

**UCLA Cloud-Based Print Kiosks 2016**  
***Improving student printing experiences one page at a time***  
Development and Implementation: Six months

**Submitted By:**

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**Team Members:**

**Department of Psychology/Life Sciences:**

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David Margolis	Web Developer
Chris Nguyen	Help Desk Supervisor
Ray Yamauchi	Help Desk Analyst

**UCLA IT Services:**

Linda Lee	BruinCard Sys. Mgr
Warren Leung	IAMUCLA Prg. Mgr.
Michel Maokhampio	Bus. Sys. Analyst
Albert Wu	Dir, Info Mgmt Svcs.

**BruinCard Center:**

Francisco Flores	Supervisor, BruinCard Center
Natasha Guerrero	Administrative Specialist
Chris Ramos	Manager, BruinCard Center
Jessica Settles	Administrative Assistant

**BruinCard Services:**

Michael Salazar	BruinCard Sys. Administrator
Ulises Perez	BruinCard Sys. Administrator

**Office of Residential Life:**

Burt Harris	Learning Center Manager
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**CCLE:**

Rex Lorenzo	Programmer/Analyst
Nick Thompson	CCLE Coordinator

**Technologies Utilized:**

***UCLA Web Single Sign-On (Shibboleth), UCLA BruinCard, wēpa cloud based print-on-demand kiosk.*** We also developed additional database and programmatic integration to pull data from a number of sources to identify students who receive Psychology “Instructional Print Credit” (IPC).

**Summary Description:**

The UCLA Psychology department conceived the cloud-based print-on-demand kiosk system as a cost-effective way to provide high quality and convenient printing service to students in support of their instructional needs. We wanted to provide: ***more convenient, better quality, more reliable, and more accessible printing service.***

To accomplish this goal, we set out to replace traditional computer lab printers with cloud-based print kiosks in order to:

- Contain printing costs at the current spend rate for departmental computer labs.
- Enable users to retrieve prints created at computer lab workstations or from UCLA cloud storage (Google Apps, Box) accounts.
- Encourage users to print responsibly by implementing an appropriate pricing model.
- Reduce staff time spent managing the lab printing function.

**The Problem:**

For the last several years, students in the Department of Psychology have printed well over 100,000 pages per year in our computer labs. We believe that a part of the computer labs’ mission is to support student needs to print materials for studying and to submit assignments. While these lab printers have provided great convenience for the students, the printing process has had problems. Due to heavy print volume wear and tear on the printers takes a toll. The previous print monitoring solution (PCounter) could not track every possible type of print job. It was difficult to limit printing to instructional use **only**.

Printing limits and quotas aimed at providing the right amount of print credit for instructional support had been marginally successful. As a result, there were a lot of wasted prints.

For many years we have been challenged to find the most efficient and fair way to provide necessary instructional printing service. Providing “free printing for instruction” and charging for “other printing” resulted in frequently changing service levels and resource allocations. Past attempts to manage these different needs included collecting cash for “other” printing, charging student S-bar accounts, debiting BruinCard funds, or simply not charging at all and absorbing the costs of all printing. We were mired in processes that needed constant adjusting as staff, policies, and student needs changed.

***In 2015, as our printers were approaching end-of-life, we considered replacing them and continuing to balance “instructional” versus “other” printing needs, or replacing the printing process with a cloud based, print-on-demand kiosk model.***

#### **The Solution:**

We’ve developed a better way of printing that rewards students for printing responsibly. Our solution properly allocates costs associated with “instructional printing” to instructional budgets and “other” printing to the user’s personal funds. This was accomplished by replacing computer lab printers with the print-on-demand kiosks made by wēpa (wepanow.com).

With four print-on-demand kiosks installed throughout the Department of Psychology area and one in the Rieber student residence hall, it is now possible to provide reliable, high quality printing service in the labs and in some areas 24 hours a day, 7 days a week.

#### **About the wēpa print-on-demand Kiosks**

The wēpa print-on-demand kiosk is a self-contained unit connected only to power and Ethernet. Each kiosk is comprised of a small computer with a touch screen and a high quality color LaserJet printer. The kiosk also comes with a mag-strip card reader allowing a UCLA student to use his/her BruinCard to access, pay for, and print documents with a simple card swipe.

