# "Presenter-On-Paper": The Camera Phone as an In-Class Educational Technology Tool

W. Tian Lim  Steven A. Wolfman
Department of Computer Science
University of British Columbia
Vancouver, BC V6T 1Z4
*wolf@cs.ubc.ca*

March 14, 2006

**Abstract:**
This report documents the work that has been done this summer for the "Presenter-on-Paper" project. We will present key project design decisions and their rationales. Our target audience includes those who are interested in replicating or extending our work, and therefore would benefit from our lessons learned. This paper is a technical paper, so we will assume that our readers will have at least a layman's knowledge of cell phone terminology.

**Table of Content:**

1. Summary ..... 3
1.1 Overview ..... 3
1.2 Background and Terminology ..... 3
1.3 Apparatus ..... 5
2. Introduction ..... 6
2.1. The Vision and Motivation ..... 6
2.2 Objective ..... 7
3. Decisions: Devices ..... 8
3.1. Selecting an Image/Data Capture Technology ..... 8
3.1.1. Cell phone with a Built-In Camera ..... 8
3.1.2. Digital Camera, with and without Bluetooth ..... 8
3.1.3. Clickers ..... 9
3.1.4. Handheld Scanner ..... 10
3.1.5. Digital Pen ..... 11
3.1.6. Conclusion ..... 11
3.2. Selecting Carrier & Device ..... 12
3.2.1. Carrier ..... 12
3.2.2. Specifics of Device ..... 12
3.3. Reflections on the Audiovox 8930 Under Bell Mobility ..... 13
3.3.1. The Picture-Messaging User Interface Flow ..... 13
3.3.2. Physical User Interface of the Device ..... 14
Image Transfer: ..... 15
3.3.3. Environmental Factors ..... 15
3.4. Conclusion on Device Selection ..... 16
4. Decisions – Algorithms and Code ..... 16
4.1. Set-up ..... 16
4.2. Modifications to Existing Code ..... 17
4.2.1. Use of a Source Manager/Factorization of Sources ..... 17
4.2.2. Check for Fresh Images ..... 18
4.2.3. Making HTTP requests ..... 19
5. Conclusion ..... 21
6. References ..... 23
7. Appendix ..... 24
7.1. Technical Details on Setting Up Ubiquitous Presenter V. 1.10.1 and 1.10.16 ..... 24
7.2. A Reference to Different Speeds Used in Cell Phones ..... 27
7.3. The Process of Image-Taking and Image-Sending Using Audiovox 8930 Interface ..... 28

# 1. Summary

## *1.1 Overview*

The "Presenter-on-Paper" project explores the use of cell phone cameras as a new channel for communication in the classroom. Students use camera-enabled cell phones to transmit their questions, comments, and exercise solutions to their instructor during class. The instructor can then review, share, and annotate these submissions in the same fashion as her own prepared slides.

## *1.2 Background and Terminology*

This section gives some basic background of this project and properly defines some terminology used in this report.

**a. Classroom Presenter (CP)**

As defined in its official website [11]:

CP is a program that uses Tablet PC ink to allow instructors to annotate pre-prepared slides and students to create submissions for in-class activities.

**b. Ubiquitous Presenter (UP)**

As defined in its official website [6]:

UP is an outgrowth of Classroom Presenter. UP extends CP's functionality by taking many of CP's features onto the web.

**c. Personal Response System (PRS)**

As defined in a website [9]:

The Personal Response System (PRS) is an instructional technology tool composed of a proprietary software application that is installed on the facilitator's computer, a wireless receiver, and hand-held infrared transmitters that have been assigned to students to record their responses to multiple choices or yes/no questions. The student transmitter resembles a television remote control, also known as a clicker.

When the facilitator (such as a teacher or lecturer) asks a multiple-choice or yes/no question, the student presses a button on the handheld device that corresponds to the intended answer. All student answers are recorded and analyzed, and can be displayed on the facilitator's computer screen as an easy-to-read histogram. Identity of the respondent is known.

**d. Pedagogy**

As defined in Wikipedia [5]:
Pedagogy is the art and science of teaching.

**e. Image Transfer**

Image transfer from a camera phone to another receiver depends on the data service provided by the phone service provider. The image transfer technology used in this project is known as CDMA 1X wireless network, which is approximately 144Kbps [14].

**f. Image Capture**

Also known as digitization. It is the process of creating a digital representation or image of an original through scanning or digital photography.

**g. "Brick/Candy-bar" phone**

The term used for a cell phone that does not have a flip cover with it.

**h. "Flip" phone**

The term used for a cell phone with a cover that flips open, revealing its keypad and its screen.

