

## PDS<sup>2</sup> System Use Report

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We report here on an analysis of nine literacy coordinators' use of a multi-media professional development support system, PDS<sup>2</sup>, which has been specifically designed to enhance the professional development activities of these school-based literacy coaches. The work detailed below represents an important intermediate step in our overall IES research project, which seeks both to assess the effects of Literacy Collaborative professional development on teacher practice and student learning and to examine the value-added in bringing web-based collaborative learning tools (PDS<sup>2</sup>) to assist in these efforts. In our larger project, we seek to assess overall program effects and evaluate the variability among these effects that may be associated with background characteristics of literacy coordinators (LCs), aspects of the school context in which they work, and the use of PDS<sup>2</sup> to support this work.

In the latter regard, we are particularly interested in the different ways in which coordinators may take up and use PDS<sup>2</sup> and the factors associated with this use. To undertake such analyses, we need to develop reliable measures of PDS<sup>2</sup> system use and have some reasonable assurance about their construct validity. What, for example, does extensive use of PDS<sup>2</sup> likely mean in terms of the ongoing work of LCs seeking to improve literacy practice in their schools?

This report uses data from a variety of sources, including digitally-generated data from PDS<sup>2</sup> and follow up interviews with LCs, to develop a set of use measures and to explore what these measures actually tell us about school-based professional development activity.

## Overview of the PDS<sup>2</sup> System

PDS<sup>2</sup> provides professional developers with flexible access to tools and resources that can extend teachers' opportunities to observe and investigate diverse examples of teaching and learning within a professional learning community. PDS<sup>2</sup> includes the following resource and functions:

Digital library of video-cases of K–3 comprehensive literacy instruction, including videos of classroom practice, teacher commentary, student work artifacts, snapshots of the physical environment, and descriptions of classroom context. Each video-case has associated professional development components, including professional commentary, professional development ideas, reference materials, and FAQs.

Search, retrieval, and authoring functions provide professional developers with ready access to the video-case materials. Resources of interest can be saved, annotated, and organized in personal containers or downloaded to the desktop.

Online learning groups allow professional developers and teachers to share information and resources, participate in discussions, and engage in collaborative work on an on-going basis.

Project staff at the University of Chicago, The Ohio State University, and Lesley University have developed PDS<sup>2</sup> in partnership with Teachscape, a commercial provider of online learning opportunities for school practitioners. As the tool's platform developer, Teachscape has supported this study by extending use of PDS<sup>2</sup> to study participants and providing us with data on a regular basis to support our analytic work.

## Description of Data Available for This Report

### *System Use Data from the Teachscape Platform*

System use data from PDS<sup>2</sup> cover almost two school years, from the period mid-November, 2005 to the present. We have completed analysis of this data through mid-March, 2007. This data is of two kinds: event data and coach library data.[1]

**Event data.** The event data tracks three kinds of users' actions: log-ins, searches, and views (i.e., the user opens a resource). These actions, at the most basic level, are mouseclicks on interface icons labeled "log in," "search," and "open" (or, as an alternative to the latter, a double click on the resource to be opened). Each system event is dated and time-stamped. This information allows us to assess amount of use, such as the number of user events and estimated time on system, and to examine possible changes in use over time.

The event data also identify the specific individual resources an LC opened. Recall that individual resources in PDS<sup>2</sup> are organized around video-cases of classroom practice, as described on page 2. As a result of this hierarchical structure where individual resources are nested in video-cases (and the data are coded accordingly), we can examine an LC's amount of use both at the individual resource level and at the level of the video-case. We can also examine the types of resources viewed by each LC. The latter provide a somewhat more substantive window into possible uses of these materials at each school.

In general, the strength of the event data is their reliability as records of log-ins, searches, and online views. One caveat, however, is in order. To make the system as convenient as possible for LCs, we do allow them to download resources to their own computers. While such downloading is an indication of value, the system does not record which particular resources are downloaded and we have no information

about the extent to which LCs use these downloaded resources offline. We know from interview data that some users engage in more of-line activity than others.

**Coach library data.** System use data also provide records of the containers (similar to document files on a desktop computer) that users create on the system and the resources they save to the containers. These coach library data inform us of the resources that sufficiently interest an LC to save perhaps to use in an upcoming workshop, for her own professional study, or simply for a closer examination at a later time. Unfortunately, the creation of containers is not time-stamped and as a result we do not know precisely when each container was created or resources stored. We can, however, approximate this information by tracking additions and changes to each coach's library by comparing the contents at a given time point to those at a previous time point.

This report focuses on the event data to examine potential measures of system use.[2] We use these data to investigate the following questions:

- To what extent are LCs using the PDS<sup>2</sup> library?
- What kinds of resources are LCs engaging with?
- How thoroughly are LCs examining video-case material?

Lastly, it is important for us to keep in mind what we can and cannot learn from these data. They provide information about each literacy coordinator's online use of the resources in the PDS<sup>2</sup> library. They do not provide information about the extent to which the literacy coordinators have actually used library resources with teachers. The extent to which online use correlates with use in professional development can be only be assessed through the coach log data described below.

### ***Literacy Coordinator Interviews***

We interviewed the nine LCs about their use of PDS<sup>2</sup> in each of the first two years that they have had access to these resources. We will conduct a third and final interview next spring. Additionally, we have interviewed all eighteen coordinators each year about their role and work as coaches implementing Literacy Collaborative in their schools. We plan to do a third and final "role and implementation" interview next year as well.

The interview material complements the use data in a variety of ways. Through the interviews, we are able to gain insight into why literacy coordinators value PDS<sup>2</sup> as a support for their work (or not) and their response to particular library resources and system functions. Their narrative explanations of their use of the system help us identify and interpret patterns we see in the digital data. The digital use data, in turn, have both suggested and allowed us to sharpen interview questions. Insights from interviews also support ongoing project design work on PDS<sup>2</sup>. The interviews about "role and implementation" are particularly valuable for understanding the LCs' beliefs about the role of teacher reflection in their implementation of Literacy Collaborative and their sense of self-efficacy around supporting teacher reflection. Because the intent of PDS<sup>2</sup> is to support such reflective teacher activity in schools, these LC attributes are key considerations.

