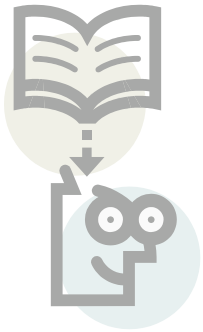

COMPUTER SCIENCE 160 · USER INTERFACES

iLECTURE

LOW-FI PROTOTYPING AND USABILITY TESTING

DUE 4 OCTOBER 2004 · GROUP 6

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This document is available online at kettle.cs.berkeley.edu/cs160-fall-04/7

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MISSION STATEMENT

iLecture is a presentation system designed to 1) facilitate the presentation of information by placing a variety of different mediums and presentation techniques into one central access point, and 2) to archive this information in a manner that makes it easily accessible and reviewable for students or other interested parties. The experiment detailed herein is an attempt to identify and resolve any basic design flaws and sources of confusion present in the system. We created a paper prototype of the system, which afforded us the basic functionality required for our testing without a heavy investment of resources. By identifying flaws in the earliest stages of development we hope to eliminate potentially costly wrong turns in later stages.

The aim of the project is to streamline the lecture presentation process. We hope to minimize instructor preparation time, make the live presentation process more efficient, aid in productive student-teacher and student-student interaction, increase the quality of notes produced by students, and make reviewing lecture material easy and helpful.

PROTOTYPE

Our paper prototype is structured around a central frame made of stiff cardboard. Transparencies on which the user can create, edit and take any additional notes are placed on top of the frame. A slide has the capability of containing multiple layers (similar to Adobe Photoshop), each tailored for a specific use. For our paper prototype, we executed this function by using transparencies stacked on top of each other. Each transparency has a tabbed title that the user can click to send that layer to the front. Right-clicking anywhere on the top layer brings up a menu that has options to hide, show, project, add, and delete that layer. Underneath the slide, is a timeline with thumbnails of each slide in the project. By clicking any thumbnail, the chosen slide with all its layers appears in the frame. This allows the user to jump to any slide he/she may visually recognize. Below the timeline is a smaller status bar with buttons that are used to move back/forward one slide and jump to the end/beginning of the file (modeled after Adobe Acrobat Reader).

The remaining windows (made of paper) can be shown or hidden as needed by the user via the View menu option.

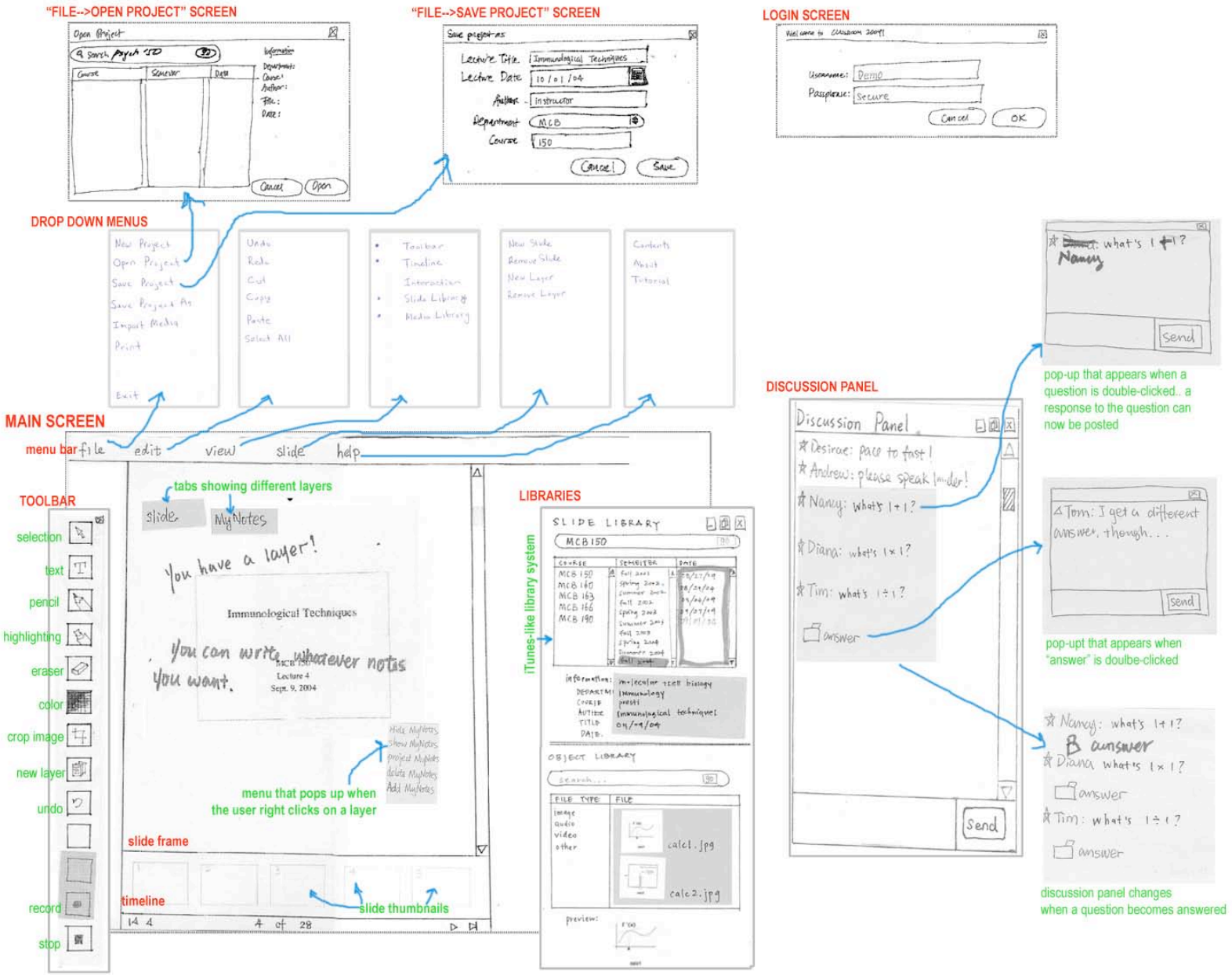
The Toolbar to the left of the Slide Frame contains the basic editing tools. Like Photoshop, the user can select objects, draw (pencil tool), highlight, choose different colors, write (text tool), erase, and crop. Our paper prototype supported limited tool functions. Subjects could draw and highlight with colored pens on the transparencies, though the type tool was restricted to basic writing. The bottom three buttons of the toolbar are reserved for video controls of the webcast. Pause, record, and stop buttons are intended for the instructor to use during lectures to begin/stop recording lectures and for the students to play/pause/stop webcasts.

