grade 6)					1.86
Teacher O (Grade 6-8)					1.72
Teacher D (Grade 6)					2.31
Teacher H (Grade 7&8)					1.96
Teacher J (Grade 6)					2.19
Teacher P (Grade 5)					3.33
Teacher M (Grade 5)					1.82
Teacher K (Grade 4)					2.42
Teacher R (Grade 5)					3.17
Teacher A (Grade 7)					1.98

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

We are not entirely sure why some groups of students felt more confident in their ability to be selected to be on *DragonflyTV*. Self-efficacy may play a part in students’ feelings about whether or not they would be selected – but we also suspect that interest in being on the show is strongly correlated to feelings about whether or not they could be selected. For example, Teacher P’s students were most interested in being on the show and were also the most confident in their ability to get on the show. Teacher N, Teacher H and Teacher A’s students were least interested in being on the show and were also least confident in their ability to be selected to be on the show.

Table 5h: Agreement with statements about *DragonflyTV* (n=574)

	1 SD	2 D	3 A	4 SA	Average Rating
I believe that the kids on *DragonflyTV* actually came up with their experiments.	117	130	202	125	2.58
Teacher N (Grade 6)					2.26
Teacher O (Grade 6-8)					2.42
Teacher D (Grade 6)					2.86
Teacher H (Grade 7&8)					2.06
Teacher J (Grade 6)					2.32
Teacher P (Grade 5)					3.33
Teacher M (Grade 5)					2.31
Teacher K (Grade 4)					2.51
Teacher R (Grade 5)					3.25
Teacher A (Grade 7)					2.39

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

Again, we find that Teacher P's class had the highest belief that the children on the program came up with their own experiments – this fact may play in to their heightened desire to be on the show and greater belief that the could be selected to be on the show (i.e. they thought that kids, just like themselves had come up with experiments and were ultimately selected to share these experiments on *DragonflyTV*).

Table 5i: Agreement with statements about *DragonflyTV* (n=574)

	1 SD	2 D	3 A	4 SA	Average Rating
I like *DragonflyTV* more than other programs I watch in school.	208	120	128	118	2.27
Teacher N (Grade 6)					2.21
Teacher O (Grade 6-8)					2.00
Teacher D (Grade 6)					2.55
Teacher H (Grade 7&8)					1.89
Teacher J (Grade 6)					2.55
Teacher P (Grade 5)					2.52
Teacher M (Grade 5)					2.06
Teacher K (Grade 4)					2.15
Teacher R (Grade 5)					3.33
Teacher A (Grade 7)					1.61

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1="Strongly Disagree," 2="Sort of Disagree," 3="Sort of Agree," and 4="Strongly Agree."

We again find evidence to support the fact that older students are less engaged by *DragonflyTV* than their younger counterparts, but responses among respondents in grade six and below are extremely positive. A majority of students seem to like *DragonflyTV* as much, if not more than most other programs they are viewing in school.

Table 5j: Agreement with statements about *DragonflyTV* (n=573)

	1 SD	2 D	3 A	4 SA	Average Rating
I learn more from *DragonflyTV* than other programs I watch in school.	125	165	175	108	2.46
Teacher N (Grade 6)					2.36
Teacher O (Grade 6-8)					2.22
Teacher D (Grade 6)					2.68
Teacher H (Grade 7&8)					1.91
Teacher J (Grade 6)					2.55
Teacher P (Grade 5)					3.15
Teacher M (Grade 5)					2.18
Teacher K (Grade 4)					2.95
Teacher R (Grade 5)					3.15
Teacher A (Grade 7)					1.92

*numbers represent the number of participants choosing that response option and averages represent the average response option where 1=”Strongly Disagree,” 2=”Sort of Disagree,” 3=”Sort of Agree,” and 4=”Strongly Agree.”

In addition to enjoying the program more, younger students also feel that they are learning more from the program – perhaps a product of the content level being at a more appropriate learning level, or perhaps a by-product of heightened engagement.

Based on the responses that we saw in the class-by-class breakout we also combined responses and analyzed data across grade levels. Data with combined grades were omitted during this phase of analysis. The table below presents students’ responses about *DragonflyTV* broken down by grade level.

Table 6: Student’s Responses By Grade Level

	4th	5th	6th	7th
a) *DragonflyTV* helps me understand how to do a Science experiment	3.10	3.34	2.88	2.92
b) *DragonflyTV* is fun to watch	3.38	3.42	2.70	2.79
c) The kids on *DragonflyTV* are just like me.	2.13	2.41	1.96	2.05
d) The topics on *DragonflyTV* interest me.	3.03	3.31	2.67	2.78
e) Other kids my age would also like *DragonflyTV*.	2.61	3.05	2.34	2.42
f) I want to be on *DragonflyTV*.	2.90	3.05	2.03	2.29
g) I think I could be selected to be on *DragonflyTV*.	2.42	2.81	2.06	2.36
h) I believe that the kids on Dragonfly TV actually came up with their experiments.	2.51	2.93	2.51	2.56
i) I like *DragonflyTV* more than other programs I watch in school.	2.15	2.65	2.30	2.22
j) I learn more from *DragonflyTV* than other programs I watch in school.	2.95	2.96	2.42	2.44

Through this additional analysis of the data we confirm a trend that was suspected during preliminary analysis, i.e. that 5th graders respond more favorably to *DragonflyTV* than their younger and older peers. 4th graders tend to be more favorable than 6th and 7th graders, but interestingly there are instances where 7th graders are more favorable than 6th graders.