We are currently working on a comprehensive analysis of the interview data. In this report, we draw on a small part of this material to examine the construct validity of the system use data presented here.

### ***Literacy Coordinator Logs***

The third source of data on use of PDS<sup>2</sup> is the LCs' online logs of their professional development and coaching activities. These logs indicate whether an LC has used video material in a particular professional development session and the source for the video, such as PDS<sup>2</sup>. The coaching logs were added to the data collection plans beginning in January 2006. We have data for the full 2006–2007 school year and half of the previous school year. These data allow us to examine directly the relationship between online system use of PDS<sup>2</sup> resources by LCs and their subsequent use in school-based professional development activities.

## **Creating Use Measures for PDS<sup>2</sup>**

We consider several measures below that are simple counts of users online actions: number of log-ins, number of searches, and total resources viewed. We also consider a measure, unique resources viewed, which omits multiple views of the same resource. A fifth measure is estimated time-on-system. Because individual resources are designed to be part of video-cases, not stand-alone materials, we also consider a measure based on the number of video-cases examined.

## Two General Use Measures

In Figure 1, we first consider the number of times each LC logged-in to PDS<sup>2</sup>. The data in this figure and in all subsequent displays are color-coded by individual LC, allowing us to look across the displays to visualize patterns of system use by different LCs. Attachment A provides month-by-month and cumulative details on the use variables displayed below.

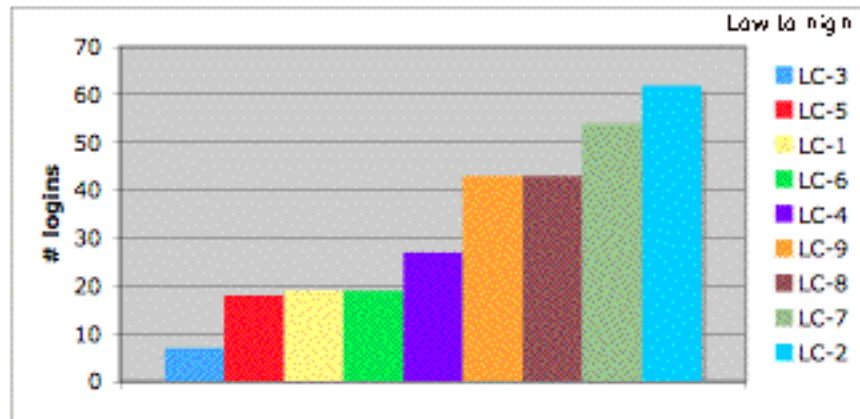


Figure 1. Number of Log-ins

During the course of 16 calendar months (13 in-school months when LCs primarily use the system), the number of log-ins for the nine LCs ranged from under 10 by LC-3 to above 60 for LC-2. Putting aside LC-3 who is basically a non-user, these data suggest two broad groups of participants: more active uses, who logged-in over 40 times (LC- 9,8,7 and 2), and less active users, who logged in about 20 times (LC- 5,1,6, and 4).

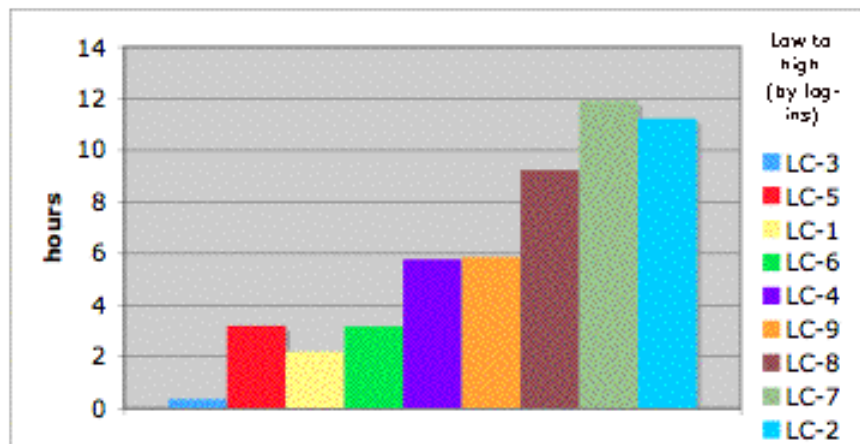


Figure 2. Estimated Time-on-System

Figure 2 shows the estimated time-on-system for each user. These user data are ordered by number of log-ins presented in Figure 1. In terms of time use, there appear to be three groups of users here: LCs 5, 1, and 6 are at the low end with 2 to 3 hours on the system, LCs 4 and 9 spent approximately 6 hours on the system, and LCs 8, 7, and 2 were online for between 9 to 12 hours. As attachment A details, the more active users were active in at least 10 out the 13 in-school months and averaged approximately one hour of use per active month.

## Three Resource-Level Measures

We also examined the total number of resources viewed by each LC, the number of unique resources examined, and the total number of searches conducted. These results are presented in Figure 3 with the cases again ordered here by number of log-ins. Again excluding the one non-user, LC-3, total resources viewed ranges from 61 to 214, number of unique resources viewed ranges from 24 to 118, and number of searches ranges from 21 to 277.

In principle, these data provide a bit more depth of view about system use than just the simple measures of log-ins and time-on-system considered above. Not surprisingly then, we do observe a somewhat different picture here. LC-4 now appears to be a more active user than LC-9. Similarly, LC-8 now appears more active than LC-7.