While UCLA provides the space, power, and network connection, wēpa owns, operates, and services the kiosks. This support model significantly reduces the amount of UCLA staff time spent on managing printing activities. In their current configuration any UCLA member or member of the public may use the kiosks.

#### **Innovation:**

Self-service print kiosks have been available to the general public in forms such as department store gift registry kiosks, airport ticket printing kiosks, movie ticket printing kiosks. Tying this kind of technology to instructional use and more specifically, to UCLA student learning, called for several UCLA units (named in this document’s Team Members section) to collaborate. Integrating the cloud printing service with key UCLA services has created a simple and straightforward user experience.

The integrated systems include UCLA’s Shibboleth Web Single Sign-On, BruinCard (UCLA’s ID and debit card), UCLA Box service and Google Apps.

**Benefit to Student Life Technology and Learning Management:**

Students can now focus on getting the documents they need without any hiccups in technical processes or fluctuating departmental policies. Integrating the kiosks with UCLA BruinCard and Web SSO makes login to the system easy, and provides a practical way to manage “free” and “paid” print quotas. Students are given quarterly quotas that cover the cost of printing approximately 50 black and white pages. In addition to single-sided, black and white prints they may choose to print color or duplexed pages, and making those choices will have an effect on their overall quota. Students have the option to pay for additional pages with BruinCard or wēpa account funds.

Students can also send documents to print and retrieve them with more convenience than ever. In addition to printing from the lab computers they can also print from their own personal computers and mobile devices. Rather than being limited to printing only in our lab, and only when the lab is open, students can now pick up their jobs at any print-on-demand kiosk. The print kiosks also allow for color printing, something we were not previously able to provide.

Another benefit is that print jobs are sent to the cloud service where they sit encrypted until the student releases them at the kiosk. Printouts no longer sit unattended at any printer because they can only be released while the user is standing at the kiosk.

**Collaboration:**

Psychology IT staff worked with many others to design and implement this service. In addition to working with a cloud printing service provider we collaborated with the UCLA BruinCard office, Campus IT services, the Office of Residential Life, and IT Staff in Life Sciences. The UCLA integrations are what really make this solution special. A cloud based, print-on-demand system without these integrations could not have been successful. The work to identify students eligible for the IPC (instructional print credit) who then seamlessly use that credit at the kiosk was critically important, and truly at the heart of this collaborative project.

**Success Factors:**

Using the print-on-demand kiosks has exceeded the goals stated in our summary description.

Printing is now more convenient.

Students have found that there are multiple ways to send a job to print, and they have more options to release their documents at kiosks located in our computer labs, the Franz Hall lobby, and at the Rieber Residence Hall.

Printed documents are of better quality.

Most student printing occurs in our labs and we are able to observe use and the quality of printed documents first-hand. We’ve noted far fewer printer jams (so no wrinkled or curled print outs), toner is replaced quickly (so no light or streaked print outs). Also, students are taking advantage of the printers’ duplex and color functions – features that were not available on all computer lab printers prior.

Print-on-demand kiosks are more reliable.

It is expected that mechanical things will wear out, so some level of maintenance for the print kiosks is expected. But so far, we’ve had very little downtime with the kiosks. When we’ve needed a component replaced we’ve been able to do it ourselves within minutes, or the vendor has sent a technician to

perform the task. While any one kiosk might be down for maintenance, there are others that may be used instead, without need for students to resend their print jobs.

The print-on-demand kiosks are more accessible.

While it is true that the kiosks inside the labs get the most use, it may be that those outside of the labs get the most important use. Having 24/7 access to printers in the lobby or Rieber Residence Hall allows students to work and print after normal business hours, when it might be more convenient for them. Students don't need to be in the computer lab to send a job to print. They can do so from their own workstations, mobile devices, tablets, or laptops, and can also email documents to the cloud or directly plug in their USB drives. Students can access their cloud storage directly at the print station and simply select a document to print. There are at least 5 new ways to access the kiosk printers compared to only one way with the computer lab printers.

**Additional success factors we hadn't planned on:**

We're seeing much less wasted paper! There are no longer abandoned print outs discarded in the lab. The staff members are also pleased to have a reduced role in printer maintenance, repair and replacement; the vendor is aware of any maintenance needs often before we are, and provides supplies or resources to resolve them. Wēpa monitors supply levels and mails us new supplies BEFORE they are needed. Now, we never run out of paper or toner. We have a much better understanding of usage needs and patterns now, since detailed reporting and tracking of printer use is provided to us by vendor.