To the right of the Slide Frame, is the Library window. The Library is divided into the Slide Library and the Object Library. The Slide Library is for organization of all slide project files and the Object Library is for organizing additional media (images, audio, video, etc.). Each library has a search field and columns that organize the files within the libraries (similar to how iTunes organizes its audio files). For the paper prototype, we organized the Slide Library into three columns—course, semester, date. By selecting a course, a list of semesters is brought up for the user to choose from. After selecting a semester and date, information about the selected project file (department, course, author, title, date) appears in a preview box below the three columns. A “go” button then allows the user to choose to open that file. The Object Library is similarly organized. After selecting “Image” in the File Type column, a list of images and their thumbnails appears. The user can then select and highlight a specific image, which brings up a larger thumbnail in the preview area below that user can drag into the slide canvas.

The Discussion Panel window appears to the right of the Slide Frame whenever the program is used in a lecture setting. It is modeled after a standard chat interface. The main area of the window shows a series of messages that begin with the name of the person who posted the message. At the bottom of the Discussion Panel is a field where the user can write or type text and click “Send” to post it to the discussion. When a question is appears, the instructor can answer it by double-clicking the question. A second window then pops up where the question alone is written with an area to send in the answer/response. In the main Discussion Panel window, answered questions appear with an indented

folder icon and “Answer” written below it. The answer itself does not appear until the user double-clicks this folder icon.

Our lo-fi paper prototype also has some basic functions through the main menu bar along the top of the screen. The “File”, “Edit”, “View”, “Slide” and “About” each showed a drop down menu specific to the category. Tasks such as opening (“File→Open Project”) and saving (“File→Save Project”) when executed brought up pop up windows that prompted for relevant information.


"FILE-->OPEN PROJECT" SCREEN
"FILE-->SAVE PROJECT" SCREEN
LOGIN SCREEN
DROP DOWN MENUS
MAIN SCREEN
menu bar
file
edit
view
slide
help
TOOLBAR
selection
text
pencil
highlighting
eraser
color
crop image
new layer
undo
record
stop
tabs showing different layers
slide
MyNotes
You have a layer!
Immunological Techniques
You can write whatever notes you want.
Lecture 4
Sept. 9, 2004
menu that pops up when the user right clicks on a layer
slide frame
timeline
slide thumbnails
LIBRARIES
iTunes-like library system
SLIDE LIBRARY
MCB150
OBJECT LIBRARY
calc1.jpg
calc2.jpg
DISCUSSION PANEL
Discussion Panel
Desirae: pace to fast!
Andrew: please speak louder!
Nancy: what's 1+1?
Diana: what's 1x1?
Tim: what's 1÷1?
answer
Send
pop-up that appears when a question is double-clicked.. a response to the question can now be posted
pop-upt that appears when "answer" is doulbe-clicked
B answer
discussion panel changes when a question becomes answered

METHOD

PARTICIPANTS

Since iLecture is targeted towards users in a large university setting, we drew our test users from a pool of UC Berkeley students and instructors. **Student A** was selected for her background in logic systems; as an electrical engineer, she deals with visually-heavy courses that include diagrams of circuits and mathematical equations. **Student B** is an immigrant who lacks experience using computers, having only basic knowledge of the most typical applications (like Powerpoint). Her first language is not English, which we hoped would bring a fresh cultural perspective on our interface design. We selected our instructors for their versatility and excellence in teaching, hoping to bring their insight into our product. **Instructor A** teaches small attendance computer classes for children, instructs calculus classes for high school graduates, and chemistry classes attended by 300+ university students. **Instructor B** is the head student instructor for a major undergraduate computer science course, and has experience with graphics programs.

ENVIRONMENT

All four interviews were conducted in different locations, but we were able to obtain a quiet and interruption-free setting for every interview. A projector or laptop was used to show the lecture webcast in order to create a real time classroom atmosphere. A tape recorder was placed in front of user according to user's comfort level to record the interview process for future reference. All paper prototypes were laid out on the table in the order they were to be performed for easy access and quick response of the human computer. The interviewers sat in a semicircle with the participant in the middle for close observations. An appropriate distance was maintained to make sure interviewers didn't create any distractions to the participant. Huge table space and good lighting were also ensured for the convenience of the user and better interview conduct.

TASKS

We began with the student by asking him to watch a webcasted lecture (imagining himself in the lecture room with the professor). During the lecture, the subject was to take notes on his tablet PC, making use of any available functions that our program provided (easy task). Here we were testing the effectiveness and understanding of the 'layer' capabilities. While watching the lecture, the subject then had to ask the professor a question (moderate task) to test the design of the discussion panel. The last task the student performed was in a home/dorm room setting. The subject was asked to open an archived webcast to review for an upcoming midterm (hard). Here we were interested to see if the subject would use the 'Slide Library' or choose to go through the menu "File→Open Project".

For the instructors, their first task was to prepare lecture slides in their home/office (hard). We listed out specific information the slides had to contain—text, images, and personal notes. This tested a couple of different areas of our design: the dragging of images from the "Object Library," the use of an additional layer for personal notes, and the toolbar. Then we changed the instructor's imagined setting to a classroom or lecture room. Here, the instructor was asked to present the lecture (easy), requiring him to

open up the slides he had prepared and begin recording the webcast. During their presentation, the instructor was also to select a question on the discussion panel to answer (moderate).

