



Evaluating campus-wide deployment of new technologies for learning:

Using the Flashlight methodology to evaluate Purdue University's pilot test of Macromedia® Breeze® (now Adobe® Acrobat® Connect™ Professional)

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Executive summary

Educational institutions usually pilot test educational applications before deciding whether to deploy them for the entire enterprise. This white paper outlines TLT Group's Flashlight methodology for evaluating Purdue University's pilot test of Macromedia Breeze, now called Adobe Acrobat Connect Professional. The evaluation indicated that the application could be of wide value to Purdue and would be relatively easy to support. The university has now begun deploying Acrobat Connect Professional across the campus.

This white paper:

1. Describes Purdue's teaching and learning environment to establish a context for this evaluation.
2. Establishes the key factors that institutions need to consider when selecting academic technologies intended for enterprise adoption.
3. Describes the Flashlight methodology used by TLT Group and Purdue to conduct an evaluation of Acrobat Connect Professional that was tailored for Purdue's particular uses.
4. Describes what that evaluation revealed about the suitability of Acrobat Connect Professional for deployment at Purdue.
5. Describes some of the lessons that Purdue University learned about the evaluation process, and the methodological changes it would consider making for future assessments of academic technology.

Introduction

Universities and colleges have heavily invested in a variety of technologies specifically designed to facilitate enhanced teaching and learning across the institution, such as computers, course management systems, digital library software, and many other software packages. These technology products and platforms have several things in common:

- They can be used by faculty and students in many disciplines.
- The upfront cost of acquiring the software is often substantial.
- The operating costs of training and support are often substantial.

Because of the potential value, institutions are continually evaluating and experimenting with new applications. Because of the costs, institutions need to be cautious about moving from pilot test to full deployment. This white paper describes a methodology for evaluating the results of pilot tests to help institutions decide whether to move to full deployment. The paper then describes how that methodology was applied to Purdue University's decision about deploying Acrobat Connect Professional, a sophisticated communications system used for web-based collaboration, presentations, coaching, and other synchronous and asynchronous communication scenarios.

Methodology

The Flashlight methodology begins with one key idea: the value of a technology can be measured only with respect to some particular use of that technology for some particular purpose. Consider the following analogy: If you need to cut paper and are pilot testing different cutting technologies, you might give scissors a high score and a hacksaw a low score. If, on the other hand, your activity is cutting metal, the hacksaw would do better in an evaluation. Carrying this analogy to the current context, when evaluating a pilot test of a new technology such as Acrobat Connect Professional, the first step is to identify activities for which activities the university hopes the technology will be of greatest value. The second step is to see how the technology does in each of those activities. The Flashlight methodology suggests a series of questions for designing the pilot test:

- **For which activities is the technology likely to be valuable?** Where is the greatest potential value for the new technology, and what is the best combination for its adding value to a valuable activity? The identity of these activities depends on the institution. For example, an online survey system may be of greater use in an institution where many faculty and administrators gather evidence to make decisions than at an institution where surveying is rare.
- **What are the competitive technologies for carrying out each of these activities?** How is each activity currently performed, and what are the strengths and weaknesses of the new technology in comparison? The answers to these questions are even more context dependent. To continue with the previous analogy, two institutions looking at a new survey system may compare it to different competitors, depending on which software each is already using.
- **What are the costs of training and support?** Is the institution able to provide adequate training, troubleshooting, and other forms of support, even if there are thousands of simultaneous users? This too may be context dependent, since different institutions have staff with differing skills, and provide different kinds of technology support services.

In short, two institutions could apply this methodology to the same new technology, and have quite different findings, and as a result make different decisions about whether to deploy the new technology.

About Purdue University

Purdue University is a large, publicly funded land-grant institution with four campuses, located in Indiana. System wide, the campus serves approximately 68,000 students (see "Purdue University by the numbers" at the end of this white paper for indices of Purdue's size). As a land-grant institution, it offers a full range of academic programs in the sciences, social sciences, and humanities, with a strong historical emphasis in engineering and agriculture.

Purdue's Teaching and Learning Technology (TLT) division provides several IT services that support a large percentage of the faculty, student, and course offerings at this large university. For example, Purdue's West Lafayette campus has one of the largest course management system deployments of WebCT Vista in the U.S., with over 93% of the student body using the system across 1,500 sections. In addition to course management, the TLT division centrally supports a variety of other technologies, including computer systems, audio-visual equipment, and classroom response systems (e-Instruction) in over 220 centrally managed classrooms; a central podcasting environment; and over 2,200 student lab computers.