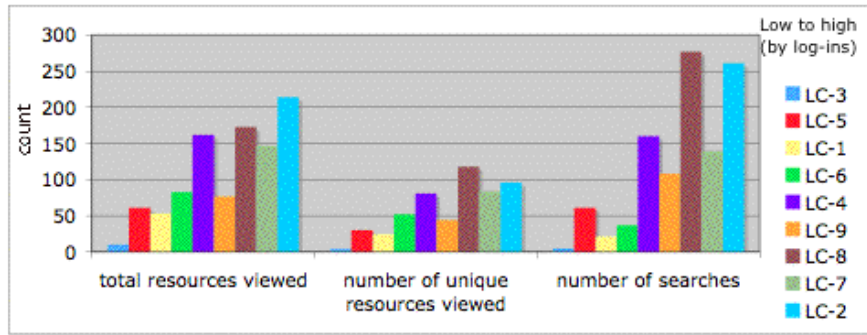


Figure 3. Number of Viewing and Searching Events

Although the total sample size here is small, these results nonetheless suggest that these three measures add some additional information above and beyond the simple log-in and time-on-system indicators. This suggests that for subsequent project analyses we create a composite measure that aggregates across these five separate indicators.

As a final check on this idea, we computed the simple correlations among the five indicator (see Table 1 below). Not surprisingly, the number of log-ins and estimated time-on-system correlate almost perfectly (.957). The correlations among total resources viewed, unique resources viewed, and number of searches range between .928 and .949. Also as expected, the correlations are a bit weaker between number of log-ins and time-on-system on the one hand and total resources viewed, unique resources viewed, and number of searches on the other hand, ranging between .773 and .883. Even so, all of this seems highly consistent with creating an overall composite for System Use.

|                                     | <i>number of log-ins</i> | <i>estimated time-on-system</i> | <i>total resources viewed</i> | <i>number of unique resources viewed</i> | <i>number of searches</i> |
|-------------------------------------|--------------------------|---------------------------------|-------------------------------|--|---------------------------|
| <i>number of log-ins</i>            | 1                        | .957                            | .821                          | .773                                     | .809                      |
| <i>estimated time-on-system</i>     | .957                     | 1                               | .883                          | .869                                     | .846                      |
| <i>total resources viewed</i>       | .821                     | .883                            | 1                             | .949                                     | .928                      |
| <i># of unique resources viewed</i> | .773                     | .869                            | .949                          | 1  | .934                      |
| <i>number of searches</i>           | .809                     | .846                            | .928                          | .934                                     | 1                         |

Table 1. Correlations among Five Use Measures

### A Video-Case Level Use Measure

As mentioned previously, a video-case is a collection of individual resources and usually includes video, professional commentary, professional development ideas, classroom context, reference materials, and FAQs. Figure 4 displays the total number of video-cases viewed by each LC. The range, not including LC-3, is 11 to 42 video-cases. More active users have typically looked at individual resources nested with 30 to 40 video-cases. Less active users examined resources within 10 to 20 video-cases.

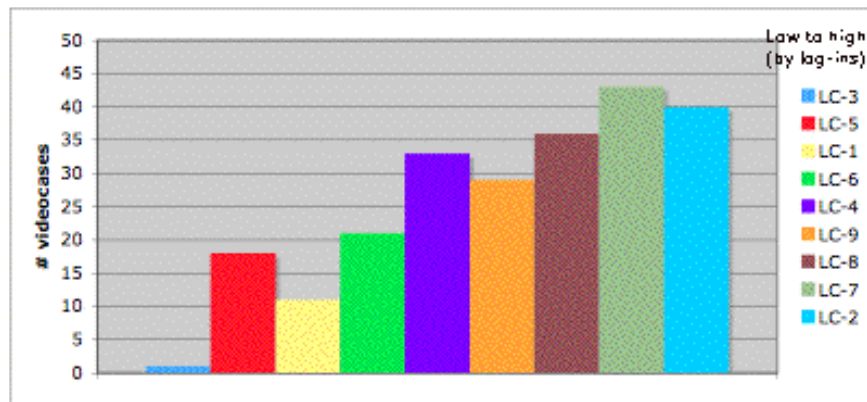


Figure 4. Number of Video-Cases Examined

In principle, a use measure at the level of the video-case aligns better with the overall the conceptual organization of PDS<sup>2</sup>. Counts of individual resources alone may exaggerate resource use. LC-2, for example, has viewed over 3 times as many unique resources as LC-5 (see information previously presented in Figure 3), but only about twice as many video-cases. On the other hand, counts of video-cases alone may underestimate resource use if some LCs considers multiple resources per video-case. For example, LC-8 has viewed fewer video-cases

than LC-2, but a greater number of unique resources (see information previously presented in Figure 2). These results suggest that, in our subsequent project analyses, we may want to include total number of video-cases examined as a companion to the overall composite measure described above.

## Taking a Deeper Look at These System Use Measures: Modes of Use

In this next section of the report, we probe more deeply into the online event data to better understand modes of use of the resources. We address questions such as the following: To what extent do LCs return to the resources they open? Do the LCs tend to view multiple resources in video-cases or just the video itself? What types of resources do the LCs tend to view? What do these additional probes tell us about our use measures?

It is important to recognize that viewing a PDS<sup>2</sup> resource simply means that an LC opened a text or video file on the Teachscape platform. An examination of how many times a user looks at a particular multi-media resource may provide some additional insights into the LC's likely depth of interest in it. It seems reasonable to assume that if an LC goes to the same resource on multiple occasions she likely values it. By extension, it seems more likely that she will subsequently use the resource in school-based PD. By analogy, a one-time examination of a multi-media resource may be akin to window shopping — “just looking,” not buying.

Figure 5 displays the number of occasions on which each LC viewed particular individual videos. The pattern for one time viewing is quite similar to what we saw in Figure 4 for the total number of video-cases examined. More active system users (LCs 8, 7, 2) have examined between 22 and 26 videos and less active users (LC 5, 1, 6) have examined 4 to 12 videos. LC 4 and 9 are mid-range users here, examining 14 and 16 videos.

