

# Supporting Faculty Goals During Student Presentations via Electronic Note-Taking

Evan Golub<sup>1</sup>

**Abstract** - As we have moved to a more technology-based classroom, much attention has been paid to using computers to present material. Computer-based presentations can be a powerful tool for faculty, but as more and more students are coming to class with laptop and tablet computers, attention is being paid to questioning the opportunities this could present to these students in the form of enhanced note-taking opportunities. This paper explores the idea of faculty (rather than the students) using a computer note-taking system during student presentations to support interaction, evaluation, and feedback. Good annotations and records of a presentation can assist in more organized and effective feedback both during class as well as after class. It can also be beneficial in the evaluation of grades during the assignment stage of a faculty member's work. The techniques discussed can be extended to a wide variety of student presentation assignments.

*Index Terms* – Computer-aided instruction, Critiquing Presentations, Student evaluation.

## INTRODUCTION

As we have moved to a more technology-based classroom, much attention has been paid to using computers to present material. Computer-based presentations can be a powerful tool for faculty, allowing for more dynamic or orderly presentations in the classroom, providing time savings for classes that are taught multiple times or with multiple lecture sessions, and potentially providing a precise record of presented material. Examples of presentation options include showing videos, using PowerPoint slides, building Web-based presentations, performing live demonstrations of software tools, and making use of electronic whiteboards.

As more and more students are coming to class with laptop and tablet computers, attention has been paid to questioning the opportunities this could present to these students [6]. One path of research has been into how computer note-taking systems can be powerful tools for students. Examples of such projects include StuPad [12] that is part of the eClass project [1,7], Classroom Presenter [2,8,11], DEBBIE [4], and BIRD [5].

This paper explores the idea of faculty (rather than the students) using a computer note-taking system during student presentations to support interaction, evaluation, and feedback. Good annotations and records of a presentation

can assist in more organized and effective feedback both during class as well as after class. It can also be beneficial in the evaluation of grades during the assignment stage of a faculty member's work.

The BIRD note-taking system (designed with students in mind) is briefly discussed to provide a context for its use during student presentations. Its use as a faculty tool is then discussed within the context of two different types of student presentation; PowerPoint-driven presentations and live project demonstrations. These discussions are meant to be representative of common student presentation scenarios. The techniques discussed can be extended to a wide variety of student presentation assignments.

Finally, the portability and adaptability of BIRD and its utility for supporting faculty note-taking in a wide variety of classrooms will be discussed.

## FACULTY AS NOTE TAKERS

Student presentations are often fast and furious. A challenge is taking notes during the presentations that are detailed enough to be useful for evaluation and feedback while still concentrating on the presentation itself. In certain ways, this places a faculty member in a similar role that students hold during class.

Just as a student can have their attentions divided between the lecture itself and taking notes about that lecture, so too can faculty members find themselves divided. It can be desirable to take notes during a student presentation, but it is important to pay attention to the presentation. If too much effort goes into the note-taking process, you risk drifting away from the presentation and missing key parts of it. The larger a class, and the more presentations given, the more important notes can become for providing student feedback and assigning grades.

A question this raises is, "How can a faculty member take good, detailed notes while still managing to stay in the flow of the presentation?" Being able to capture the context at the time a comment comes to mind could be a valuable tool. If students are using computer-based presentation tools, then capturing the current screen's image and being able to add annotations and comments to it might be a desirable ability.

If the classroom has a presentation system with note-taking abilities such as BIRD, Classroom Presenter, or DEBBIE installed, then this can be used by faculty as well as by students. In the remainder of this paper, the BIRD system is briefly introduced and examples of faculty note-

---

<sup>1</sup> Evan Golub, University of Maryland, Department of Computer Science, Human-Computer Interaction Lab, College Park, MD 20742, egolub@acm.org

taking are presented framed within that system. It was chosen for its flexibility in terms of presentation tools, as well as its relatively low demands in terms of classroom infrastructure.