As one of several business units within Purdue University's IT organization, TLT does not operate in a vacuum. The technology solutions supported by TLT have to complement the efforts and activities of other campus IT units. In some cases, TLT services are dependent upon the support

of other IT business units. Specifically, TLT works closely with the central IT Customer Service unit and the central IT Infrastructure unit to develop and maintain many of the teaching and learning technologies.

Designing an evaluation framework

Given the nature of the Purdue environment, campus leaders wanted to develop an evaluation framework that was sensitive to a wide range of issues that could affect the deployment of a potentially popular IT system.

Because TLT Group's aim was to help Purdue decide whether there was a good educational and cost/benefit case for institutional deployment, the pilot test period and subsequent evaluation needed to help Purdue answer three questions:

1. From an academic perspective, will Acrobat Connect Professional be used in ways that make a valuable contribution to teaching and learning?
2. From an IT perspective, was the system compatible with:
 - a. Purdue's standards for security
 - b. Purdue's course management system
 - c. Will Acrobat Connect be compatible with Purdue's security standards, course management system, and current infrastructure?
3. From a support perspective, could Acrobat Connect be efficiently supported on a large scale with minimum and predictable staff resources?

TLT Group's formal evaluation activities focused on question 1. Purdue's TLT staff answered question 2 through their own inquiries; that topic is not covered in this white paper. We will discuss briefly how Purdue answered question 3 and how this question might be studied in the future.

Adding value to valuable activities

The broad question on academic contribution and value was broken into the following specific questions.

1. What are the most valuable and widely practiced activities at Purdue for which Acrobat Connect Professional might be of greatest advantage? Several factors need to be considered in answering this question:
 - For which activities is the new technology likely to be helpful?
 - Of those, which activities are most widely used and of greatest importance for Purdue to achieve its mission?
 - For which of those activities would the new technology provide the greatest added value when compared to current available technologies for accomplishing that purpose.

After considering nineteen, three activities were selected where the activity was academically important and the use of Acrobat Connect Professional seemed likely to make the activity even more valuable:

- Live online meetings (for example, working meetings among staff and highly interactive courses)
 - Live one-on-one coaching and tutoring
 - Participation in presentations and other courses
2. When considering these particular instructional uses of Acrobat Connect Professional, do pilot test participants see Acrobat Connect Professional contributing to better learning? There are several ways in which technology can improve education. For example, it can enable more valuable content to be taught. It can, help the institution serve students that might not otherwise get an education, or lower the cost of key institutional activities.

In the context for which Acrobat Connect was to be used, it made sense to focus on activities that, according to Chickering and Gamson (1987), are especially important for improving learning outcomes. These are activities where:

1. Student-faculty contact is encouraged
2. Cooperation among students is encouraged
3. Active learning is encouraged
4. Prompt feedback is promoted
5. Time on task is emphasized
6. Communication of high expectations are communicated
7. Respect for diverse talents and ways of learning

Chickering and Ehrmann (1996) later illustrated how faculty often use technologies for just these purposes. To gauge how much Acrobat Connect Professional would improve educational outcomes, we asked participating faculty whether Acrobat Connect Professional was enhancing these educational activities.

These items are also an index of value as well as help us answer our third question about technology support.

2. Compatibility with current IT infrastructure

One of the issues facing many IT organizations is the difficulty often faced in integrating a new system into an existing set of services. They often have a set of established expertise areas, as well as internal policies and procedures for IT systems deployment. In terms of teaching and learning systems, we had three basic criteria.

First, can the system leverage the existing authorization and authentication framework? Systems that require internally managed IDs and passwords are looked down upon. The ability to draw upon existing LDAP or similar authorization and authentication systems is a fundamental aspect of “enterprise” systems.

Second, a university’s course management system (CMS) is often its largest eLearning technology investment. It has a broad range of functionality and establishes a good base for a wide range of activities. From Purdue’s perspective, other systems are valuable to the extent to which they add missing components and additional functionality to the central CMS. In addition, can the systems be integrated so that one system can be accessed within another? Is there an integration framework already in place, or can one be easily developed?

Third, does the system take advantage of existing technical knowledge and infrastructure? For instance, if the vast majority of systems within an IT unit are Windows® based, deploying a UNIX® based solution might be more expensive than were it deployed in a unit that already supported other UNIX applications. Being compatible with existing systems helps avoid unnecessary problems and expenses down the road.

Assessing support implications for the academic enterprise

Systems need to be efficiently supportable if they are to scale appropriately. On a large scale, even minor problems can become serious burdens. Addressing a problem in a package that makes up 10% of the system is not difficult if you only have 10 users. However, if the user base grows to 5,000, that same issue can create unsustainable demands on the support staff.