PROCEDURE

For each of our interviews, at least three members were present. Tingting was the computer for all four interviews while Jennifer acted as the facilitator and greeter for three of the four interviews. Steven, Vlad, and Alexey alternated as note takers. The procedure we followed for our process was modeled after the procedures in *Prototyping for Tiny Fingers*. The greeter introduced the user to the class, project, and program. The user was then told their role in our design process and was then given a consent form to sign (Appendix A).

We then began by having the facilitator perform a walk-through demonstration — showing how to open up slide project with the interface. This was a quick warm-up that gave the user a chance to get comfortable. We then gave the user time to get familiar with the interface. Here they explored the toolbar and windows and we were able to hear their initial responses to the interface. This also allowed them to see what functions would be available to them for the tasks they were about to perform.

The facilitator then presented the user with a sheet of paper detailing the first task they were to perform (Appendix C). At this point, we began voice recording the interview. The user completed the tasks, describing out loud his or her thought process. Observers took note of the user's actions as well as any difficulties the user was having with the current interface. Upon completing the three tasks, we opened up discussion with all members of our group who were present and the user. We asked if any particular part of the interface was confusing or unnecessary and for suggestions on how they would like to see the interface improved. After the first interview, we did make a slight change to our paper prototype. The idea of layers seemed a bit confusing for our user, so instead of using a sheet of paper for the Slide layer and a transparency for the Note layer, we decided to change the Slide layer to a transparency as well. Other than this modification, the prototype was kept consistent between interviews. Interviews lasted an hour on average.

TEST MEASURES

During the experiment, our main concerns were to see if the user interface might become a distraction to the student during note-taking. The idea of layers could potentially be too confusing or become an annoyance rather than aid while note-taking/reviewing. It was important for us to observe how the user interacted with the Libraries. Did the students and professors actually use it? Or were they more confused and intimidated by it? We also looked to see if the instructor actually found it more convenient to have an Object Library from which they could import media files. We left multiple ways of completing certain tasks available to the subjects (opening a project file by "File→Open Saved Project" or through the slide library, opening/closing a window either by clicking the "x" in the upper right corner of the window or going to "View" in the menu bar). By doing so, we were able to see which method the subjects found to be more natural to them. In our initial designs, we tried to make the interface operationally transparent so that the users wouldn't waste lecture time figuring out how to use the program. This was another concern we were careful to observe.

RESULTS

Because low-fi prototyping for this system necessitated the use of two separate user groups we had some very different but nonetheless overlapping sets of issues. A general discovery concerning both user groups was a concern for seeing features not relevant to the particular user group being tested. One user commented that if the feature didn't really apply to her, she shouldn't be seeing it.

Additionally both user groups expressed concern about inconsistencies of terminology across different interface elements, specifically between the terminology of the libraries and the file menu. In a related vein users found certain elements (timeline, slide library) unintuitively labeled.

Both user groups were displeased with the slide library's method of organization which produced results represented by date. Multiple users suggested that results should be represented by lecture title.

The largest common concern of the student user group was the layer-relevant functionalities of the program. The difference between slides and layers was not immediately clear to one of the users; this led us to include a more thorough introduction to the concept before beginning testing, however, even with this introduction the second user still found layers difficult to grasp.

Additional student concerns included: want of a search feature in the discussion panel archive, being able to view multiple slides per page, being unable to locate webcast feature, and confusion about what the play button played.

Among the instructors the greatest issue was figuring out how to begin projection of a presentation. Both instructors found the relevant buttons in the tool bar unintuitive and offered alternate solutions including a separate menu with projection options. Users also erroneously assumed from precedent that a presentation was projected as soon as the program was launched.

Additional instructor concerns included: scalability of discussion panel concept, need for a clearer indication on how to respond to questions in discussion panel, too much information entry required to save, and need for video playback controls for a video inserted into a slide.

DISCUSSION

The experiments brought to our attention that users learned our interface through transfer. Based on our introduction of the program as a lecture and note-taking tool, the users related our interface to their previous experiences with programs (Microsoft Powerpoint, instant messaging, and even webcasts on RealPlayer) and had corresponding expectations. We found lo-fi prototyping is flexible and easy to create and modify. This allowed us to make and implement quick decisions, which became useful when after our first interview, we needed to make some minor changes. Some of our attempts at borrowing features from other programs failed. The Slide Library, which we modeled after the iTunes interface, confused users.

The experiment couldn't reveal certain aspects. Some features of our program, like our Scale Image and Crop Image functions, don't translate well in low-fi prototyping. Our subjects also had no real motivation to use the system since our emulated lecture setting was in an imagined setting.

In response to the concerns of our users, we reevaluated our system's interface, ranked our users' concerns according to Jakob Nielsen's severity ratings, and propose the following changes:

• **Libraries interface**: Combining the Slide Library and Object Library into one unified pane will be easier to use than our current two-library method. The Search function will give more relevant results, based on the content.

• **Layers interface:** We decided to abstract the concept of layers for students since they found layers complicated and unintuitive for note-taking. Instead, our interface should let them write on top of slides on a Notes layer by default, referring to this "layer" as simply "My Notes," and allow them to hide or show "My Notes." This way, they will enjoy the benefit of layers without having to deal with the Layers interface.

• **Discussion Panel:** A newsgroup-like interface with a more refined message hierarchy will replace our instant messaging interface. We could also implement a moderation system, whereby a third party, such as a teaching assistant, filters through student responses and sends only the most important ones to the instructor. That way, instructors won't need to spend time sifting through all of the student complaints and questions. Students who want to find particular messages can use the Search function that will be integrated in the panel.

• **Projection and Playback:** Our interface should automatically begin projecting the lecture upon opening so that the instructor has one less step for setting the system up. Recording and playback controls will be moved off the current main toolbar and into a separate command toolbar.

• **Consistent Terminology:** Menus and buttons used different words to refer to the same functions; these will use the same words.

• **Separate mode-like interface presets for students and instructors:** Our interface will have presets based on the user type, since students complained about the visibility of irrelevant instructor-specific features. This allows users to focus on the features they need while maintaining the possibility of customized interfaces.