## *1.3 Apparatus*

The software used was:

- Microsoft Visual Studio 2003 C#
- Ubiquitous Presenter version 1.10.16

The hardware used was:

- Motion Computing Tablet PC, Windows XP
- Toshiba Laptop Pentium 4, Windows XP

# 2. Introduction

## *2.1. The Vision and Motivation*

The “Presenter-on-Paper” project explores the use of cell phone cameras as a new channel for communication in the classroom. Students use camera-enabled cell phones to transmit their questions, comments, and exercise solutions to their instructor during class. The instructor can then review, share, and annotate these submissions in the same fashion as her own prepared slides.

Classroom Presenter's “student submission” facility and other similar student interaction technologies have shown the value of augmenting traditional spoken interaction in the classroom with an electronic communication channel [6]. Unfortunately, most of these systems require expensive technology (such as Tablet PCs) or esoteric technology (such as single-purpose “clickers” and their associated receivers) [16]. Furthermore, these technologies generally operate in parallel with the artifacts and annotations students already manage in class: their notes. Therefore, using the interaction technologies imposes additional, often cumbersome, physical and cognitive load on students.

The Ubiquitous Presenter project begins to address the first of these concerns, which is to improve classroom interaction, by extending participation in Classroom Presenter-based presentations to any student with a web-enabled device. However, students’ participation on these devices still is not integrated with their existing note taking practices, and the range of participating devices is practically limited to PDAs and laptops.

Our project extends Ubiquitous Presenter so that students with cell phone cameras can submit written annotations on slides (and any other work the camera can capture!) to Classroom Presenter presentations. Cell phones, even those with photo capabilities, are inexpensive compared to laptops and tablet computers. Unlike “clickers”, cell phones have multiple uses and significant value to students, independent of their use in the classroom. Adoption of cell phones is already extraordinarily widespread, and adoption of cell phone cameras is spreading [3].

Cell phones are small and convenient enough with sufficient battery life for students to bring them to class and manage the phones as part of their physical space. Finally, our system integrates the cell-based submissions tightly with students' existing note taking practices.

For this project, we have developed a proof-of-concept extension to the Ubiquitous Presenter system that allows phone-based submissions of unprocessed images.

In the future, we will explore practices that develop in the classroom around these submissions. Time permitting, we will also explore interface design for the student's cell phone, alternate methods of image capture, processing of images (such as registration with stored slide images), quantitative learning effects, student-to-student communication, and mechanisms to "close the loop" from the instructor back to the student and from electronic images back to paper.

## *2.2 Objective*

This report documents the work that has been done this summer for the "Presenter-on-Paper" project. We will present key project design decisions and their rationales. Our target audience includes those who are interested in replicating or extending our work, and therefore would benefit from our lessons learned. This paper is a technical paper, so we will assume that our readers will have at least a layman's knowledge of cell phone terminology.

Interested readers should also familiarize themselves with the systems underlying ours: Classroom Presenter [1, 11] and Ubiquitous Presenter [4, 6].

# 3. Decisions: Devices

This section discusses the different factors that we considered in selecting the physical tools to achieve our project goals. The final device that we chose to work with is a cell phone with built-in digital camera capability.

## *3.1. Selecting an Image/Data Capture Technology*

### 3.1.1. Cell phone with a Built-In Camera

**Advantage**

The cell phone is currently the most popular piece of technology for communication amongst students [3]. As camera phones are becoming more affordable, we anticipate a shift of student ownership from cell phones to camera phones. This implies that more students will be carrying camera phones. We want to take advantage of this phenomenon and have students use their phones in the classroom, rather than making them buy a separate device just for a class.

Compared with just a digital camera, a camera phone is a more multipurpose device – students can use it to call each other as well as take impromptu pictures.

**Disadvantage**

The image resolution of current camera phones is not as good as digital cameras. Camera phones are more sensitive to their environment as compared with digital cameras, like steadiness of hand and lighting conditions. As students do not have much space and time to adjust to the lighting conditions in their classroom, shadows on the artifact photographed are likely to affect the legibility of the images projected onto the screen.

### 3.1.2. Digital Camera, with and without Bluetooth

**Advantage**

A digital camera offers high image resolution. It also has more image controls to adjust the camera in different environments. These factors help with overcoming lighting difficulties and fuzziness in the images produced.

Using Bluetooth, digital cameras can send images to other nearby Bluetooth-enabled devices. It can also be more natural to capture images using digital cameras comparing with camera phones as they fit the well-learned model of cameras use that people already have.

**Disadvantage**

A digital camera only has one role – being a camera. It is possible to use digital cameras in classroom. However, students will then need to bring in not only their own computers, but also cable(s) that will enable the transfers of images taken, from the cameras to the computers. Then, they will also need to open up a web browser and email these images to the teachers. This multi-step process is time-consuming and a hassle for students who are at the same time following the on-going lecture.

A digital camera with Bluetooth would be ideal to combat the above situation. However, then the connectivity of Bluetooth during lecture time must stay persistent, and also that the lecturer's device must be Bluetooth-enabled. Digital camera Bluetooth is not as readily available as normal camera phones.