Ballooning support demands is an issue that Purdue has had to frequently face as the use of enterprise educational systems has grown. These experiences made it clear that demands on support needed to be a part of the evaluation. Anticipating the support needs in advance of a large deployment can help identify long-term costs.

Applying the Flashlight methodology: Evaluating the Acrobat Connect pilot test

This section of the white paper focuses the first evaluation question of to what extent would Acrobat Connect Professional be used to make valuable improvements to academically valuable activities. As described above, we focused on three areas:

- Live online meetings (for example, working meetings among staff and highly interactive courses)
- Live one-on-one coaching and tutoring
- Participation in presentations and other courses

About 50 pilot users in total were recruited after the user groups had access to Acrobat Connect Professional for approximately two months. The survey asked whether they had used Acrobat Connect Professional for any of these three chosen activities and, if so, how eager were they to use it again for that purpose. The range of answers ran from “strongly desire to use it again” (5) to “strongly desire to avoid it” (1).

| Activity for which Acrobat Connect Pro was used | Score of eagerness to use Acrobat Connect Pro again Strongly desire to use it again=5, Strongly desire to avoid it =1 |
|--|---|
| Live online meetings | 4.27 |
| Live one-on-one coaching and tutoring | 4.23 |
| Participating in presentations and other courses | 4.33 |

These responses made it clear that pilot participants were eager to use Acrobat Connect again for each of these three purposes.

The second measure was instructional value. Some of the pilot participants had used Acrobat Connect Professional in their courses. We were interested in the activities described in Chickering and Gamson’s “Seven Principles of Good Practice in Undergraduate Education.” How valuable did Purdue faculty members think Acrobat Connect Professional would be for improving each of those activities?

| The Seven Principles of Good Practice: “Please rate how effectively the following learning goals are achieved when using Acrobat Connect Pro to participate in live, instruction-centered events.” | 5=Very well 3=Unsure 1=Very poorly |
|---|---|
| Student-faculty contact is encouraged | 3.7 |
| Cooperation among students is encouraged | 3.7 |
| Active learning is encouraged | 3.8 |
| Prompt feedback is promoted | 4.0 |
| Time on task is emphasized | 3.8 |
| High expectations are communicated | 3.7 |
| Diverse talents and ways of learning are respected | 3.7 |

Although we were hoping for higher ratings, they were encouraging, since faculty were using Acrobat Connect Professional for the first time and with no preparation. Methodologically, it was also clear that the wording in this part of the survey could have been improved.

Improving the methodology: After the survey, we felt that the question regarding the seven principles of good practice was too abstract and ambiguously worded. For example, some respondents may not have known what “time on task” meant, so it’s hard to know what their responses referred to: One person may have focused on training time and given a negative answer, while another may have seen it as later efficiencies and given a positive answer. These difficulties could be addressed by asking more concrete questions.

Another question we would like to ask is how Acrobat Connect contributed to class discussions among students. For instance: Which of the following options best describes the value of Acrobat Connect for class discussion among students or if a discussion would be impossible for students without Acrobat Connect Professional, select “a”.)

- a. Discussion among the students during the class periods was **much more valuable or extensive** than it has been in classes like this without Acrobat Connect Professional.
- b. Discussion among the students during the class periods was **somewhat more valuable or extensive** than it has been in classes like this without Acrobat Connect.
- c. Discussion among the students during the class periods was **about the same as it has been** in classes like this without Acrobat Connect.
- d. Discussion among the students during the class periods was **somewhat less valuable or extensive** than it has been in classes like this without Acrobat Connect.
- e. Discussion among students during the class periods was **much less valuable or extensive** than it has been in classes like this without Acrobat Connect.

If it didn't make the survey too long, we might precede this question by asking the following:

Before using Acrobat Connect, which methods did you use to encourage these types of discussions?:

- a. I have never taught a course like this with students like these.
- b. Because I didn't have something like Acrobat Connect, I didn't try to have such discussions
- c. I brought the students together in a room with a blackboard, whiteboard, or some other way for them to write, and see what others write, while also conducting an oral discussion.
- d. I have used a communications technology such as _____ to support discussions among students.
- e. Other: _____

Another issue to consider in future studies is whether those who volunteer for pilot tests are innovators and early adopters and, therefore, use Acrobat Connect in qualitatively different ways than less-eager faculty and staff. We discuss this issue at greater length in the section "Support and scalability."

Compatibility with IT infrastructure

For complex technologies such as Acrobat Connect Professional, it is important to assess the institution's readiness to support the entire constellation of technologies needed for effective system deployment and use.