APPENDIX

A. INTERVIEW CONSENT FORM

Interview Consent Form

Project title	Classroom 2004 Usability Testing
Course/Study	R3E9G740
Date	

Purpose of the study:

The purpose of the project is to develop a system that makes note-taking more efficient, makes lecture preparation easier, and helps students communicate with instructors and other students. The project combines various media into one single integrated source that allows professors and teaching assistants to organize and pass along information to the students, who also use the system for their note-taking and organizational needs.

Your involvement in the study:

The study is expected to take less than an hour. The participants will perform three tasks during this study and will be given task directions for what they are trying to achieve. They are encouraged to think aloud and give opinions on any aspects of the project.

Privacy and confidentiality:

All the information collected by the study is completely confidential and is stored anonymously without personal details.

Participating in and withdrawing from the study:

Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

I, _____, give permission to winning_group_6 to use notes based on the interview with me on Classroom 2004 Usability Testing, or to use transcripts of tapes of that interview, for scholarly and educational purposes. I understand that these will include a paper to be read by the instructor or TA in CS160 User Interface Design, Prototyping, and Evaluation, and may include publication of that paper in an electronic class book that is accessible to students in the class and to other users of the internet.

_____
(signature of interviewee)

_____
(signature of interviewer)

_____
(date)

All questions regarding this project can be directed to
winning_group_6@lists.berkeley.edu

B. DEMO SCRIPT

Demo: import lecture slide from previous semester

1. To open the program, double click *Classroom 2004* icon on the desktop(user, password prompt)
2. To log in, enter *demo* in username, and *secure* in passphrase, click *OK*(empty slide appears)
3. To search lecture slide, enter *MCB150* in search bar under Slide Library, click *go*
   (MCB150 appears on the top of the course list)
4. Right click MCB150(a list of previous semesters appears)
   Right click *fall 2004*(a list of lecture dates appears)
   Right click *09/09/04*(lecture imported into the slide frame, time line shown) Is it loaded into the slide frame directly, or does it open in another window, so the user can copy the slides that he/she desires? Left click to have the option to import the whole lecture.
5. Left click on the slide, select import(slide appears in the original window)
6. Close new window
7. To save the updated slide, go to File(dropdown menu)->Save Project As(prompt window appears)
8. Enter *Immunological Techniques* in Lecture Title, *10/1/04* in Lecture Date, *instructor* in Author, *MCB* in Department, *150* in Course. Click *Save*
9. Close program

Student tasks

You will be watching lecture webcast of personality psychology 150, while provided with lecture notes. Suppose this is the course that you are taking to satisfy the social science requirement for your major. And the lecture materials are tested on the exams. You are going to perform the following tasks:

During lecture:

1. take notes(write down things that you find interesting or important. Think about how you normally take notes, special notations to distinguished the important concepts, different color of pens) (easy)
   - play web cast, prepare transparency, go to next slide(how does the user know about the layer, why not comment on the original slide directly?)

   Expected behavior:
   1. click on new layer icon(give transparency)
   2. write notes (may click on icons in the toolbar, highlights, colors…)
2. ask professor the following question: why do we give a "cover story" to mislead the participants in certain experiments?(moderate)
   - update discussion panel

   Expected behavior:
   1. write or type in question
   2. review answer by click answer folder in discussion panel

Post lecture:

3. The midterm for psych150 is coming next week. You would like to study for the

exam by archiving the lecture webcast on 09/31/04 while reorganizing the existing lecture notes. Your username is *student*, and passphrase is *mypw* (hard)

- play web cast, prepare transparency, go to next slide

Expected behavior:

1. To open the program, double click *Classroom 2004* icon on the desktop(user, password prompt)
2. To log in, enter *student* in username, and *mypw* in passphrase, click *OK*(empty slide appears)
3. To search lecture slide, right click *Psych150* in Slide Library (a list of lecture dates appears)
4. Right click *09/04/04*(lecture opened in the slide frame, time line shown, discussion Panel shown)

Use can view webcast by click play, then new window opens.(why not have all buttons related to webcast, play, stop, pause put in new window. And have a button for opening the webcast on toolbar?)

use laptop to show new webcast window

5. New notes can be added to existing layer.
6. To save the updated slide, go to File(dropdown menu)->Save Project
7. Close program

Instructor tasks

Before lecture:

1. Prepare a two-slide lecture, start from scratch, add notes for presentation and side notes for your own use (not to be shown during lecture presentation)and a picture. Your username is *instructor*, and passphrase is *myp.w* (hard)

Expected behavior:

1. Open the program, double click *Classroom 2004* icon on the desktop(user, password prompt)
2. Log in, enter *instructor* in username, and *mypw* in passphrase, click *OK*(empty slide appears, with slide library and object library)
3. Create first slide: type, write side notes using layer, toolbar (post-it)
4. Add another slide: go to *Slide ->new slide* (new slide appears, add one slide to timeline)
5. import a picture from *object library* (new image appears in the slide)
   Op1: go to image, select from files (show changes in *file*, and *preview*)
   Op2: search(show changes in *file type*, *file*)
6. To save the updated slide, go to File(dropdown menu)->Save Project As (prompt window appears)
7. Enter *data* in Lecture Title, *data* in Lecture Date, *data* in Author, *data* in Department, *data* in Course. Click *Save*
8. Close program

During lecture:

2. Give a lecture using the slides you've prepared which include the use of pictures, slides and video. You also have a question for your students to solve at the end of the lecture. You will let them solve it first then announce solution(moderate)

(1. in toolbar, change *play* and *pause* to *record* 2.libraries are gone, replace with discussion panel 3. give instructor pointer to advance slides)

Instructor might want to refer to previous slide, use timeline?

3. Questions and comments are posted in the discussion panel, select one and answer. (Combined with previous task)(easy)

Concern: student can't send anonymous questions or comments. So if there are students intentionally disrupt class by sending inappropriate messages, they will be hunted down.

Expected behavior:

Op1: oral answer, repeat question, then speak through microphone

(do nothing)

Op2: answer Diana's question(whose question hasn't been answered by others)

(follow thread one)

Op3: answer Tim's question(whose question has been answered by others)

(follow thread two)

Does instructor need to post in Discussion Panel, maybe eliminate *send*?