**Impact from the Student perspective:**

Even though students are printing significantly less at the kiosks than they used to at the department computer lab printers, we haven't had any complaints that they can't print as much as they need to print in support of their instruction. In reviewing student print usage for the Winter 2016 quarter we found that two thirds of the students who received instructional print credit used half of their allocation or less, a subjective indicator to us that the quarterly credit we provide is sufficient.

From wēpa print analysis reports we noted that 75% or more of the student print jobs are printed using the wēpa print driver installed on our lab computers, which tells us that the lab is where most printing originates. Wonderful! The computer lab is where students can immediately get in person help if needed. Yet as mentioned above, they are not limited to only printing from the lab. Students are enjoying other technical and operational advantages as well. They no longer have to wait for printers to warm up and their print jobs don't get mixed up with other user jobs. The release station requires that the sender to login and release the document for print.

At the end of the 2016 Winter quarter we surveyed students on their satisfaction with the new print-on-demand kiosks. 308 students were surveyed, 96 of them responded. Some key findings follow:

- 83% are either "somewhat" or "very" satisfied with the print kiosks.
- 90% of those surveyed said that the print quality was "very high," or "high."
- Nearly all who responded said they'd like to see additional kiosks on campus.

By providing students with a department-funded, quarterly allocation **and** allowing them to individually pay for additional pages, we are meeting the needs of students at both ends of the printing spectrum, fairly and responsibly. Students can print up to 50 pages per quarter at no cost to them, or they can choose not to print at all – there is no financial consequence or penalty either way. The department

then pays only for the allocations used at the end of the quarter, and sets a new IPC for each student at the start of each new quarter.

**Impact from the Staff perspective:**

On the staff side, we’re spending much less time resolving printing issues, and NO time tracking use, purchasing consumables, repairing printers, sourcing and purchasing new printers. There is no time spent setting and adjusting user print allocations through PCounter any longer. Students eligible for Psych-IPC receive it automatically when they are identified as currently taking a Psychology course through Registrar’s records. They can then “print away,” using a declining balance of wēpa funds.

Issues	Before	After
Planning for next year	We had to source and propose each fiscal year printing supplies such as paper, toner cartridges, printing management software, and printers themselves.	Nothing to purchase. Everything is supplied to us by wēpa. The supplies are sent to us well in advance so that we don’t run out of anything at anytime.
Printers malfunction	We had to trouble-shoot whenever printer malfunctioned.	wēpa notifies us of malfunctions, and gives us instructions and/or parts to resolve issues.
	Coordinating repair was cumbersome. Ordering parts and effecting repairs could take weeks; “loaner” printers might not be available for the duration.	wēpa sends out technicians within a day or two. They replace the parts, or give us new kiosk.

**UC Contribution - Shareable and Interoperable:**

Print kiosks using this model could have the potential of helping standardize the student computing experience as do services like Shibboleth Single Sign-on, and eduRoam (higher education federated wifi access). In the case of printing, once a job is sent to the cloud it can be released at any similarly configured kiosk, regardless of physical location. A campus standard approach would be welcome and is possible with little to no up-front investment.

The print-on-demand kiosk that we’re using can be put anywhere there is sufficient need. The technical requirements are only for power and Ethernet. There is a minimal staff time requirement to consider: someone must be available to restock paper as needed and replace toner or other consumables – all provided by the vendor.

Web SSO and BruinCard integration can be included at the time of delivery of any other print kiosk. As they are currently configured, **anyone** may use the print kiosk. Users who are not eligible for the Psychology IPC (instructional print credit) simply pay for pages they print independently using BruinCard, or wēpa funds. The vendor is eager to address requests for additional integrations. As an example, we are in the preliminary stages of getting the APIs and necessary backend infrastructure in place to add integrations with UCLA’s course management system (CCLE the Common Collaboration and Learning Environment ), and student class schedules. For now though, improved printing service at a predictable and limited cost is our greatest success, and allows us to use our own technical resources in other more useful and valuable ways for the department.

**For further information please see printing statistics and survey results in the following BOX folder:**

<https://ucla.box.com/v/PrintKiosks>