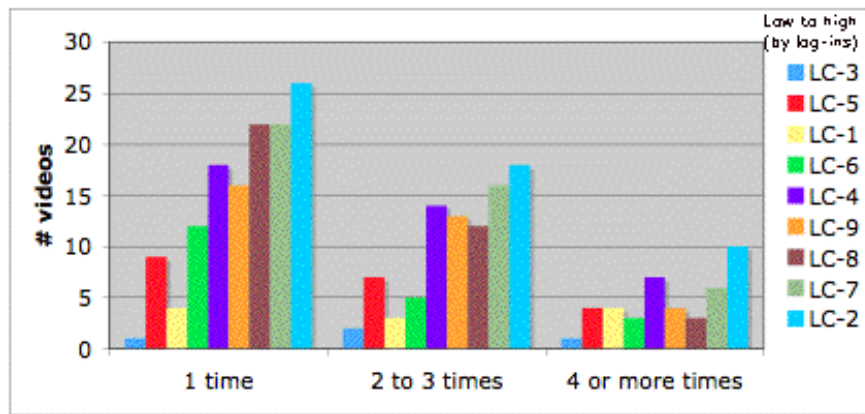


Figure 5. Number of Videos LC Viewed 1 Time, 2-3 Times, 4 or More Times

A similar pattern occurs for the number of videos viewed 2 to 3 times. More active users viewed 12–18 videos while less active users viewed 5–7 videos. In terms of the number of videos viewed 4 or more times, the range shrinks considerably. With the exception of non-user LC-3, the data for the remaining LCs tend to be within a similar range of 3 to 6 videos.

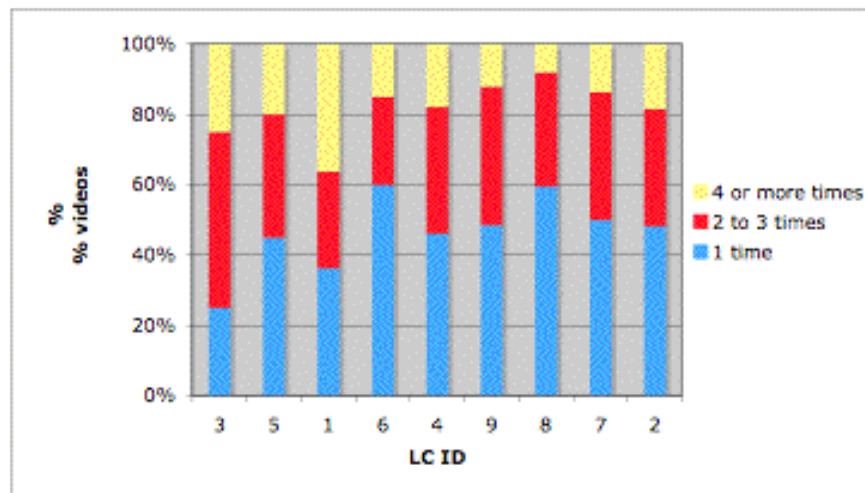


Figure 6. Proportion of Videos Viewed Once, 2 to 3 Times, and 4 or More Times

Another way to view this same information is in terms of the proportion of videos each LC viewed 1 time, 2 to 3 times, and 4 or more times. This is presented in Figure 6. Again, the LCs are listed in order of number of log-ins (i.e. our simple index of overall system use). Even though more active system users are reviewing more video materials, the proportions of videos they view 1 time, 2-3 times, and 4 or more times tend to be quite similar to their less active counterparts. In general, LCs tend to view 45–60% of videos only once and 10–20% of these resources four or more times. LC-1 does stand out, however. While she tends to view fewer videos than her colleagues, she is much more likely to examine each video on multiple occasions. LC-5 tends in this direction as well. There is some evidence here that less active users, foregoing breadth, may be demonstrating some greater depth or thoroughness in use of selected resources.

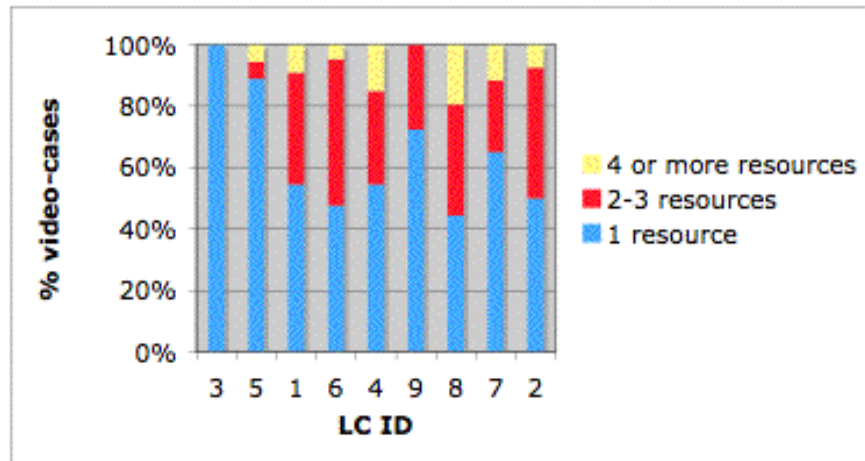


Figure 7. Proportion of Video-Cases by Number of Different Resources Viewed

Pursuing this theme a bit further, the results presented in Figures 7 (above) and 8 (below) probe more deeply into how LCs use the various resources that comprise video-cases. (These results complement those previously presented in Figure 4 on the number of video-cases examined.) Figure 7 displays the proportion of video-cases in which an LC views only one type of resource (typically video), 2 to 3 kinds of resources, and 4 or more resources. Note that LC-8 examined fewer video-cases than LC-2 (see Figure 4), but she appears to have examined the cases in more depth, having considered four or more resources in a substantially larger percentage of the video-cases that she reviewed. This suggests that extent of video-case use (number of video-cases) and thoroughness of video-case exploration (number of different resources viewed) are separate dimensions that may be worth consideration in subsequent analyses.