C. TASK DESCRIPTIONS

STUDENT

You will be watching a lecture webcast of 'Psychology 150: Personality Psychology.' On your tablet PC, you will be provided with lecture notes that are identical to the one shown in the lecture webcast. Imagine, though, that you are sitting in a large lecture room with other students and the lecturing professor in the same room. This is a course that you are taking to satisfy a requirement for your major. Lecture materials are tested on the exams.

You are going to perform the following tasks during lecture:

Take notes on the tablet PC as you would during any normal lecture. Make use of any available functions on the tablet PC. Think about how you normally take notes—special notations you may use or any other note-taking habits you may have.

Ask the professor the following question:
Why do we give a "cover story" to mislead the participants in certain experiments?

_____

Now, the midterm for Psychology 150 is coming up. You would like to study for the exam by reviewing the archived lecture webcast on 09/09/04. Imagine that you are sitting in front of your computer. Your username is *student* and passphrase is *mypw*.

INSTRUCTOR

You are preparing to give a lecture to a classroom of students about _____. For this task, you are to create two slides that will aid you in your presentation.

The slides will have the following:

1) Text to be projected for students to view during the presentation.
2) Image(s) to be projected for students to view during the presentation.
3) Personal notes that will *not* be projected during the presentation.
4) Any other information you find necessary.

Your user name is *instructor* and passphrase is *mypw*.

_____

Now you are about to present the lecture you have just prepared for on the tablet PC. Imagine that you at the front of a large lecture room or classroom with other students seated in front of you. The projection screen is behind you.

You are going to perform the following tasks during lecture:

Present your lecture.

At the end of lecture you will have one question for your students to solve (provided on the slide). You will let them solve it first and then announce the solution.

Questions and comments are posted to the discussion panel. Select one and answer it.

D. RAW INTERVIEWS FOR STUDENT A

2004.09.28 Tuesday evening

Subject: EECS undergrad student A.
(start 19:48)

Environment

The seminar room in 606 Soda is a quiet room with appropriate lighting and acoustics, and small enough for our test. We've dimmed the outer lights of the room to simulate lecture. The projector is activated with a webcast to simulate a live lecture occurring.

Jennifer — Greeter & Facilitator
Tingting — Computer
Vlad — Notes on paper
Steve — Notes on computer

Summary of Concerns

— Naming of "Project", "Slides"
— Confused between concept of "slide" and "layer."
—

Demonstration

Jennifer greets the subject and gives a demonstration of how to

"What's the username for? Do you have a separate one for every class?"
"How did you search for the class?"
"What about the other semesters? ... A library of notes?"
"What does the scrollbar do?"
"How do you make those changes?"
"Why is it called *project* [in the file menu]?"

Jennifer encourages Student A to just play with the interface.
— Student A starts "hovering her mouse" over the buttons; tooltips appear.
"I don't know what that 'new layer' thing is."
"Are these two blank squares buttons, or no?"

"I don't understand Record or Stop."
"I don't know where Preview is."
— It doesn't do anything when you click on it!
She goes to Help and Preview. "Whoa, that worked!"
"I don't know the difference between Slide and Layers. Because if you have two ... you can't see them, right?"

"When I usually start a new program, right, I have a purpose. ... I just do what I need to do and not do everything."

Tingting starts recorder.

Task A and B (take notes and send a question)

"I don't get it, how am I going to take notes?"
—Jen explains, that the professor's notes will appear and she can write it on top if she wants. She's supposed to pretend she's in the lecture.
—Jen explains Layers that show separate pieces of information, like transparencies on top of each other.

"How did that Discussion Panel appear? Where is the Search?"

She seems very disoriented for the past few minutes still.
Vlad starts the lecture.

"Should I pretend I don't know any of this information and take notes?"

Start lecture 20:04.
Presses Color button to get two different colors. (She ends up gripping both Vis-a-vis pens.)
"Do I ask my question now?"
She clicks on Discussion panel. "So, I would write it here, and press Send."
She writes words atop the printed lecture material onto the overhead. She switches colors.

"No it's not! Send."

"Okay, so this slide doesn't match what he's saying, ... but I would scroll to the next one, maybe?" "Arrrrgh. Pressing! Nothing's happening! I'm going to break it." Clicks on Slide menu. "I don't think that's it. It's this thing... maybe."

Scrolls down. Tingting takes away the layer.

"How did he even answer that? It's magical! I have no idea what he [the answer] means!"

"Confused! Send."

Tingting writes more on Post-Its.

"He's just talking about little stories and not saying anything important. These are just illustrations that won't really help, anyways.

"New layer. That worked." as Tingting puts the overhead down.

"I don't know what this is." she says, pointing to the bottom thing.

"Am I supposed to press Pause?" ("No, it's live," Jen says.) "That'd be really cool, if you could pause him in real time!"

"These buttons are for the professor. Why are these here? (she says, points to the left)." "What does this bottom bar mean?"

"So this is a highlighting color, and then the pen color? What's the difference? Is one just fatter?"

"How are you actually selecting the colors?"

"Cropping... I don't know why you'd ever use that." "Why don't you have a resize feature? Why would you crop it? It has all of the lecture notes. If you resized it, you could see everything on the page... you could see friends' notes next to professors' notes, and your own notes."

"'Cuz I don't know about the slides and the layers."

Jen attempts to explain what a layer is.

"So this has Internet access?" (not really ...)

"I still don't know difference between slide and layer."

"Why would I make a new slide while the professor is talking?"

She's smiling throughout the task; arms closed, and laughing throughout ... clearly amused by this whole process.

"You already have your own layers... and you can not just view th elayers."

Task C (review notes)

She starts clicking around on the right panels. "Click on Radio. Yes. No, okay, that was wrong. Type in Psych 150, "Go," and then click on Video. Nothing happened!" (Jen says: an error message pops up.) "It says, review the webcast!"

"Why? **I want to watch the video. I don't want to touch the slides."**

Jen says that slides are attached to the video.

