"Anytime I'm on the train, I would just type it up:" Commuter Students Using Technology
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Thanks for inviting us to York today. We are CUNY faculty and also librarians and anthropologists, and our research concerns the academic culture of undergraduates at CUNY. Like you we are very interested in our students, how they learn, how they use technology, what we can do to support them. Today we're going to talk about what we know about how our CUNY students are using technology, and how this knowledge can help you help students use technology effectively in their college careers.

We hear a lot about the "millennial" generation and college students using technology. There's lots of marketing around this concept, and a lot of research and a lot of news generated. A fair amount of the news is about how instructors are dealing with the rise of digital technologies. Here we can see headlines that point to instructors banning technology in their classrooms or looking for the next great technology to work with. And of course today's symposium is about this very topic.

So what do we here at CUNY really know about our students and technology? We know some details about the kinds of technology students have access to and are using from the CUNY student experience surveys (SES), conducted every two years. Here's some context from those surveys taken in 2010, 2012, 2014 (and just to note that these numbers are CUNYwide, but that the numbers from York hew pretty closely to the CUNYwide data).

Overall access to technology is slightly better for students at the senior colleges than the community colleges. It's interesting to see that CUNY has stopped asking students about the devices they own and use in 2014. We should also note the caveat that our data was collected before the widespread adoption of tablet computers like iPads.

However, you'll see that a persistent 3% of CUNY students have no regular internet access off-campus. Remember that CUNY has 270,000 undergraduates – the percentage is small, but that's still thousands of students. And if you assume a 30 student class, that's an average of one student in your class without internet access. If even one student in your class doesn't have consistent or predictable access to the internet, your tech-based assignments may not work with those students in the ways you expect.

The SES numbers show that our students are fairly well wired. However, there is more to the story than that. There is a widely accepted sense that anyone born in the last 20 years – in which digital technology has become thoroughly integrated into daily life – is necessarily familiar with, has access to, and know how to use a wide variety of forms of digital technology. These folks are often referred to as "digital natives." And we know that most of our students own a cellphone or smartphone and have home access to computers and the internet. Technology is integrated across their days for social communication and pleasure, and somewhat less for employment and academic work. But in fact, the idea of "digital natives" is not really a useful way to understand our students, their needs, their experiences, or their capacity to learn.

Mere access to technology does not tell the whole story. Despite constant connection to friends and family via text messaging and social networks, students' experience of and preparation for using technology in their academic work is uneven — not just in their online research skills but also in their proficiency with basic productivity, word-processing, and presentation software.

Do they know how to:
- use the tools at their disposal? for learning or just for socializing?

- create content using the online tools at their disposal?
- manage information overload?
- work collaboratively, on or off-line?
- use tools ethically and legally?

For example, they can send an email, and they can use Word to write a paper, but can they attach a Word document to an email and send it? Giving them tools, or assuming they have them, is not enough. Other researchers have found this as well, including Ezster Hargittai in her Web Use Project at Northwestern. Hargittai calls this a "second level digital divide" wherein students may lack skills in using the technologies they do have access to. This lack of experience is cause for concern, as it places CUNY students at a disadvantage compared to college students who have these skills, and further complicates the access issues that CUNY students may also experience.

A growing body of research indicates that the idea of the digital native is a myth. Like most things, it's far more complicated.

That brings us to our research study. We wanted to learn more about our students, not just what they are doing in the library and with research but to understand where their schoolwork and research fits into their broader lives.

We interviewed students and faculty at six CUNY colleges: Borough of Manhattan Community College, Bronx Community College, Brooklyn College, City College, Hunter College, and New York City College of Technology, and used several different methods to gather information:

- 30 student interviews at each college:
  - Photo Surveys
  - Mapping Diaries
  - Retrospective Research Process Interviews

- 10 semi-structured interviews with faculty at each college

(More detailed information about our research protocols is available on our website: http://ushep.commons.gc.cuny.edu)

Here's what we learned about how our CUNY students are using technology.

CUNY students hewed closely to the national and university-wide statistics for access to mobile phones at the time of our interviews. The vast majority owned and used cellphones or smartphones. Many spoke in strong, positive language about their mobile phones; some photographed them in response to the prompt "something you can't live without." Students who had a smartphone with a data plan took full advantage of the features offered, including for academic uses. These students reported being constantly connected to friends, family, college, and their jobs via email, Facebook, and other communication applications on their phones. This student quote might sound familiar to you – many of us with smartphones probably use them the same way.

However, students used different strategies to adapt to fluctuating finances and the availability of communication technologies on campus and in other locations. The Bronx CC student who took this photo had both a standard cellphone and a Blackberry smartphone. She bought unlimited texting in monthly increments when she was able to pay for it. She was originally from the Caribbean and her Blackberry contract was based there, which also impacted her opportunity to fully access the internet on that phone. Other students mentioned using a prepaid plan for their cellphone or smartphone;

phone service is suspended once prepaid funds have been depleted, a source of inconsistency in students' access to mobile communication. And we actually lost touch briefly with a student we planned to interview because he had run out of minutes on his phone.

Some students told us that they didn't use their phones to access the internet, even if they owned a smartphone. Some disliked the browsing experience on a smartphone because of the small screen size, speed of data access, or complexity of the websites they wanted to visit. Others told us they didn't want the additional expense to access the internet on their phones. Some students told us about using their cellphones for calling and texting, and using available wifi on campus on an iPod touch or other internet-enabled device. For these students, using college wifi meant they could avoid data charges on their phone while still gaining mobile access to the internet. They could also use the free wireless services available in certain businesses, public libraries, and public parks.