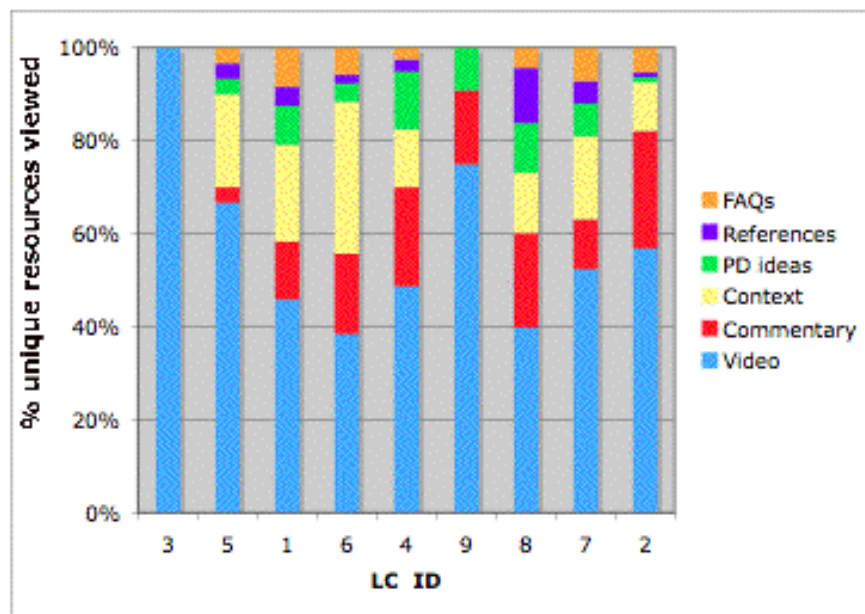


Figure 8. Types of Resources Viewed

Finally, the data in Figure 8 on use of the different types of resources that comprise video cases complements the information on the number of unique resources viewed previously in Figure 3. It provides substantive detail on the broad types of resources — video, professional commentary, classroom context, professional development ideas, reference materials, and FAQs — that each LC viewed. In this display, the types of resources viewed are represented as a proportion of the total number of unique resources examined by each LC.[3]

This figure shows that 40-60% of the resources LCs examine tend to be videos of classroom practice. Beyond this, the commentary and classroom context materials appear to be of most interest. Professional development ideas — suggestions about how these materials might actually be used in school-based activities — attract less attention. Within these trends, however, users vary in terms of the resources they examine, with some, for example, showing greater interest in PD ideas than others.

Note that the patterns in Figure 8 on kinds of resources viewed and Figure 7 on number of resources viewed per case complement each other. Together these data describe the extent to which each LC examines resources other than video and the kinds of resources she tends to consider. For example, from Figure 7 we see that LC-5 mostly views one resource (video) in her exploration of the instructional cases and in Figure 8 we find that, when she does examine other resources, she tends to focus on classroom context. LC-9 viewed 2-3 resources in one-third of the video-cases that she examined (Figure 7) and those resources are mostly commentary and/or professional development ideas (Figure 8). In contrast, LC-8 viewed 2 or more resources in over half the video-cases she examined and looked broadly across the variety of resources available to her. These data suggest some subtle but perhaps highly significant differences in system use patterns that merit further exploration in a subsequent study with a larger number of participants.

## Probing the Construct Validity of These Measures

We have discussed so far a number of possible measures based on information recorded as a by-product of use of the Teachscape platform. In varying ways, all of these indicators capture aspects of the extent and modes of system use. In this section of the report, we turn to our LC interviews and LC work logs in an effort to understand better what these data indicate substantively about LCs use of PDS<sup>2</sup> in school-level professional development.

### Interview Data

The event data identified LC-2 as the most active user of the system. It is instructive to examine how she thinks about the resources provided by PDS<sup>2</sup>. In particular, she believes in using the video materials primarily to show “best practices” to her teachers:

I think, really, I would like better quality (videos)... I would love nothing more than to have high-quality videos to show my staff. Especially the initial-level training people, it really needs to be — not perfect because we know there isn't a perfect lesson — but it needs to be really best practice.

Recall, however, that the system was specifically designed with the intent of encouraging reflective practice and developing teachers and coaches skills in analyzing practice. For this reason the multi-media library includes many examples of ordinary classroom lessons within comprehensive literacy. LC-2 has not, at least as of yet, embraced this objective. Similarly, LC-5 shares LC-2's perspective and suggests that the extent of her system use is partly due to having to search the resource base to find these exemplary videos:

I'm grateful for the assets because the modules or the videos that we leave Literacy Collaborative training with, while they may be exemplars, aren't of the best video or audio quality. So I felt like I was left without anything to show my teachers. So with the assets, while we may have to SEARCH (emphasis added by transcriber to reflect a perception of emphasis by the speaker) for exemplar examples, they're at least of high quality...

In contrast, both LC-1 and LC-8 reported in their interviews that they identify videos by teaching component and grade level and they tend to use video that meet criteria in these areas. They are not weeding out video if it is not exemplary. The beliefs of these individual LC about the use of video are more consistent with the designers' intents around reflective practice. For example, LC-8 commented:

I think the value is not so much to show a perfect lesson as to show, “This is why this teacher made this decision.” Teaching decisions are based on the kids you're working with.... I don't want them to think that you have to structure it [classroom practice] just like this. I want them to know the most effective way to respond to a child so their teaching is effective.

Although LC-1 uses the system less than LC-8, she tends to talk about the value of video in similar way to LC-8. Video creates opportunities for discussion about teaching and learning.