## THE BIRD NOTE TAKING SYSTEM

The **Beacon-Identified Real-time Display (BIRD)** note-taking system [5] was designed as a tool with the goal of allowing students to more effectively and efficiently take notes in certain classroom situations. Specifically, in classes where an LCD projection system is used to display material at the front of the room (e.g.: PowerPoint slides, HTML outlines). In these situations, in order to have a context to comments they write, students often copy down what is on-screen. It is sometimes preferable to be able to simply write only ones own thoughts, but still copy the presented material to give context to those comments. While the intent of the BIRD project was to create a tool for a student note-taker, this paper addresses its utility to the *faculty* note-taker during a student presentation.

With the BIRD system, a server is run on the presentation computer. When running, it emits a beacon to the local network to facilitate automatic discovery of the server by the note-taking clients in the room. As requests come in to the server from clients, it returns copies of the current screen image either from the primary or secondary screen over the local network. This is useful if using a presentation system such as PowerPoint that allows for two different views (presenter -vs- audience) or performing a live presentation. The server's design means that a note-taking client is able to capture a screenshot of almost any presented material.

At the start of class, the students using the note-taking client have their client search for servers on the local network. A list is returned and they then select the entry for their class. Once the server is selected, any time that the student sees something being projected that they would like to annotate, they request a screen via the client.

Due to the minimal setup time and automated discovery support, the server can easily be run from the machine on which the students are giving their presentation, whether it is provided in the classroom, or students bring their own laptop.

Within the note-taking client, each page has two panes; the top one is able to display an image and accept ink, the bottom one is able to accept typewritten notes. Any ink added to the image pane that crosses into the space occupied by the image appears on top of the image. There are two categories of ink available; pen ink and highlighter ink (see Figure 1). Pen ink is opaque while highlighter ink is partially transparent.

When working on a page, the ink can be temporarily hidden to reveal full access to the image beneath it. If you would like to have a second set of comments for a

particular screenshot, an additional page with a duplicate of the current page's image can be added to the document. A new page without an image in the top pane can also be added for solely freehand drawing.

## USE DURING PRESENTATIONS

One type of student presentation is centered on students discussing a given subject, while using a pre-built, essentially "static", set of slides using a presentation system such as PowerPoint or a PDF viewer during their talk. This section discusses one example of this type of presentation, and how computer-based note-taking can be utilized with it, but it can be generalized to any such student presentation.

As an example within which to frame this discussion, I will use an exercise done in some Human-Computer Interaction courses [3,10]; a "Hall of Fame/Shame" exercise. It is essentially an expert review of an existing piece of software where teams give an in-class presentation of their review. For the presentation, they introduce the application, its target users and its purpose. They then discuss the various aspects of the user interface within the context of human-computer interaction and usability. At the end of the presentation they place the application either in the "HCI Hall of Fame" or "HCI Hall of Shame". Presentations are given to the class, typically aided by a PowerPoint show used to organize the flow of the presentation as well as to show appropriate full or partial screenshots.

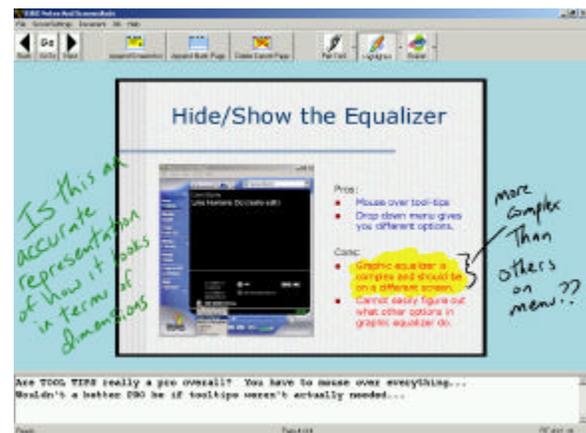


Figure 1: BIRD note-taking client with student presentation screenshot and annotations.

During the student presentation, I become the note-taker by sitting in the audience with my TabletPC. As the students give their presentation, I capture slides about which I have comments and/or suggestions. Figure 1 shows an example of a screenshot taken during a team's presentation. The page includes several components; a capture of their slide, comments that are written on top of

that screenshot regarding one of their bullets, and a general question/comment. These notes can be used later either during the Q&A portion of the presentation (as discussed below), or when grading the team's performance and giving them additional private comments.