"What is this (points to bottom-right)? You can *add* a video to a slide? I would suggest you not have it there. Teachers should have 'Teacher mode.' and I click on the correct date. And then ... I'm confused. What? Player? So how do I play the video?" Tingting points to the webcast on the presentation. "What is that?!"

"I'm just studying, right? Does this make sense why this appears?"

"**Newsgroup?** What if you have questions after? Like combined with the questions from during lecture. Even if it's just conversations ... I don't want to look at through the whole thing... it's just these small windows. You can actually Delete things you don't want."

"Is that it? I'm done studying...!"

Discussion

Jen: Let's say you want to jump to the third slide.

"Can I click on the bottom arrow twice?"

"You can click on the bottom buttons? That's so wrong! This [bottom left arrow] is the same as the scroll-bar on the right... It's not natural that they're both there. I think this (she points to the bottom) is better."

"How do I not see some layers? I don't want to see this slide anymore. I just want to see my notes." ... (oops)

"Tabs mean you can only look at one or the other... you can't look at multiple ones. Just have it like Photoshop."

"So I can look at other dates too."

"What about **exam files?** About **discussion?** Where are the **discussion notes**?"

"I kinda don't like the date thing ... I don't remember what goes on what date. You have to click it? You can't just put your mouse over it? So it seems ... like ... why have the dates? You know it's going to be sequential ... and have the whole list..."

"You can change it .. I would put the titles, not dates."

"What was the third column for?"
"So you could watch their [previous semesters'] webcast too?" yes.
"So how does the search work? Does it get it?" ... well the way we've been searching is that the courses show up ... but what if you want something completely random.

"What is this again? [the information] so if I click on it,... Title is the title of the lecture ... so if I click on Psych... Information part is redundant ... "

"If things are on top of each other ... then I want to hide certain layers."

She doesn't seem to like redundancies.

"But then there isn't as much space ... to write on ... because there's the slide... you don't have whole paper."

"Can you view **multiple slides on a page**? Four per page ... six per page... I think that's helpful 'cuz... it's a pain ... with a book you have to keep on flipping back and forth to *see references*."

Are there any other tools that you would find useful? Color switching is a little too complicated. Any time I want to switch back and forth between two colors ...
Two colors is enough ... you can always switch between two pens ... "

"I only use pen, so I don't really use erasers..."

"I would still want a typewriter b/c I have bad handwriting... but most people would want to write it... like equations... and summation ... all that EE 20 stuff. So I guess handwriting would be better. It'd be really good if it could convert it to the correct symbols."

"What's View again?"

"[the tape recorder] is so cute!"

"If I just had one... would this be bigger? If you click on one ... it should just make it big... does that mean you want both or only the second one? I don't think I'd look at the discussion very much unless *I* have a question."

"Other questions from students... not really useful."

"But when would I have time to write in my question? I'm writing notes at the same time. ... 'cuz when you're in class, you actually interrupt things."

"I think it should alert you that an answer was posted for the question that you asked. "

"No ... what if there's like 50 people asking a question ... will the professor answer all those questions?"

"If I had time ... then he took a drink of water... then I'd look at this discussion panel ... or anything relevant to my question."

"Yeah, I don't really understand this ... the slide library."
"So if he had a Powerpoint, he could click on this animation, and he could play this. ... and add/write notes." So the webcast could be a separate window.

At home: with webcasts. "Yeah, where's the lecture when you're at home? ... Like, how are you going to see the actual webcast? ... you can watch the lectures when you're in review."

"...Oh... so if the professor makes gestures.. you can't see it! What if someone's pointing at something... you can't see it."

"How do you FF, pause ... ... FF is good. Rewind is good too! *laughs*"

"What was ... um... Edit again? Wait, what's Interaction? Timeline? I'd ... call it... just the Slides. Yeah, Thumbnails, I guess."

"Edit. Cut. Copy. Paste. Yeah, I don't understand all that. Why would you cut up the Lecture notes?" [Vlad and Tingting suggest.] "Yeah, for some of these (she points to Tools), aren't these only for Lecture, and some only for Review? Can't you just have buttons for Cut/Copy/Paste? And people are familiar with those icons."

"Yeah, the resize would help ... still... so you can view a lot of things on a page. Couldn't you just make a slide with everything you want, like a summary sheet and copy lots of different sections on a slide?"

"What lectures have a lot of images? I can't think of any ..."

"Do you have a Print option? What kind of ... is it a Text File? So it's like Adobe. Cool. Umm... Import Media. What's that again? What's Open Project? That's something you've already saved?"

Project and Slide ... terminologies confusing.

"I don't understand how this could be on a Tablet... how will this appear on my Computer?" (Would you like to have this Tablet PC to take with you, or just have it in every lecture hall?) "I don't know how's it going to be ... webcast.. you would obviously need the web."

"It's just more information that you can get during lecture.... but during lecture you're busy anyways... I don't see the advantages. Convince me to buy it."

"Would I see a blank slide?... What if you want to jump to the end?"

For every slide, what you see is the finished product. And, if you want to play it back... then ... "The webcast should be a separate thing... b/c I won't always have wireless... then if I want to see it from the beginning, I'd just press Play."

Jen: talks about complicated diagrams
"Yeah, that's good."
Vlad: you're saved from having to write anything the professor writes
"So your notes would be what, then? ... ohh..."

"You wouldn't really want anyone's notes, then ... 'cuz it'd just be their questions. and the notes are already written."

"And I could look at my notebook ... helps me to write his slides anyways. I also don't have a computer 24/7." ... "Is there any way to compress all the layers... and put them all on one page? Is there a View version? ... like .. you know how Adobe has all these... print 6 per page."

"Yeah, just gonna have the slide with the lecture notes and you can write as much as you want on it. And if you want more space, make a new slide."

"You're not going to crop during lecture."