### 3.1.3. Clickers

**Advantage**

Clickers are small and light to carry around. The following figure illustrates its smallness:

Fig.1 – A PRS clicker next to a ruler.

Also, clickers are easy to use – students just point their respective clicker to an infrared receiver in the room, and press a button to indicate their choice of answer.

**Disadvantage**

Clickers have limited expressiveness. They allow users to only select answers for multiple choice questions. They are only used in one particular context, which is the classroom. There needs to be a clicker response system setup in a particular lecture hall before clickers can be used, otherwise they are rendered "useless" [15].

### 3.1.4. Handheld Scanner

A specific example of a handheld scanner is the Visioneer Strobe XP 200 [8]. It is like a normal flatbed scanner, except it is smaller, portable and scans only flat documents, one at a time.

**Advantage**

It can be used to digitize a copy of the student's handwritten solution. This device does not in any way preclude the use of pen and paper. It is only needed after students are done with writing on the paper.

**Disadvantage**

Handheld scanners currently starts roughly at ~CAD$200 [8]. This is quite expensive on a student budget, unless the item is well-modified for many other uses.

### 3.1.5. Digital Pen

A Digital Pen is like a normal pen, except that it digitizes handwriting and stores it into its own non-volatile memory [13].

**Advantage**

It maintains the natural use of pen and paper. Just like a USB flash drive, it is easy to carry around, and it "remembers" what it has written.

**Disadvantage**

A typical Digital Pen can only be used to write on a special type of paper that is not widely available, and costs more than a normal piece of paper. Each pen also requires a cradle that can enable the download of information stored in the pen, and usually this cradle needs to be plugged into an electrical source when in use. The pen itself requires batteries. These extra devices that need to be carried around and add to the amount of physical items a student must manage in her classroom space.

As this device is a novelty, it is still expensive – the price can range from US$200 to 300 [10].

### 3.1.6. Conclusion

The camera phone is most "student-friendly" of all the devices discussed. It is by far the cheapest image capture technology that is widely available. A clicker in comparison, is cheaper, but it is less functional than a camera phone. Even currently available resolution provided by camera phones more than meet our project's demands.

## *3.2. Selecting Carrier & Device*

### 3.2.1. Carrier

At this stage, our primary objective is to obtain a proof-of-concept that the usage of camera phones in classrooms is feasible and beneficial to both students and instructors. We anticipated a heavy use of the picture-messaging function, and a need for a storage facility for the images that we message. So, the cost of this functionality was a key concern.

There are four major cell phone service providers in British Columbia: Bell Mobility, Fido, Rogers AT&T, and TELUS Mobility. In terms of cost, service and device, Bell has the better package – it is the only carrier that has cheap unlimited picture-messaging, and it provides a large, inexpensive online album.

Other carriers require a charge of ~$0.20 per picture-messaging, and not all of them have a (free) online album. This would be expensive for the researchers and (more importantly) might demotivate student participation. The prevalence of such plans is a concern for future use of this system in the classroom. Because of these factors, we selected Bell Canada as our carrier.

### 3.2.2. Specifics of Device

The camera phone is required to have the highest image resolution that is available here. Considering that classroom environment (variables like the lighting condition, and image focus) would play a huge factor in visibility of the image captured, the device should also have a built-in flash and a zoom mechanism.

As all four of the service providers do offer camera phones meeting our criteria, our selection of the device was mainly influenced by the selection of the service provider. Among the camera phones provided by Bell Mobility, the Audiovox 8930 with a resolution of 1.3 mega pixels and a built-in flash was promising. Although this resolution is much worse than a regular digital camera's resolution, it is nonetheless the best image resolution currently available in British Columbia for a camera phone.[1]

[1] Classroom experiments showed that this resolution is more than adequate for our needs.