After the team has completed their presentation, there is a question and answer period. During this, other students in the class have the opportunity to ask the team questions about specific parts of their presentation, or ask questions we felt were unanswered. As students ask their questions, the notes can be used to flip to the page corresponding to the student question so that I can either enhance the question that has been asked, or check that question off my own list. After the presentation, I often spend several minutes reviewing the style of the presentation rather than the content. The notes allow me to do this in an orderly and efficient fashion by starting at the first page of the notes and flipping through them looking for stylistic comments in the notes I took.

When it comes to grading, in order to avoid being overly harsh or soft on the first few teams, it can be useful to wait until a few, or all, teams have presented to feel more confident in the consistency of comments and evaluation. The notes can help refresh memories on the varying styles and quality of presentations when assigning grades. While looking through a copy of the teams' PowerPoint slides side-by-side with handwritten notes can do this, having notes integrated with the slides from the presentation can decrease the time it takes to review them as well as increase the level of confidence in memories of the presentations.

For private evaluation sessions, teams do not always immediately avail themselves of this opportunity. If a team comes a few weeks later, having comments in the context of their presentation slides helps recreate the presentation scenario. While a paper-based system of taking notes during presentations would support this as well, it would have the additional overhead of filing and tracking these printouts over the course of the semester. Additionally, if a team comes to ask a question at the end of a class rather than during office hours, using electronic rather than paper-based notes allows you to always have your notes available to discuss with the students

Overall, a great advantage of this note-taking technique is that one does not have to invest time in drawing a sketch of the displayed image or attempting to write a detailed description of what their thoughts were at that moment. The image will provide context for the notes when reviewing them. This can allow a faculty member to focus more attention on the presentation at hand while still taking notes during the presentation.

Although some of this experience could be supported by having students submit their presentations earlier, and then printing them out to bring to class, there are aspects that would be unavailable or less convenient. Aside from the issues mentioned above, there are also practical issues such as running out of note-taking room on the page for a

particular slide or that of needing to bring a wide variety of pens and highlighters to class.

## **USE DURING OTHER PRESENTATIONS**

Another category of student presentation is that of a live demonstration of something they built. In situations such as these, being able to capture exactly what is being shown when you have a thought can be a great time saving device. If you do not, you may need to search through their work for the specific screen, or possibly even need to recreate the entire walkthrough up to that point to refresh your memories or verify a visual feature.

The same techniques described in the previous section can be used in these situations as long as the students stop at individual screens for discussion. Whether it is a Web site through which the students are navigating, an interactive Flash application, or a program they wrote (to name a few) the projected material can be captured and annotated.

I have used this technique during term project presentations in classes where my students design graphical applications in a variety of programming languages. During the two-week presentation time frame, students presented their work as I took notes. After all the teams were done with their presentations (25 teams in Spring 2003 and 12 teams in the Fall 2003 semester) I then spent an afternoon writing overall comments and assigning grades for all of the teams based on the information contained in my notes.

In addition to my own students, I have used these note-taking techniques in a colleague's class where I acted as an outside observer during the class' final presentations. During these presentations I felt I could more fully concentrate on what the students were discussing since I was able to invest less effort in taking notes. In this scenario, having the annotated screen captures supported quickly and easily selecting a question or two for each group at the end of their presentation. Once again, the notes were also useful to refresh my memory of the details of the presentations when it came time for me to give my opinion of their performance.

## **USING THESE TECHNIQUES WITH THE BIRD SYSTEM IN A VARIETY OF CLASSROOMS**

The techniques discussed in this paper, though specifically presented in relation to the BIRD system can be extended to other note-taking systems. One reason that the BIRD system was used was the portability and flexibility of that system. Unlike some other systems, there are few infrastructure requirements for BIRD. This would allow faculty to support the described uses quite well in a variety of classrooms.