In general, the LCs value PDS<sup>2</sup> videos for their “real world” quality.

I really value them in that they're up-to-date and believable. (LC-7)

It's the idea of theory and understanding and then seeing it in practice and how concrete that experience is for people because you can't...it's very helpful to see it in action. It just helps level the playing field in terms of what that looks like cause who knows what someone's imagining! ...there are teachers who look just like them who are in urban, suburban settings... (LC-3)

Even so, the LCs have a tendency to want to use the videos to "demonstrate practice" rather than as a context for "reflection on practice:"

I just think that teachers want to see. Kind of the biggest thing that comes out from teachers is that they want to SEE more. So the power of the video, number one, is seeing what the pieces of the framework are SUPPOSED to look like (emphases added by transcriber). (LC-9)

Through further analysis, we hope to understand better how these beliefs influence overall patterns of use of PDS<sup>2</sup>. Just as the kinds of resources viewed and thoroughness of video-case exploration may not be closely related to extent of system use, these beliefs about the value of PDS<sup>2</sup> may not be either. This suggests that LCs looking for exemplary practice may still be able to adapt PDS<sup>2</sup> to their purposes, even though most of the resources in the system were not explicitly prepared for this purpose.

In the end, we are left with the question of what accounts for the differences in use between LC-1 and LC-8 and between LC-5 and LC-2. In both pairs, the LCs have similar beliefs about the use of video, but one is a more active user of the system. Future analysis using our survey measures may provide an explanation.

### Coach Log Data

As mentioned earlier, the LCs keep logs of their professional development and coaching activities. These provide another window into PDS<sup>2</sup> use. The following display, Figure 9, shows the number of 2nd year training classes in which LCs used videos in the 2006–2007 school year.

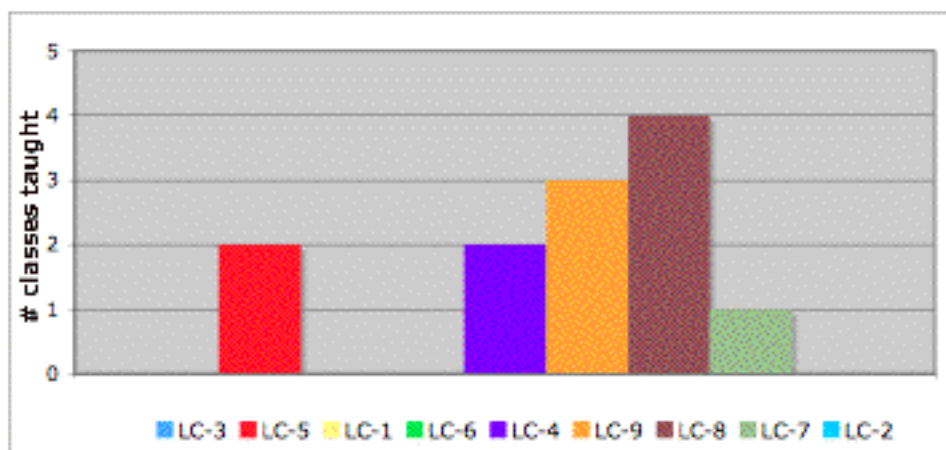
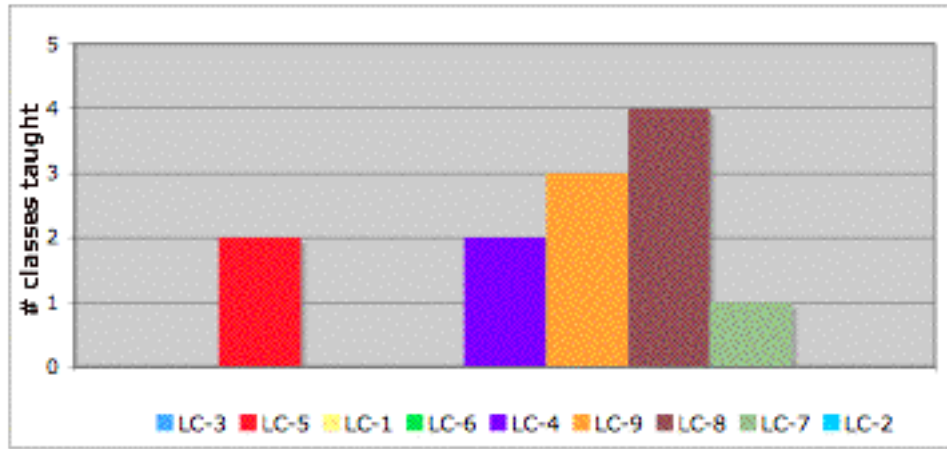


Figure 9. Use of PDS<sup>2</sup> Resources in 2nd Year Classes in 2006–2007

Four LCs have not used PDS<sup>2</sup> resources at all in professional development activities with their second year teachers. These LCs tend to be the less active users of the system, though LC-2 is a notable exception. The range for the five LCs who have used the resources is 1 to 4 classes. Because classes are typically held about once a month throughout the school year, LC-8 is a "high-end user," drawing on system resources in about every other training class.

Four LCs ran two training cohorts in 2006–2007, which means that in addition to their 2nd year class, they conducted an introductory class as well. Operating two cohorts of this sort tends to be common in large schools because there is a limit to how many teachers an LC can work with at any one time. Of these four LCs, two (LCs 1 and 2) have not used PDS<sup>2</sup> resources with their 2nd year class, but are using them with their introductory class. LC-7 is using the resources much more frequently with her introductory than 2nd year class. Only LC-8 used the resources a significant amount in both classes. Introductory classes are held twice a month and for twice the amount of time over the course of the school year than the 2nd year classes. This may partly account for the higher use. Yet the interviews also suggest that LCs tend to use video primarily to teach the structures and procedures of practice and introductory classes focus on these structures and procedures.