What students like best about *DragonflyTV*

Kids as hosts

- I like most about *DragonflyTV* is that kids my age are doing things that look really fun.
- They kids weren't old people trying to be cool.
- I liked that it shows real people doing their experiments and learning about science
- I liked that kids were the hosts, instead of adults. Why, because it was sometimes getting boring with adults
- I liked that the kids were my age because it helps me understand
- I like watching experiments being done. It is especially cool to see kids my age doing them
- the kids made the show more exciting than normal videos, so this helped me pay attention more
- what I like most about *DragonflyTV* is the children get to appear and do something. I like this because it shows that children are interested in science and it persuades other children to get up and try something

Older kids recognized the appeal of having kids on the program but shared the following comments:

- I liked how your show got kids involved doing projects. But overall it was a little too young for our class of 7th graders
- It was kind of kiddy and not that fun to watch a lot of little kids. You should make one for older kids
- to me *DragonflyTV* didn't really spark my interest because it seems a little young for me

Makes you think

- I liked science puzzle questions because you need to think about the question to figure it out.
- I like the way kids handle the problems put in front of them
- I like the song and how they solve problems using science because it's hard to solve science problems
- I like *DragonflyTV* because it's a mystery and I like mysteries because you can kinda say the answer

Teaches about/inspires experimentation

- I like that kids are doing the experiments that come up in everyday life, I like this because I could do the experiments.
- I like how they show you step by step their ways of doing the experiment. Also how they show you how it starts and then the end result.
- I liked how they show experiments we can do. I like it because you could do it at home.
- I liked that they did real science experiments that I could try
- When they try to do their experiments because it's pretty cool to see them

- I like how the kids do experiments in different ways than you would think because it helps me to realize that I can maybe do it someday
- because it kinda taught you how to do experiments
- it helped me with my science fair project
- I liked how they showed everything step by step and if I ever wanted to do one of those experiments, I could
- what I liked about *DragonflyTV* is some of the experiments they do. I like them because it made it look like learning it would be fun.

Learning new things

- The way the kids made it easy to understand because it's important that kids understand what these experiments mean.
- I really liked the bottle rocket experiment because we did those at our school but on tv they were cooler and I learned more about them. It was interesting
- *DragonflyTV* made concepts simple and easy to understand.
- it has facts and it teaches you new things. You get to see actual videos/pictures of what they are talking about.
- I learn a lot in a short amount of time
- it helps you understand the things you're learning better

…and making learning fun

- I liked how it was fun and taught us at the same time
- the part that I loved was that it was fun, and it helped me in science. Because it explained a lot and gave really good ideas. In conclusion, it inspired me to build a robot/learn about them
- I liked how it taught me fun ways to do boring things and I liked that because it is fun
- I liked how they tried to make it seem interesting because it makes it more fun
- I like that it is fun to watch and educational at the same time, because you don't want to watch something boring.
- I like it because I love science and it makes learning fun.

Style

- I liked their humor
- I liked how it was really fast-paced and had a lot of energy and music
- it keeps our attention because it moves fast and it's fun to watch
- I like the theme song because it's catchy and has a nice beat
- I liked the music because it was up-beat and funky
- It's not very long. The more longer it is, the more boring it will be.

Topics

- Sports
- Animals

- Rockets
- Weather
- Dancing/Music
- Rafting
- Roller Coasters
- it's creative in how they introduce different topics with something that a lot of kids know about. It's also very cool to see the sport/activity in action (example: martial arts)

What students like least about *DragonflyTV* (and why)

The most commonly mentioned things were that the children and hosts were sometimes too cheesy:

- The acting. These kids didn't act normal! They were always looking uncomfortable and weird.
- they are constantly overreacting, and it looks really fake. I think they should act more natural!
- I disliked it because it was really cheesy, almost everything, but it was a tad bit better than some of the other science videos

This added to the fact, for some older viewers, that many felt it was geared toward younger children:

- I thought it was corny because it was too childish
- shows are too kiddish
- It made me feel like it wasn't meant for kids my age (maybe more like 4th graders)
- I didn't like the idea that kids younger than me were on. If the kids were my age, I would enjoy the show more.

And others found the content/topics presented to be too basic or about things they had already learned:

- I thought that the episodes and clips from *DragonflyTV* were not equal to my level in science.