Fig. 2 – Audiovox 8930

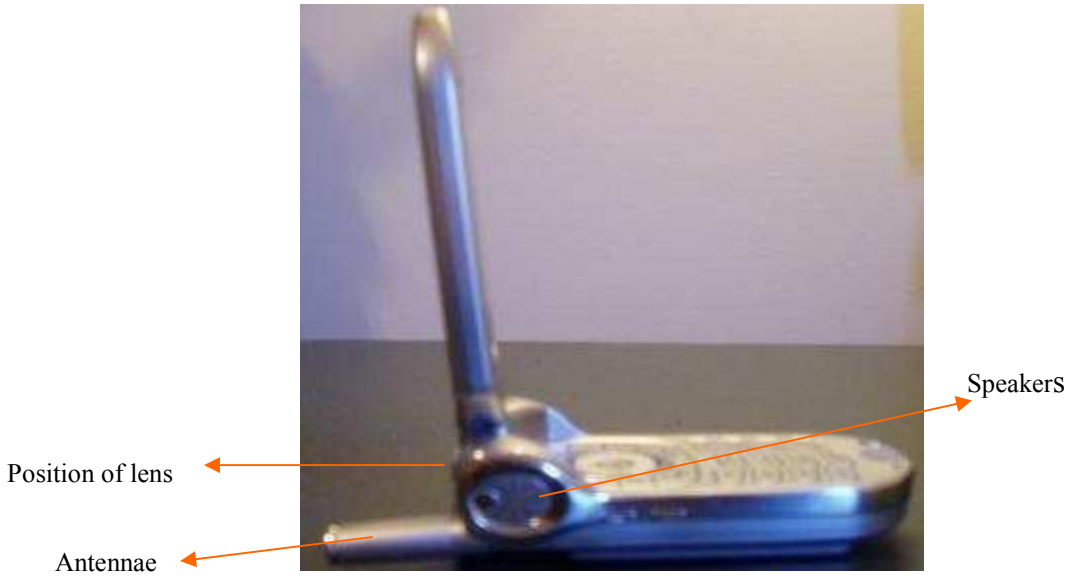


Fig. 3 – Side view of the phone.

## *3.3. Reflections on the Audiovox 8930 Under Bell Mobility*

We used the Audiovox extensively in the classroom that we will be running our user studies in. There were a few attributes that we did not consider beforehand, and they affect the usage of the camera phone crucially. The following is a list of these attributes:

### 3.3.1. The Picture-Messaging User Interface Flow

**Amount of Time Needed for Image Transfer**

Overall, the picture messaging process takes slightly longer time than we hoped. To successfully send one image to the online album with good reception takes an average of one minute. In the

classroom context, this is a significant lag. Furthermore, if the send is unsuccessful, the student must repeat the whole process. This danger could distract students who must follow the lecture, and at the same time monitor the camera phone to make sure the image is successfully sent.

Furthermore, upload time depends on difficult-to-control factors like the signal strength of the service, which can vary even across a single room. Traffic levels on the service may also limit the bandwidth available for image upload.

**Picture-Messaging to Online Album**

The phone's picture-messaging process can be confusing, especially for first-time users of this phone and service. Immediately after capturing an image, the user is presented with two choices, "Send" and "Next". Unfortunately, only the "Next" choice will send the image to the online album (the user's goal). Even the researchers make this frustrating mistake repeatedly!

**Antenna Position**

When the antenna of the camera phone is extended out, it sticks out into the view of the camera lens, and unnecessarily blocks the view of the user. Also this means that while the camera is being used, the antenna should not be pulled out, but during the sending of the image to other sources, the antenna should be pulled out for better reception. This constant adjustment is frustrating for the user.

### 3.3.2. Physical User Interface of the Device

**Shape of Phone**

This camera phone is a flip-phone, with the lens on the neck on the swivel. Some users have commented that it is awkward. Some preferred that the camera phone be a candy bar style; others preferred the lens to be either on the cover of the flip, or on the cover of the back of the phone.

We selected this phone with the hope that the swivel at the neck of the phone would improve the image taking for a seated student. Unfortunately, we did not find that the flip shape contributed

to the use of the phone. A brick phone with the camera lens on its back might actually be easier to hold and use.

**Resolution & Legibility**

We did a "rough" try-out with different lighting and resolutions. There are a few resolutions to choose from: 320x240, 640x480, 1280x768 and a few lighting conditions that may be similar to a few classroom lighting conditions. The resolution 1280x768 produced the only legible handwriting image in the 'least bright' condition, but none of the resolutions produce legible image in the 'darkest' (no light at all) condition.

Based on these results, we tested out the1280x768 resolution with the camera phone in our test classroom under different conditions. However, during one of the user studies, our user found that with 640x480 resolution, not only the image produced is still legible, but also the reduced resolution reduced the image send-out time! The images that turned out the best as projected on-screen usually are the ones that were zoomed in, and taken with flash.

**Image Transfer:**

What we currently have for our project is Bell's 1XEV-DO service [14]. It is capable of supporting wireless data speeds of 144Kbps. It is currently one of the fastest data communication network services in Canada.

Another factor to consider is the cellular coverage of an area. If someone is trying to send an image from a weak coverage area, it will take the person longer to send the image. Some service providers charge by the amount of airtime an image transfer takes, and if this area happens to be the classroom where our extended UP system is used, students will have a strong disincentive to participate.

### 3.3.3. Environmental Factors

**Steadiness of hands**

The person using the camera phone has to have steady hands in order to hold the camera still. Keeping the flash on does help with the effects of shakiness, but not much.

**Lighting conditions**

Classroom lighting is not the best condition to be taking pictures. It varies, depending on the size of the class, whether the class has windows or not, and the position of the lights with the user. The effect of shadow on the image is significant, reducing the quality and legibility of the image when projected on-screen. Ideally, image capture should be done with full lights. However, this requirement conflicts with the ideal situation for image projection, which calls for reduced lights.