E. RAW INTERVIEWS FOR STUDENT B

Notes on Mo's interview:

- Have difficulty understanding the concept of layer, would prefer writing on the slide directly instead of switch between layers and slide.
- Confusion with play button which is intended for playing of the webcast, instead, participant thought it's the same as play slideshow in the powerpoint
- Slide library not very useful, would prefer open lectures from File menu which is similar to the program that she uses on a regular basis.
- Don't wanna discussion panel by default, even though live interaction with instructor and other students can be desirable. Don't totally eliminate it either, since it's a good option to have it around in case of having any questions related to lecture.
- Uncertain about the terminologies used in menus, "timeline, interaction, media library" due to inconsistency between the menu and windows.
- During reviewing lecture, newsgroup is preferred instead of simply having the ability to archive discussion questions from the lecture.

F. RAW INTERVIEWS FOR INSTRUCTOR A

Unclear about the demo..
Why do all MCB classes show up when , you type in MCB 150..Order
-Time line is an unclear term..
Why is all this information usefule in the save dialogue.. seems irrelevant
Why even have semester when just date is sufficient(in slide view)
Wants lecture titles next to date

Task1
Saves document as soon as he starts
Notices object library for image inport... goes to scale.
Slide menu worked well, knew to go there ..
Knew to creeate new layer for notes
Guessed that toolbar button created new layey (despite already having seen slide file menu)

After the fact..
Wants to know how to insert into object into library

Task2
Assumed that interface was already projecting.. was told that it wasnt.. looked in view menu.. finds record button,
Why does prject button look likerecord..
Doesnt know about interaction screen.
Confused about why it wasnt there before..
Finds it annoying.. (joke)
(interaction screen with everyone being able to see discurssions) thinks it will not work in practice with large class.. will scroll very fast.. in large class wants mechanism to only take comments for area of students (like first 2 rows)
steven asked howmany student responseswoudl probably like
wants a delay before answers are accepted (for polling?)
additional conversation going on, are they listening to me or are they talking to each other /w questions , feels like he would have to address all conversation to keep focus on his lecture
wasnt clear that everyone had this screen.. thought it was just being projected
\needed to make layers visible,. Was unsure... thinks about the project button again tries it .. but wrong.. brought the correct layer to the top but didnt know how to proceed.. went into help, needed help , was told about right clicking right click on slideand make visiable
not sure if he should just be answering nancy?

After the fact
Steven wonders whetheher right click is a good idea.. richard doesn't mind said it would be fine.

Wonder why new send dialogue is relevant.. should just highlihgt question and sanswer in the general send section.

Wouldnt answer in the discussion panel ..
would want to see everything even if tawas involved.. but wants TA involved..

new toolbar icon withprojector, as well as record ..
need to put layer visibility options in more obvious play

-bring more transparencies

G. RAW INTERVIEWS FOR INSTRUCTOR B

Notes on 3rd interview

Bad things.

1. Puzzled at start of program – don't know how to do what. Got some help from Jen. as to what to click.
2. Puzzled at how to show stuff to students – what gets shown and how. Didn't get what "record" meant, because didn't know about webcast.
3. Chat feature is too difficult to use. Problem how to send stuff, what goes where.

Analysis of problems:

1. Concepts of our program are difficult for first time users. When this big thing pops up with lots of options, some people get lost ("I want to make a slide, how do I do it?"). Need labels, instructions. Big buttons are best – will look at them first.
2. Need to be precise in everything. You want something, you click, and it does it for you. Lecturing is stressful, so if its too complicated, professors will make mistakes. Especially details when saving – to make sure will find it later, when showing something to students – do not want blips like showing own notes.
3. In general, during the start of lecture, professors are stressed, so they can forget to "start" anything. They are much better at stopping stuff at the end – they have to pack and go anyway, so it will stop automatically.
4. Users of our system might need to be too techno-savvy to use it. Classroom 2004 relies on many programs for previous knowledge:
    - ✧ Photoshop – toolbox, layers (which might be a difficult concept).
    - ✧ Powerpoint – general design, editing slides
    - ✧ Animation program (MAYA, etc) – slide timeline, showing stuff to projector.
    - ✧ Messenger/AIM – chatting with students
    - ✧ Adobe Acrobat – scrolling through slides
    - ✧ Windows Media Player – playing/stopping video and making it loop.
    - ✧ iTunes – searching for slides in the slide library.

And how they fit together is not immediately clear. Interface needs to be more minimalistic to shorten time to find stuff. Stress is another factor, so make it as simple as possible. Mistakes during program use when students are watching are NOT good.

Suggestions on improvement

1. Save "chat" feature for future development – it seems thorny and complicated to teachers.
2. Delete "crop" feature from toolbox – told explicitly its not useful.
3. Simplify the concept of program? Make it easier to understand what "timeline", "object library", "slide library", "layers" mean. The fact that we assume teachers will have to learn our system before they become professors is not an excuse to develop a simpler and easier interface.
4. Make important buttons BIG.
5. Make interface as minimalistic and simple as possible. Cut out confusing/ ambiguous functions.

H. ADDITIONAL PROTOTYPE IMAGES

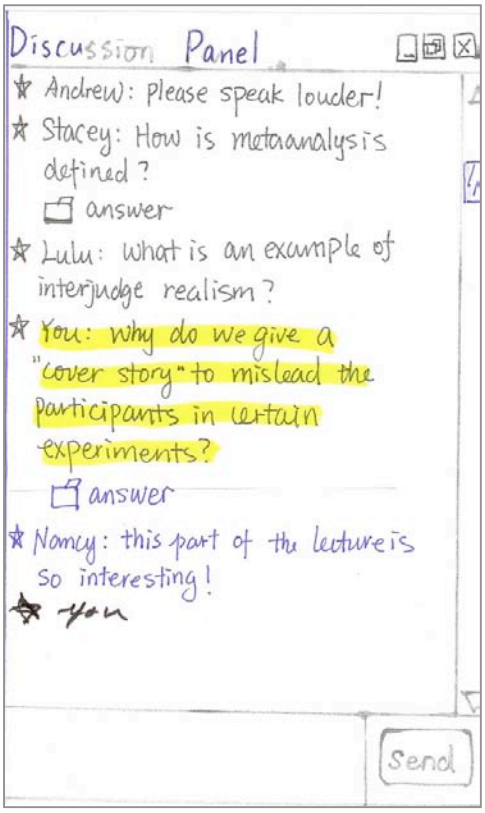


Figure 1. Additional Discussion Panel used. Highlighted text indicates a message posted by the user.