Some students also disliked certain experiments or specific elements of the experiments that made them seem less realistic:

- I didn't like how they were so neat because everything was exact
- they act all excited to learn. They only do it for excitement then they give them scripts because no kids know that much.

Elements of Inquiry Worksheet

Name: _____ **Date:**_____

1) What *DragonflyTV* segment you are watching: _____

<u>Part A Instructions:</u> Watch the first video clip – look and listen for how the kids developed their investigation.

2) What was the topic of the investigation?

_____

3) What questions did they ask in their investigation?

*A)*_____

B)_____

C) _____

4) If you were going to investigate this question, what materials or equipment would you need?

_____

_____

_____

5) What kinds of measurements or observations would you make?

_____

_____

_____

<u>Part B Instructions:</u> Watch the second video clip and see how the kids investigated the question.

6) What materials or equipment did they use to do their investigation?

_____

_____

_____

7) What kinds of measurements or observations did they make?

_____

_____

_____

8) What kind of a chart or graph did the kids make to display their results? (describe or draw)

_____

_____

_____

9) What did they conclude or learn from their investigation?

_____

_____

10) What follow-up questions or investigation ideas did they come up with?

_____

_____

11) What other investigation ideas or follow-up questions did you come up with?

_____

_____

_____

Video Usage Study Interview Protocol

Hello, my name is _____ and I'm working with Jennifer Borse on the *DragonflyTV* Video Usage Study. We have been interviewing teachers throughout the study and I was wondering if you had a few minutes today to talk about some of you video usage experiences in a little more depth than the log forms have allowed you to do.

If yes, continue (Great, if you have questions or additional comments for me at any point during the interview, please feel free to interrupt – Some of the questions will be similar to those asked on the weekly logs but this interview will give you a chance to provide more details on your thoughts and experiences)

If no, try to reschedule

1) What do you like best about using video for instructional purposes?
   Specifically: what do you like and why do you like it?

2) What do you like least about using video for instructional purposes?
   - Did you have any technical problems?
   - Did you have any problems finding video programs or segments to use?

3) Do you think video is an effective instructional tool?
   - What are the characteristics of a good video program or segment?
   - Are there specific contexts when video is more helpful? (e.g. with certain types of students, in certain classes, with certain topics, etc.)
   - How do you know it is effective – what types of evidence have you found?

4) Do you think that video is an effective motivational tool?
   - What types of videos do students like best and why?
   - What evidence have you found to support the fact that they are motivated?
   - Are there other instructional tools that are equally or more motivating?

5) What did you think about *DragonflyTV*?
   - Had you used it before?
   - Which programs or segments did you like best and why?
   - How did it compare to other videos that you use – pros and cons of DFTV and other programs (easier to incorporate it into a lesson, better learning results, more interest from the kids, etc)
   - Will you continue to use it next year or in the future?

6) How, if at all, has your use of video changed during this study?
   - Did you show more or less programs?
   - Did you show shorter or longer clips?
   - Did the way that you used video change in any way?

- Did the way that you find videos change?
- Did the way that you share video resources with colleagues change?

7) Did you try the Inquiry Challenge?
- Had you been doing something similar beforehand?
- How did this method of using video differ from the way you usually use video?
- What did you like about using video in this way? (were students engaged? Were they able to come up with good ideas and/or questions?)
- What did you dislike about using video in this way?
- Do you think that it was effective to take this inquiry approach to using video?

8) How do you think your use of video will change in the future?
- Did you develop any new strategies for using video as a part of this study?

9) What can video producers such as the producers of *DragonflyTV* do that would help teachers to more effectively and easily incorporate videos of their program for instructional purposes?
- Things about the program itself – its length, its topics, its style, etc.?
- How about the resources or services provided in addition to the programming?

Additional Questions for Onsite Visits/Case Studies

Can you tell me a little more about your school and students – how would you describe them to a teacher in another city or state?

Can you think of any students in particular who respond particularly well to video programming? (both in terms of in class behavior and academic performance?)

Are there any anecdotes that you can share with me about your video usage either during this study or before?

When you aren't showing video in your classroom how does your teaching style vary?

How does the lesson that I observed today differ from the lessons you do with other video programs?

DFTV Classroom Observation Protocol

Observer:	Observation #:
Teacher Name:	
School Name:	
City:	
Date:	
School Description: **Description of surrounding area:** **Student population – total number:** **Average number of students per class:** **Socio-Economic Status:** **Academic performance:** **Public/Private?** **Other:**	
Classroom Description: **Physical description:** **What decoration is present;** **What technology is present?** **What is the student seating configuration?** **Are Dragonfly TV materials visible – if so , where?**	
Class Description: **Topic:** **Grade:** **Subject:** **Time:** **Number of Students:** **Number male:** **Number female:** **Number Caucasian:** **Number African American:** **Number Hispanic:** **Number Asian:** **Number Other (describe):**	