Purdue found it relatively easy to support the technological needs of Acrobat Connect Professional—getting cameras was not a problem, and the audio tuning wizard was improved in the latest release. These kinds of contextual technologies are also important issues to think about when considering full-scale implementation of a new technology.

Support and scalability

To understand why support was such an important topic for investigation, consider Purdue's size. The university's four campuses, outreach sites, and online learning programs serve over 68,000 students (full-time equivalent) statewide. It has over 4,000 faculty and lecturers, another 4,000 administrative staff, and 4,000 clerical staff. Along with graduate assistants and others, the university employs almost 18,000 staff, many of whom might use Acrobat Connect Professional if it were fully deployed. In addition, it is not unusual for Purdue's WebCT Vista system to have over 2,000 users logged on simultaneously.

No IT organization can deal with implementation at that level if there are significant support problems. So this part of our evaluation was designed to analyze potential support demands posed by Acrobat Connect Professional.

Rather than providing advance training or support for a technology that might never be deployed, Purdue decided to find volunteers who were willing to figure it out themselves. To put it bluntly, the test was to give early adopters access to Acrobat Connect with virtually no support or training and then “see who came yelling for help” to support staff.

In the survey, participants were asked how long it took them to set up their Acrobat Connect sessions the first time they ever tried it. According to their responses, the average preparation time was 14.7 minutes. (This includes not just setting up the software but also the related hardware and software needed for audio and video, as well as briefing other participants in the session about how to use the system.) We then asked whether that time decreased with familiarity; most people said “yes” (87%).

Only 15% of the pilot users reported having some sort of technical difficulty. In a non-production environment, with no training for most participants, that was considered very encouraging. “For the pilot, we just recruited some users at the beginning of the fall semester and let them try Acrobat Connect,” Bart Collins recalls. “We offered no formal training for any of the pilot users. We wanted to see how much support would be needed, so we started with none. These were, of course, early adopters who often had experience with similar types of technology.”

Improving the Methodology: A study of this type should also get evidence about the learning curve. In the future, we would also ask participants whether they used Acrobat Connect Professional more than once for this or some other activity, and if so, how long did setup take the second time and how long would it take if they became routine users of the system.

There are limits to the strategy of using only interested and technologically savvy participants, because it doesn’t give much insight into the support demands of staff members who may have less curiosity or less patience with new technology. On the other hand, the Purdue method of pilot-testing did not have to find uninterested faculty willing to spend time on a technology that might never be deployed.

Summary judgements

Finally, respondents were asked whether the IT organization at Purdue (ITaP) should move from pilot stage to full implementation.

| | | |
|--|--------|-------|
| Would you recommend that ITaP move Acrobat Connect Pro beyond the pilot stage and make it a generally available resource to faculty, staff, and students? | Yes | 81.1% |
| | Unsure | 13.5% |
| | No | 5.4% |

Support staff opinions were consistent with the survey data. Instructional designers, people who provide application support, and system administrators—the staff directly involved with the pilot—unanimously agreed it was appropriate to move forward.

Making the decision

The survey provided important evidence for Purdue’s decision-makers. After examining the data, they decided that full-scale implementation was both desirable and feasible, so they began discussing the possibility with other units. The three campuses each confirmed that they would pay for part of the cost. For example, an institutional enterprise resource planning (ERP) deployment was underway, and that large teams also wanted to be able to use Acrobat Connect Professional for its meetings. Other units also generated support to help underwrite it. ITaP provided the lion’s share of the funds, but it was important for other units to contribute.

Applying the Flashlight methodology at your institution

The steps that follow are specific to evaluations of pilot tests, so we suggest you also review the TLT Group’s Flashlight Evaluation Handbook material and/or any other texts on evaluation design.

Step 0 (optional): Establish generalized benchmarks

A place to begin is to identify studies that can shape and validate later pilot tests and evaluations. For example, the National Survey of Student Engagement collects data relevant to the seven

principles, which may provide a framework for benchmarking new evaluation programs. At this writing, Purdue and The TLT Group are considering whether to extend this idea to study uses of enterprise applications, to evaluate in which areas its current infrastructure is doing well at supporting activities of fundamental educational importance (for example, faculty-student interaction) and where there are gaps between faculty and student aspirations and technological realities.

Why go to the effort to gather and update this kind of evidence? This data will help your institution decide which educational and technological initiatives are most important. By identifying gaps between educational needs—the activities that ought to be easy to do and easy to support—and reality—what’s actually easy to do and support—your institution will be in a better position to decide where to invest scarce time and dollars in new educational programs, infrastructure, and support strategies.