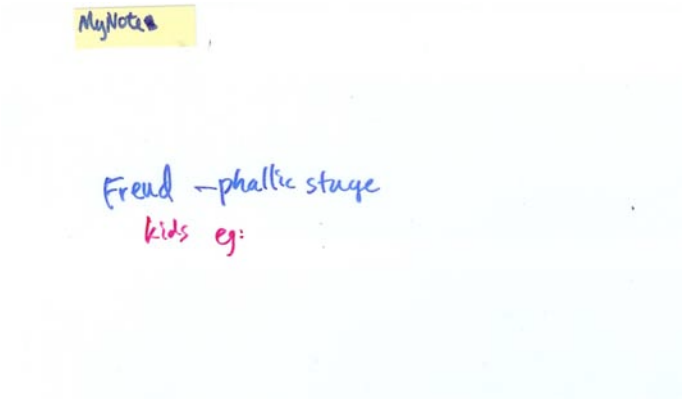


Figure 2. Notes taken by Student A

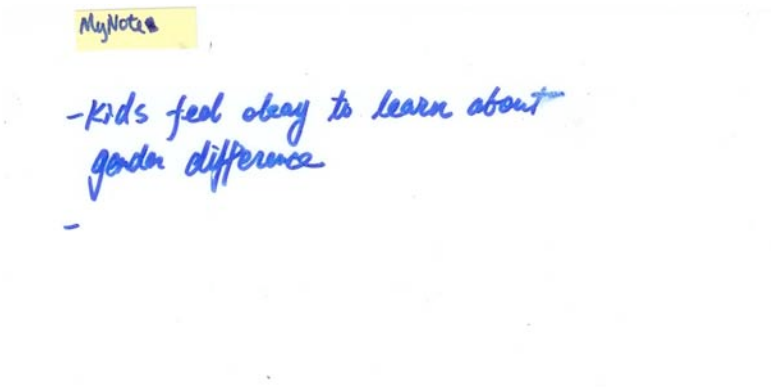


Figure 3. Notes taken by Student B

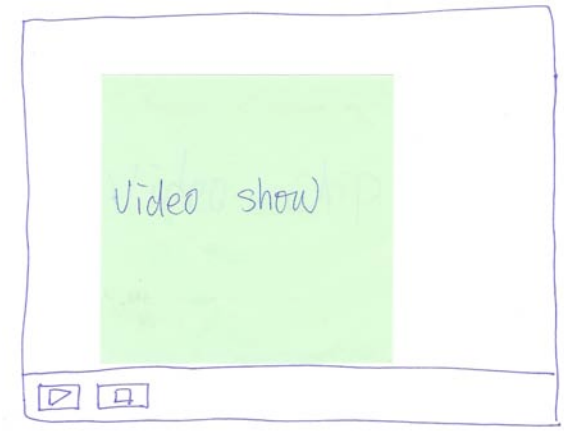


Figure 4. A video clip as it would appear on a slide.

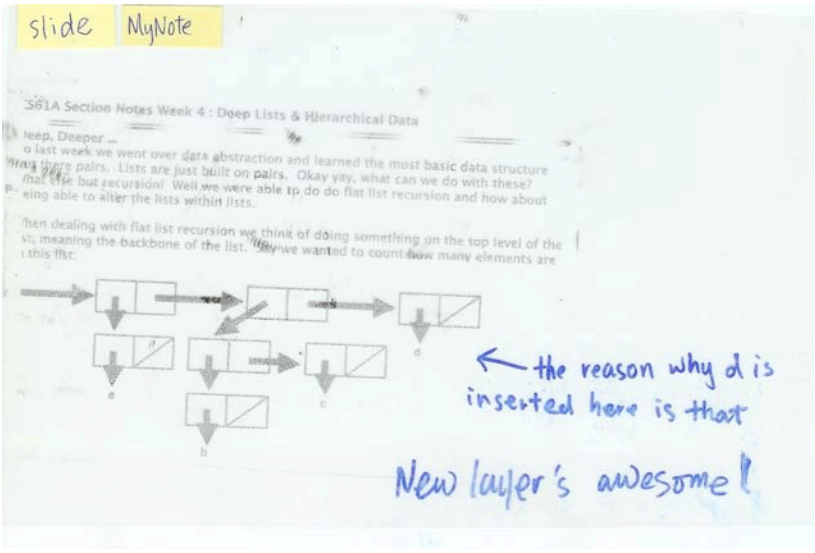


Figure 5. Slides used by Instructor B

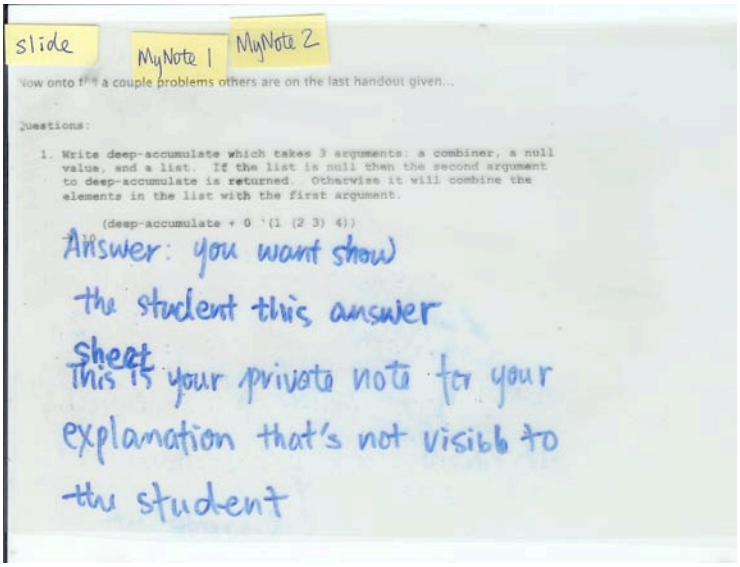


Figure 6. Slides used by Instructor B