### *3.4. Conclusion on Device Selection*

In conclusion, future selections of image capture devices for this project should consider the following requirements:

- Signal strength of the service used should be strong enough as to not impede the image sending process.
- The user interface flow of the image taking process should be clear and precise.
- The image sending process should be efficient, i.e. the fewer steps the better.
- The physical form factor should be suitable for image capture from a seated position. For example, the lens and the antenna positions should be placed without hindrance to one another.

## 4. Decisions – Algorithms and Code

### *4.1. Set-up*

The set-up for this project includes installing the existing code of UP, compiling it and running it successfully on our machine. As UP is still under development, the version of UP obtained had bugs that needed to be fixed. To overcome these bugs, one of the things that we did was to seek

help from someone who was deeply involved with the development of UP and knows the code quite well. She also had similar experiences coming into the UP project.

During the modification of the code, we encountered different issues, like network access to secured websites. In these cases, we sought help from various networking experts in the community in addition to Internet searches for information through Google and the MSDN website.

## *4.2. Modifications to Existing Code*

As we expanded the existing code, we discovered potential areas of improvements in terms of object-oriented programming principles. There were also new methods that we needed to add into the code, for example to enable access to the online album website, which requires a password upon login.

The following analyses the modifications, add-ins done to the existing UP code, and arguments for some designs to be implemented in the future.

### 4.2.1. Use of a Source Manager/Factorization of Sources

The current UP can accept submissions from only two sources, which are the Presenter-based submission and the student web-browser submission. These different sources of submission are hardcoded in the code.

Our current project saw the addition of one more student web submission source, the online album. We realized that we would have to write similar methods written for the student web-browser submission type for our source to work in the UP code. This redundancy can be overcome if we introduce the concept of a source manager that handles the different web submission sources. This abstraction of web sources using a source manager from the core UP

code will enable easy expansion of the types of sources that can be accepted by UP in the future. We do anticipate there will be more web-based sources to be included in the future by UP.

**Conclusion**

We did not implement the source manager. However, we did abstract web submission sources into a class hierarchy. We chose not to implement the source manager at this stage because we want a quick and pain-free proof-of-concept. Creating the source manager would be too much effort for the short-term benefit. However, our code's source factorization is a quick prototype illustrating some of the benefits of a full source manager.

### 4.2.2. Check for Fresh Images

**Pull vs. Push Methods**

When a new image has been submitted by a student, the lecturer needs to be notified. There are two methods that can achieve the results above. We call one a "pull" method and the other the "push" method. In the "pull" method the instructor's UP checks for new images periodically and pulls the new images from the online album to her machine. This method was originally used in UP's code for the browser-based submissions.

The "push" method is the opposite of the "pull" method, which involves a source manager that interfaces between the different image submission sources and the lecturer's UP. The source manager informs the lecturer's UP about the availability of a new image available from a specific source. Once detected, the image is downloaded onto the lecturer's machine.

We prefer the "push" method because we do not want to keep checking for new images even when there was none to check for. We also do not like the fact that we need to decide ahead of time on the frequency of new image checking. The number of checks also depends on the number of different image sources that can be accepted by UP. These issues are resolved through the "push" method -- image downloads happen only when there are new images.

**Conclusion**

The existing code uses the “pull” method and assumes there are only two different types of submission sources, the web-based submission and Presenter submission. We decided to use the “pull” method as this is the way UP has implemented its web-based submission method, and it is working. To change the method from “pull” to “push” would cost time and effort and introduce new risks.

However, we do intend to switch to the “push” method in the future as it eases the implementation of image checks and reduces overhead when UP takes on more submission sources.

### 4.2.3. Making HTTP requests

The online album requires a username and a corresponding password that only a Bell user that subscribes to its Picture Messaging service would have. The username is the valid Bell phone number. We used the Ethereal software [12] to analyze the protocols used between the online album website [7] and our browser. This information from the login page has to be passed on to the consequent pages for accessibility. As this may involve dealing with decrypting the SSL encryption, we decided to look for “easier” ways to access the other pages of this website without encryption.

The online album provides a function for the user to email out to other people and text-message other Bell subscribers to invite them to view a particular set of pictures the user chose to share with them. A URL link to the selected section of the album is provided in these messages. The viewer cannot do anything on the image that s/he is looking at. This invitation has no time limit. This method avoids encryption and maintains the privacy of the user’s login information.

Since we have decided to “pull” new image from the album, we make two consecutive Http requests in the same session. The first Http request involves using the album URL that was sent out through invitation. Once we establish a connection with the album website, we obtain the cookie information and the html source code of that particular page. The cookie information is used to maintain the session if we do make the second Http request, and the html source code is

used to check whether there is any new image in the album by looking for a new image ID. If there is a new image, then a second Http request is made using the same session as the first one, and the new image is then extracted from the website. To simplify our code, we only allow our system to accept one new image at a time, from one party (one album).