The minimum hardware requirements to use this software in a classroom are currently the presence of two machines with the Microsoft .NET framework installed, which are able to communicate with each other over a network, and an LCD projector. It should be noted that there is nothing specific to the .NET framework being used that would prevent writing servers for other platforms such as MacOS, Linux, or earlier versions of Windows. The network environment can be either wired, wireless, or a hybrid configuration. This includes the option of an ad-hoc wireless network between the presentation computer and faculty note-taking computer. The BIRD software has been used successfully in all of these scenarios.

One seemingly limiting factor is the need for two computers; a presentation computer connected to the projector at the front of the room, and a portable computer on which to take notes while watching the presentation. However, as was previously noted, the BIRD server application is small, easy to install, and easy to detect in a room. As a result, the presentation computer could easily be a computer already present in the classroom or even the student's own portable computer.

Since the BIRD system is not dependent on any particular software for presentation, it can be used during virtually any computer-based presentation, whether done with PowerPoint, Flash, a Web browser, live demonstrations of software, or even technologies such as a Mimio [9] whiteboard capture bar.

## FUTURE PLANS

My personal experience in using note-taking in the manner described was a success. I felt I was able to keep more organized and detailed notes. I was able to select questions to ask of my students with less effort and was able to better describe the context of my question based upon my notes. I was more confident in determining an appropriate grade as well as providing feedback to students after they received their grades. Additionally, I placed no additional burdens on my students in order to accomplish these ends.

Though I have not yet decided to share my notes directly with the students in the class, I do plan to explore either connecting my TabletPC to the LCD projector to review my comments publicly, or to e-mail a copy of my notes for a student's presentation to that student. One issue this will raise is whether this would lead to self-censoring during note-taking to avoid offending or intimidating students. One idea is to review the notes after class and edit or remove any comments that are not appropriate to give to the students in a "raw" form.

One of the plans for the future of the BIRD system is to incorporate the ability to use a digital camera as the server. This would allow note-taking in situations where a computer was not being used for the presentation but rather media such as posters, chalk boards, and whiteboards without capture devices.

## ACKNOWLEDGMENT

My thanks to Allison Druin, Ben Bederson, and William Gasarch for inspiration and support, and to Microsoft University Relations for the Toshiba 3500 TabletPC used in the classroom.

## REFERENCES

- [1] Abowd, G., "Classroom 2000: An Experiment with the Instrumentation of a Living Educational Experience," *IBM Systems Journal, Special Issue on Pervasive Computing*, Volume 38, Number 4, October 1999, pp.508-530.
- [2] Anderson, R., Anderson, R., Hoyer, C., Simon, B., Videon, V., and Wolfman, S., "Lecture Presentation for the TabletPC," *Workshop on Advance Collaborative Environments*, 2003.
- [3] Bederson, B., Syllabus for a course in Human Factors in Computer and Information Science, <http://www.cs.umd.edu/~bederson/classes/hci/syllabus.htm>
- [4] Berque D., Johnson D., and Jovanovic L. "Teaching Theory of Computation Using Pen-Based Computers and an Electronic Whiteboard," *Proceedings of ITiCSE 2001, the 6th Annual Conference on Innovation and Technology in Computer Science Education*, June 2001, pp. 169-172
- [5] BIRD Note-taking System, <http://www.cs.umd.edu/~egolub/AVIAN/BIRD>.
- [6] Campbell, A. And Pargas, R., "Laptops in the Classroom," *Proceedings of the 34th SIGCSE Technical Symposium on Computer Science Education*, 2003, pp. 98-102.
- [7] Classroom 2000, <http://www.cc.gatech.edu/fce/eclass/overview>.
- [8] Classroom Presenter, <http://www.cs.washington.edu/education/dl/presenter>.
- [9] Mimio Whiteboard Capture System, <http://www.mimio.com>.
- [10] Landay, J., Assignments list for a course in User Interface Design, Prototyping & Evaluation, <http://guir.berkeley.edu/courses/cs160/spring2002/assignments.htm>.
- [11] Simon, B., Anderson, R. and Wolfman, S., "Activating Computer Architecture with Classroom Presenter," *Workshop on Computer Architecture Education*, 2003.
- [12] Truong, K. And Abowd, G., "StuPad: Integrating student notes with class lectures," *Proceedings of CHI 1999 Extended Abstracts*, pp.208-209.