**Figure 10.** Use of PDS<sup>2</sup> Resources in Introductory Classes in 2006–2007

*Note: that only four LCs had two training cohorts of teachers in 2006–2007, running both an introductory and 2nd year class.*

These data begin to shed light on a major program design issue for the Literacy Collaborative. In order to deepen teachers’ understanding of practice through analysis of ordinary records of practice, the Literacy Collaborative needs to address more explicitly coordinator concerns about their own self-efficacy both vis-à-vis analyzing practice and orchestrating case-based discussions of such practices with their teachers. As an individual LC commented:

One of the biggest things that take a lot of time is for me to sit down and look at the video and then thoughtfully think about how I can use it in the [professional development] classroom. So I tended to use the videos that I was already familiar with in the sense of what we used in training when we all gathered together for professional development as Literacy Coordinators. I felt like I’d have more understanding of that, to have more talking points, with the teachers. And I think that that kind of feeling sometimes prevents me from using the other videos because I’m not quite sure how to interpret some of the videos or I guess a little bit of fear of where to take the discussion. (LC-4)

In principle, LCs have supposedly been engaging in this type of activity all along under the Literacy Collaborative professional development model. The introduction of PDS<sup>2</sup> and the conduct of this study, however, has made clear how difficult this may actually be for novice coordinators and how little of this may actually be occurring.

## Summary and Conclusions

This report presents an analysis of the use of a multi-media professional development support system by nine literacy coaches working with K–2 teachers. A primary purpose has been to explore possible measures of coaches’ use of the system. These measures will be employed in our larger study of the effects on teachers’ practice and student learning of Literacy Collaborative, which is a comprehensive school reform model that includes literacy coaching as a core component. As a part of this larger study, we seek to determine the value the coaches’ use of the technology-based system adds to improvements in teacher practice and student learning. We need reliable measures for this purpose.

This report describes the data we have collected on the coaches’ use of the professional development support system over a two-year period, including digital data from the system, interviews with the literacy coaches, and coach log data. To consider possible measures of system use, we focus on analysis of data generated from three kinds of online events — logging in, searching, and opening resources. We examine six possible use measures based on this analysis: number of log-ins, estimated time-on-system, number of searches, total resources viewed, unique resources viewed, and number of video-cases examined.

We also report on our analyses of the “online events” in an effort to understand better potentially different modes of use of the resources. These analyses suggest that there is a dimension of depth, in addition to breadth, to consider in resource use. An LC’s use of the system may demonstrate one, the other, or both of these dimensions. We may want to further analyze our use measures in terms of these dimensions and consider additional measures to represent them, if needed.

Our probe of modes of use also considered the types of resources coaches examined. The results suggest that some coaches use the substantive resources accompanying the videos more than others. Patterns in types of resources coaches use may differ in ways that reveal differences in the coaches’ expertise, their beliefs about the purposes of their professional development work with teachers, and/or the developmental status of comprehensive literacy practices in their schools. They may also reveal differences in the substance and quality of the coaches’ actual professional development activities. While the study sample size may be too small to quantify these differences, our

data are sufficient to support further descriptive exploration of potential relationships among use of resources, coaches' characteristics, and the actual work of coaching.

Our analysis of the event data, in the end, suggests that more log-ins tends to mean more overall system activity, including more time on the system, more resources viewed, more searches, and more video-cases viewed. It also tends to mean more videos viewed multiple times and more video-cases in which 2 to 3, and 4 or more resources are examined (this figure not shown). The color-coded figures in this report shows, however, that there are some notable differences among users on different measures in relation to the number of log-ins. This suggests the need for a composite measure.

An exception to the "more means more" generalization is that more log-ins does not necessarily mean more active use of the substantive resources in the system. The use of these substantive resources seems to be a separate dimension from amount of use.

In the last section of this report, we analyzed data from interviews with the coaches and logs of their activities to examine what our measures might be telling us about use of PDS<sup>2</sup> in actual professional development activities. The interviews suggest that beliefs about the use of video in professional development vary among the coaches. A few are focused on the value of video for creating a common experience in a learning community of teachers and generating opportunities for discussion about teaching and learning. A greater number are focused on video's value for demonstrating practice through exemplars of classroom practice. However, our designations of more or less active users, based on proposed use measures, appear to provide no insight into coaches' beliefs about the value of video in professional development activities.

Finally, the coach log data confirms what the interview data initially suggested: coaches tend to use the PDS<sup>2</sup> resources more with their introductory than their 2nd year classes. Such use is consistent with beliefs about the value of video for demonstrating the structures and procedures of practice. Interestingly, the coach log data reveals that three of our more active users had an introductory class in both years of the study.[4] This raises the question of whether LCs who have used the system more have done so primarily to serve a larger number of professional development classes. To evaluate this simple explanation, we need to conduct a more detailed examination of the use data, for example in terms of periods of use rather than cumulative use. Also we need to examine the coach log data from the previous year when all the coaches had introductory classes. At this point, it is difficult to conclude whether more active coach engagement with PDS<sup>2</sup> actually means increased use of system resources in professional development activities with a given set of teachers.