**Conclusion**

We implemented these HTML requests, and are able to successfully download target images. The only problem is that if the student decides to take an image upside-down, we would have an upside-down image projected on-screen. It might be tempting for students to do so because the form-factor of this phone makes capturing upside-down images from seated position easier. So far we do not have anything on UP that can rotate the image. But this is a minor issue which can easily be fixed. For now, we will assume that our user can only send in upright images.

## 5. Conclusion

The "Presenter-On-Paper" system allows students to bring in external physical artifacts into classroom discussions through pictures. The following figure is representative of actual classroom use.

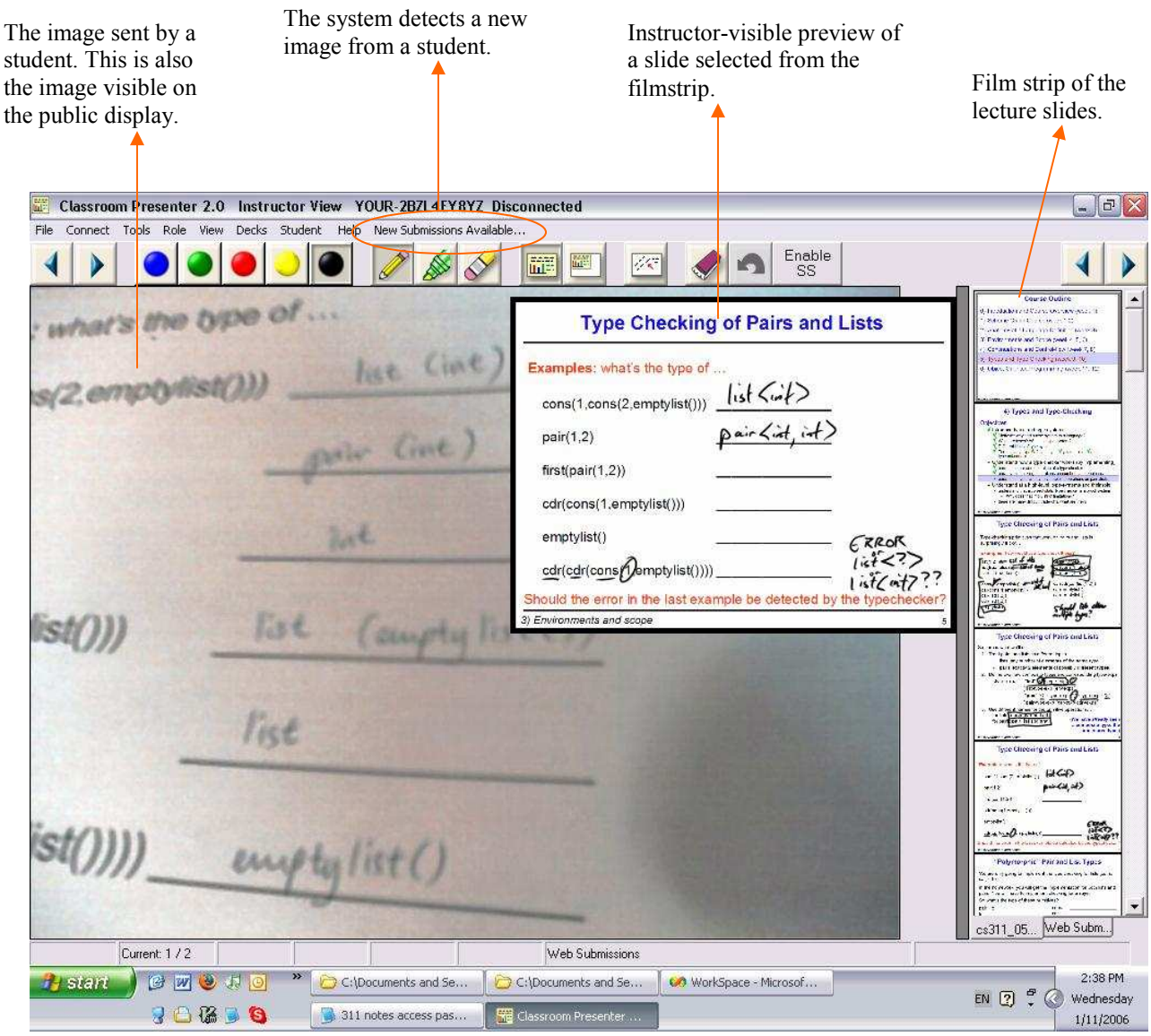


Fig. 4 – A screenshot (instructor's view) of "Presenter-on-Paper" interface, with an image sent by a student to her instructor.

We believe that the "Presenter-On-Paper" project has allowed us to bring to focus the usage of camera phones as an educational tool in classrooms. Using Ubiquitous Presenter as the basis for

our system, we allow a user to capture an image of some physical artifact and send it to her instructor. In turn, her instructor can choose to share this image with everyone else in the classroom. We believe that our research into the different areas of the device used in this project, our design decisions and rationale, and the designs and algorithms we used to extend Ubiquitous Presenter, will help others extend our work or explore similar questions.