Step 1: Identify the activities for which using the new technology provides the most value to the institution

It’s important to create a committee or informal group, composed of likely stakeholders, to plan the study. Potential users are more likely to have creative and innovative ways to make use of the new technology.

It usually makes sense to gather a very concrete set of activities and then decide how to sort them into groups. Each cluster of activities may become a somewhat separate study: different users, different competing technologies, different contextual factors. For example, at Purdue, we could have done one study on interactive seminars (using faculty members and students to pilot the technology) and another focusing on IT help desk specialists using Acrobat Connect Professional to see the desktops of remote users (which involves different participants and different competing technologies).

Step 2: Identify participants in the pilot test

Look for people who are interested in each activity. This step could be conducted in parallel with step 1, because those interested in the technology may help you identify the activities around which the study will be designed.

Consider whether to include people who are not early adopters. Some of the reasons for reaching out beyond the usual group is to see whether others consider using the technology for different activities than the early adopters, and also to see whether there’s a difference in the cost of supporting early and late adopters.

Step 3: Budget your pilot test and evaluation

One basic question is, “What’s at stake in this pilot study?” Consider both the potential gains and lifetime costs if this technology is deployed to the whole institution. What are the costs of making a mistake? Use these insights to budget time and money for the pilot study and its evaluation.

Step 4A: Plan your inquiry of the value added to valuable activities

Even before participants begin pilot testing the technology, consider how you will collect data.

Consider the possible issues and pose questions. For each of these questions, has someone else already collected data? Would there be a sufficient payoff to collecting this information?

- Is some form of this activity already accomplished without using the new technology?
- What technologies are used at this point to carry out this activity?
- How frequent is the activity? Has data already been collected?
- How is its effectiveness typically estimated?
- How are its outcomes typically assessed?
- What factors tend to make the activity difficult?
- What incentives encourage people to do this activity?

After the pilot test period, consider asking participants some of the following questions (in addition to some or all of the questions above).

- What are the strengths and weaknesses of the technology when used for this activity, compared with the best alternative way of carrying out this activity?
- Did the participant use the technology repeatedly for this activity, or decide to stop? Why?
- Does the participant recommend that the technology be made available institution-wide? Why or why not?
- For what other activities might this technology provide important value? (The answer to this question might lead to additional pilot testing.)

Step 4B: Plan your inquiry regarding compatibility with your IT infrastructure

This inquiry (typically carried out by IT staff or consultants) will vary by the technology and institutional context. Use your budget estimates from step 3 to gauge how much effort to put into this activity.

Step 4C: Plan your inquiry regarding support

You may want to do what Purdue did and give pilot test participants less support than a typical user might receive after rollout, to save costs and see what happens with minimal support. The risk is losing participants (and their data) if they have too tough a time with the technology. The benefits are that you will get an unfiltered idea of the service and support demands.

For a post-test survey or interview, important information includes:

- Time and frustrations involved in the first use of the technology for this activity.
- Any misunderstandings or skill gaps that unnecessarily contributed to the difficulty.
- How much easier or quicker it was to use the technology the second time.
- Any advice on how to improve support.

In interpreting this data, it's important to check needs and frequency: How much does each participant need to carry out the activity, and how frequently did they use the technology to do it? The greater the need and the more frequent the use, the more quickly the participant will probably learn to use the technology. It's important to collect data from a variety of users: some with high needs and high frequency of use and others who are less committed and less frequent users.

Step 5: Gather and interpret data

Step 6: Work with stakeholders to recommend on whether to deploy the new technology

Evaluative evidence rarely provides decisive, indisputable guidance, but if the studies have been done well, they should provide clear guidance for whether to deploy the pilot technology across the institution.

Final observations

This study marked a step forward for ITaP in the use of data for decision-making. Purdue plans to do more such studies that focus on the combination of effectiveness and support issues.

It's worth repeating that the most important lesson of this study is the strategy for designing locally appropriate evaluations. This Flashlight strategy can be applied to other technologies as well as to other types of institutions. The particular questions may vary, and the answers may be very different, depending on the institution's particular needs and capabilities. But the stakes are too high for institutions to make such decisions blindly. Careful, locally tailored assessments of pilot tests ought to become a standard part of IT decision-making regarding new technologies.

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Purdue University by the numbers

Undergraduate enrollment: 30,875

Graduate enrollment: 6,932

Professional student enrollment: 905

Classes offered: over 5,300

Credit hours offered: 1,107,183

Faculty and lecturers: 2,616

Adjunct faculty: 242

Graduate student staff: 4,461

Extension educators: 272

Faculty/student ratio: 14.7:1

Academic colleges and schools: 9

Academic departments: 120



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