| LC-2                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 62    | 2    | 7   | 7    | 2   | 6   | 4   | 2   |      |      |     | 3    | 17  | 1   | 5   | 6    |     |     |
| # of views            | 214   | 5    | 28  | 25   |     | 15  | 19  | 2   |      |      |     | 1    | 49  | 4   | 36  | 30   |     |     |
| # of searches         | 261   |      | 23  | 44   | 4   | 16  | 9   | 4   |      |      |     | 47   | 58  | 1   | 2   | 53   |     |     |
| time (minutes)        | 675   | 18   | 84  | 80   | 7   | 42  | 36  | 4   |      |      |     | 13   | 151 | 8   | 44  | 188  |     |     |
| time (hours)          | 11.2  |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 12    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 53    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-7                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 54    | 5    | 5   | 7    | 12  | 7   | 1   |     |      |      | 4   | 3    | 3   | 3   |     | 4    |     |     |
| # of views            | 147   | 26   | 3   | 36   | 17  | 11  | 3   |     |      |      | 11  | 8    | 10  | 12  |     | 10   |     |     |
| # of searches         | 140   | 18   | 10  | 12   | 6   | 14  |     |     |      |      | 14  | 11   | 12  | 38  |     | 5    |     |     |
| time (minutes)        | 714   | 81   | 10  | 98   | 69  | 62  | 2   |     |      |      | 19  | 141  | 86  | 84  |     | 62   |     |     |
| time (hours)          | 11.9  |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 14    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 53    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-8                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 43    |      |     |      | 5   |     | 2   |     |      |      | 4   | 10   | 7   | 5   | 5   | 1    | 2   | 2   |
| # of views            | 173   |      |     |      | 11  |     | 10  |     |      |      | 14  | 32   | 69  | 16  | 7   |      | 8   | 6   |
| # of searches         | 277   |      |     |      | 14  |     | 6   |     |      |      | 61  | 10   | 87  | 9   | 34  | 5    | 49  | 2   |
| time (minutes)        | 555   |      |     |      | 45  |     | 43  |     |      |      | 31  | 102  | 186 | 60  | 46  | 4    | 23  | 15  |
| time (hours)          | 9.2   |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 12    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 32    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-9                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 43    | 1    |     | 3    | 11  |     | 3   |     |      |      |     |      | 10  | 2   | 2   | 8    | 3   |     |
| # of views            | 77    | 1    |     | 6    | 22  |     | 12  |     |      |      |     |      | 12  | 4   | 5   | 13   | 2   |     |
| # of searches         | 108   |      |     | 28   | 7   |     | 23  |     |      |      |     |      | 14  | 10  | 1   | 18   | 7   |     |
| time (minutes)        | 350   |      |     | 78   | 44  |     | 51  |     |      |      |     |      | 62  | 14  | 20  | 54   | 26  |     |
| time (hours)          | 5.8   |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 12    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 47    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-4                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 27    | 6    |     |      | 2   | 10  | 4   |     |      |      |     |      |     |     |     | 3    | 2   |     |
| # of views            | 162   | 26   |     |      | 1   | 47  | 60  |     |      |      |     |      |     |     |     | 12   | 16  |     |
| # of searches         | 160   | 34   |     |      | 2   | 31  | 48  |     |      |      |     |      |     |     |     | 18   | 27  |     |
| time (minutes)        | 347   | 110  |     |      | 4   | 101 | 71  |     |      |      |     |      |     |     |     | 29   | 32  |     |
| time (hours)          | 5.7   |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 4     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 9     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-6                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 19    |      | 3   | 2    | 1   | 4   | 1   | 1   |      |      |     |      | 3   |     |     | 4    |     |     |
| # of views            | 53    |      | 8   | 6    |     | 15  | 6   |     |      |      |     |      | 7   |     |     | 11   |     |     |
| # of searches         | 21    |      | 4   | 4    |     | 4   | 9   |     |      |      |     |      |     |     |     |      |     |     |
| time (minutes)        | 132   |      | 49  | 14   |     | 31  | 8   |     |      |      |     |      | 20  |     |     | 10   |     |     |
| time (hours)          | 2.2   |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 5     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 18    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-5                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 18    | 1    | 2   | 1    | 1   | 5   |     |     |      |      |     |      | 5   | 1   |     |      |     | 2   |
| # of views            | 61    |      | 7   | 22   |     | 25  |     |     |      |      |     |      | 1   | 5   |     |      |     | 1   |
| # of searches         | 61    |      | 3   | 12   | 1   | 27  |     |     |      |      |     |      |     | 13  |     |      |     | 5   |
| time (minutes)        | 193   |      | 35  | 71   | 1   | 57  |     |     |      |      |     |      | 11  | 12  |     |      |     | 6   |
| time (hours)          | 3.2   |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 6     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 19    |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

| LC-3                  |       | 2005 |     | 2006 |     |     |     |     |      |      |     |      |     |     |     | 2007 |     |     |
|-----------------------|-------|------|-----|------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|
|                       | TOTAL | Nov  | Dec | Jan  | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan  | Feb | Mar |
| # of logins           | 7     |      |     | 2    |     |     |     |     |      |      |     |      |     |     |     | 2    | 3   |     |
| # of views            | 10    |      |     |      |     |     |     |     |      |      |     |      |     |     |     | 4    | 6   |     |
| # of searches         | 5     |      |     |      |     |     |     |     |      |      |     |      |     |     |     | 2    | 3   |     |
| time (minutes)        | 33    |      |     |      |     |     |     |     |      |      |     |      |     |     |     | 9    | 13  |     |
| time (hours)          | 0.36  |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # containers created  | 1     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |
| # items in containers | 0     |      |     |      |     |     |     |     |      |      |     |      |     |     |     |      |     |     |

[1] Note we also have data on the use of the online learning groups, but we know from our interviews with the LCs that there has been only limited use of learning groups to date.

[2] The utility of the coach library data is less clear to us at this point as interviews with some LCs suggest that their containers have been inactive for some time and others are choosing to store materials offline on their own computers, rather than using the Teachscape functionality for this purpose.

[3] Note that other resources in the system are teacher commentary, student work artifacts, and pictures of classroom environment. These are not included in the analysis because these materials are available for a limited number of video-cases and their use is low.

[4] It is worth noting that in our work to develop new technologies for schools, we have repeatedly encountered users who cite time as a primary reason for not using the technology as much as they think they should. Here we have evidence that the practitioners who presumably have the least amount of time to use technology because they serve the greatest number of teachers are using the technology the most. Future analysis may help us explain why this is occurring.