In closing, a few practical and sage words of advice: consider the shape of the phone as the right shape will ensure the user can hold the phone properly. Shadows play a big role in the quality of the image taken. Students sitting at different places in the classroom will experience different lighting conditions and different Internet signal strength. Cost of picture messaging differs from provider to provider, and cost structures will influence students' behaviour. Always eat your greens.

# 6. References

[1] Anderson, R., Anderson, R., Simon, B., Wolfman, S., VanDeGrift, T., Yasuhara, K. (2004) Experiences with a Tablet PC Based Lecture Presentation System in Computer Science Courses. Proceedings of the ACM Special Interest Group on Computer Science Education.

[2] Ratto, M., Shapiro, B., Minh Truong, T., Grisworld, W.G. (2003) The ActiveClass Project: Experiments In Encouraging Classroom Participation. Proceedings of the International Conference on Computer Support for Collaborative Learning 2003.

[3] Thornton, P., Houser, C. (2004) Using Mobile Phones in Education. Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education.

[4] Wilkerson, M., Grisworld, W., Simon, B.(2005) Ubiquitous Presenter: Increasing Student Access and Control in a Digital Lecturing Environment. Proceedings of the Proceedings of the ACM Special Interest Group on Computer Science Education.

[5] http://en.wikipedia.org/wiki/Pedagogy

[6] http://edtech.ucsd.edu/aboutUP.html (corr. to [4])

[7] https://mypictures.bell.ca/login.do

[8] http://reviews.cnet.com/Visioneer_Strobe_XP_200___sheetfed_scanner/4545-

[9] http://searchmobilecomputing.techtarget.com/sDefinition/0,,sid40_gci894282,00.html 3138_7-31106586.html?tag=nav

[10] http://www.amazon.com/exec/obidos/tg/detail/-/B00006JP23/102-0261200-6110514?v=glance

[11] http://www.cs.washington.edu/education/dl/presenter/announce.html (corr. to [1])

[12] http://www.ethereal.com/

[13]http://www.logitech.com/index.cfm/products/features/digitalwritingtopics/US/EN,CRID=2095

[14] http://www.mobiletechnews.com/info/2002/02/12/155707.html

[15] http://www.google.com/search?q=cache:_vdMXHEHDRgJ:www.fairfieldmirror.com/news/2005/11/10/News/Students.Use.Clickers.To.Get.Things.To.click.In.The.Classroom-1052840.shtml+prs+clickers&hl=en&client=firefox-a

[16] http://www.usc.edu/isd/locations/cst/tlsnew/ats/prsclickers.html

# 7. Appendix

## *7.1. Technical Details on Setting Up Ubiquitous Presenter V. 1.10.1 and 1.10.16*

**1. Setting Up Ubiquitous Presenter (helped by Michelle).**

**-** started on Tablet PC with UP 1.10.1, but the bug of "Unable to find module file 'C:\....\Program Files\Microsoft Tablet PC Platform SDK\MSTPCRT.msm" has thrown me and Steve off for quite awhile now.

- cannot find this file in MoCo… what are the search results online (Google it!)?

- After *the* accident with the MoCo Tablet PC, we switched to working with the UP code with my laptop completely.

In chronological order:

- **Installing UP 1.10.1 (Tablet PC):**
- Downloaded the install and source package from

< http://activecampus2.ucsd.edu/~mw4/UP1.10.1.zip> (link sent on June 1)

- Some errors/bugs that need to be fixed:
    - Microsoft.Ink.dll needs to be version 1.0.2201.2 in the machine's assembly directory (C:/windows/assembly/)
    - Downloaded Microsoft.Office Primary Interop Assemblies from <http://www.microsoft.com/net/> and used this page < http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnoxpta/html/odc_oxppias.asp> that has some guidelines on how to reference the Office XP PIAs.
    - Tried to overcome the MSTPCRT.msm bug after compiling the program, but to no avail.
- **Installing UP 1.10.1 (Laptop):**
- Repeat everything as above again.
- Ran & successfully compiled the UP 1.10.1 code.
- **Installing UP 1.10.16 (Laptop):**
- Had some problems with it…

- > ...\1.10.16\PresenterSetup\PresenterSetup.vdproj
  > Could not find file 'C:\Documents and Settings\Owner\My
  Documents\HCI_cpsc\Tian\1.10.16\UW.Presentation\PresenterPlayback\obj\D
  > ebug\PresenterPlayback.exe' 'The system cannot find the file specified.'
  >
  > ...\1.10.16\UW.Presentation\Presenter\Form1.cs(10):
  > The type or namespace name 'WorkSpace' could not be found (are you
  > missing a using directive or an assembly reference?)
- Michelle also mentioned that they also had some ink problems too…
  - Fixed the ink problem on Jul 6 2005 by making sure that all Microsoft.Ink.dll that is referenced is the same version.

## 2. Familiarization with UP's code:

- Steve's and Michelle's help…

- Terminologies:

> 1. DeckBuilder
This is a peripheral (or however you spell that word) application
that exists pretty much only to create CSDs for use with Presenter.
It's become less popular, since there is now a PowerPoint plug in that
will save CSDs straight from PPT. (Deckbuilder and the PPT Addin are
also what instructors use to upload slides to the web for UP)

> 2. presenter playback (or just playback)
I'm not quite sure, this is new this year. I think it's literally a
way to record a presentation, with live ink and (maybe sound?)
rebroadcast it on the web

> 3. Slide vs screen
Slide is just like a slide in a ppt - the thing that pops up when
instructor is lecturing. Screen, I believe in Presenter context, is
the entire application visually and might also have to do with the
dual-screen output (instructors can run presenter as we see it on one
screen, and output just the slide, like a PPT slideshow, on another
screen).

> 4. Slidedeck
A CSD. CSD stands for "conferencing slide deck" - it's the equivalent
of a ppt file, just literally the collection of images/slides that are
used for a presentation.

> 5. Deck
Short for slidedeck, but the same thing

> 6. guid
Globally Unique Identifier. A data structure supported by .NET that allows creation of large identifiers (essentially some string of bits) that have a miniscule probability of being repeated elsewhere. Handy way to tag info uniquely. Not Presenter specific.

> 7. capability (somewhere amongst the code for the Role Setup Region in ViewerForm.cs)
A plug-in for ConferenceXP; not crucial for our particular work on Presenter.

> 8. workspace
All I know is that this is the namespace where all of teh
Presenter-specific code lives - it borrows some Deckbuilder and other
code, Workspace is the stuff that's not borrowed. But don't quote me
on that...

- The difference between UP's and P's codes is indicated by the term "UbiPres".
- UP allows web submissions from students; connects to a classroom (and a certain class slide, with password)
    - A "Loading submissions…" & "New Submissions Available" menu option.

**3. Accessing the Album and Images online.**

- The site < https://mypictures.bell.ca/login.do > is SSL-encrypted.

- This may prove difficult to overcome, so we looked into other options available at this level before deciding to dive into SSL-related code.

- The album provides a facility to send email invitations out to different email addresses and phone numbers (those within the Bell network only).
- The recipients will be able to view current and updated album(s) that corresponds to the email that is sent out (i.e. the email basically gives permission to the recipients to access the album passively – the viewer cannot change anything on the images that s/he is looking at)

- This invitation has no time limit.
- Newest image on top of the stack first.
- So, since our design is for the UP code to be *pulling* the image from the album, for first phase we decided to just pull the newest image (i.e. the first image) in the album, by making **2 consecutive Http requests in the same session…**

- The .cs file that handles Bell's submissions is *bellWSS.cs*.
    - we make a Http request using the album URL.
    - from this request we grab the cookie information and the html source code of that particular page.
        - the html source of the page is used to check whether there is a new image (new id) available in the album.
        - the cookie information is used for maintaining the same session as we access the different images/pages of the website.
    - if there is a new image in the album, its corresponding ID is extracted from the html source code and is used by a second Http request to enable the image download into a specific folder on the computer.
    - This second request must use the cookie information obtained from the first request. This is to enable the website to recognize the second request as a valid request i.e. in the same valid session.

## *7.2. A Reference to Different Speeds Used in Cell Phones*

From http://reviews.cnet.com/4520-3504_7-5664933-2.html?tag=arw::

| | 1980s | 1990 to 1995 | 1995 to 2000 | 2000 to 2005 |
|---|---|---|---|---|
| **1G**<br>Analog: voice only | AMPS | | | |
| **2G**<br>Digital: voice and limited data<br>(less than 20Kbps) | | CDMA<br>GSM | | |

| | | | | |
|---|---|---|---|---|
| **2.5G**<br>Data at dial-up speeds<br>(30Kbps to 90Kbps) | | | GPRS<br>1xRTT | EDGE |
| **3G**<br>DSL speeds<br>(144Kbps to 2Mbps) | | | | UMTS<br>1xEV-DO |

## *7.3. The Process of Image-Taking and Image-Sending Using Audiovox 8930 Interface*

The process goes like this: capture the image -> select “Next” -> select “Upload to Album” -> select the appropriate online album to send to (one can have more than one album) -> send.

At the ‘select “Next”’ stage, there is also another choice, a “Send” option. Selecting the “Send” option will not get the user to send the image to an online album. Instead, it brings up a menu with the options of sending the image to another phone, or an email address, or to the existing contacts stored in the phone, or “Other Services”. There is no option to “Send” to an online album. The user then needs to backtrack to the beginning (2 steps) to select the “Next” option, which will bring up the “Upload to Online Album” option.