All of our campuses offer access to computers and the internet through computer labs and wifi services, and some CUNY colleges offer additional computers for student use such as laptop or tablet loan programs. Some campuses also have computer kiosks for quick access to the internet in public areas around campus. Without exception, all of the students we spoke with relied on campus computing options at some point in their semester. Most used college computer labs to print, even those with access to a printer off-campus. All of the colleges provided free printing for students, though some imposed a maximum number of free pages per semester and made paid printing available after the limit was reached.

Students' experiences in using campus computer labs were varied, but many expressed frustration at the long lines they encountered and what they perceived as a shortage of computers available for student use, as this photo from BMCC shows. They were also frustrated by their attempts to complete academic work in college computer labs when other students were socializing there, as this quote illustrates.

This photo from a student at Hunter does a great job in summing up student frustrations with the printing challenges she encountered on campus. Not only are there many signs that all read "no!" but the student who took this photo told us that it was midterms and that printing in this lab had been unavailable for two weeks. She said to us: "I mean, this is the Resource Center, but you don't get much help."

We did meet many students who had access to laptop computers, but only a few of them said that they regularly brought their laptops to campus. A few students mentioned concerns about the security of their laptops away from home, but most said they left their laptops at home because they were too heavy to carry around all day between home, the college, and their other responsibilities. Several other studies of how students do their academic work at the University of Rochester and at UCLA found similar results, even though most of those students lived on campus and our CUNY students typically have substantial commutes.

Most of the students we spoke with had off-campus access to a computer — either a desktop or laptop — and the internet, most often in their homes. But often this was not unrestricted access to a home computer. Many students shared computer access with other members of their household, which could constrain access. The large majority of students we spoke with lived with multiple family members, sometimes in small apartments with little private space for their academic work. This quote is from student at Hunter described her need to share the family computer and a laptop with her sister, who was also a student at Hunter. The photo here is from student at Bronx CC who lived in an apartment with two other family members, and his bedroom was also the living room. Note the TV and game console next to the computer desk, both potential distractions from academic work.

Of course the students we met used technology for their academic work. What did they do? The usual things:

- Research on the internet and via library resources
- Using computers to write papers and create presentations
- Using Blackboard and other online platforms to view and do coursework

These are the activities we know about and expect students to do with technology. But what else are they doing?

A few students used ereaders in their daily academic lives; they specifically mentioned the Amazon Kindle and Nook. They often needed to use multiple technologies to integrate the ereaders into their schoolwork. The Hunter student who took this photo used his Kindle to do his course reading on the subway, which required him to convert his course texts to PDF and load them onto the Kindle, and allowed him to highlight text and export annotations. He did this for convenience, to make the most of his commute, but he also told us that he liked the experience of reading on the Kindle. A BMCC student loaded her course notes and study guides in PDF onto her Nook. She liked the paperless lifestyle for both environmental and economic reasons, however she noted that she did feel like she had to let her professors know that it was an academic tool when she used it in class.

For academic research, it's not surprising that many students preferred to use the internet over library databases and books, as other studies have also shown. Google was mentioned by name by nearly every student; some students knew about library resources while others did not. But most preferred to use Google or another internet search engine rather than library resources because they found internet resources easier to access and use than library databases. Students often seemed unaware of the ways in which library databases can be more efficient than searching the internet. Some students told us they were frustrated when they couldn't access articles on the internet for free, and clearly didn't realize that their college library might subscribe to databases that provide access to the full text of articles. Though we did meet some students, often in the latter part of their college careers, who understood the advantages of using internet and library resources together in their research.

The ability to evaluate the relevance and usefulness of internet and library sources is essential to effective research. While many students understand that they need high quality sources, sometimes they called them "valid" sources, they were often uncertain about what, exactly, makes a source credible and reliable. Like other researchers, we found that most of the students we spoke with were satisfied with their search strategies and results, and tended to use resources that they were familiar with. Some students did acknowledge that they could have found better sources for their papers and projects. We asked them what they would do differently in future research projects, and many said that they would go beyond the internet to find better sources of information, like the junior from City College quoted here.

A few students used their technologies for academic work in more innovative ways. One Bronx CC student we met used the peer-to-peer file-sharing protocol BitTorrent to download PDFs of books that he said he could not get at the college library. Of course it's illegal to use file-sharing to download copyrighted materials, and this might be impossible to do on campus due to filters or other network restrictions. As you can see in his quote, he referred to this practice as "more comfortable" and thus better done at home. This student preferred to do his academic work at home, and the ability to download his course readings from home seems to be a component of his preference for studying at home rather than in the library.

As we mentioned before, for smartphones featured prominently as academic tools for the students who owned them and used them with a data plan. A smartphone is essentially a pocket-sized

computer, and many students found that they could use their smartphones for their academic work. This quote from a busy City College student who was pre-med is a great example. These devices helped students with time management by allowing them to merge their academic work into their days, either spontaneously or by taking advantage of found time on their commute.

And we were surprised to discover that some students type their academic papers on their smartphones while riding the subway. This may be especially common for students with long commutes – the average commute time for CUNY students is 45-60 minutes each way. This quote is again from a City College student; we also had confirmation of this practice by a faculty member, who told us that he sometimes received assignments from students via email with the "sent from my phone" signature text at the bottom. As that faculty member suggested, for some students, their smartphone might represent their best access to technology for this work. This illustrates both student constraints in accessing technology for schoolwork as well as their adaptability in using the technology available to them to complete their assignments.

The faculty we spoke with also had insights to share, as you probably do, too. They were concerned with students' access to and use of technology. Many expressed deep frustration with students' ability to evaluate the source and nature of information online (and this is something we see and feel as librarians, too!). And you can see from these quotes that some faculty articulated their role in helping students learn better ways to use technology for their needs. Many had encountered students who lacked experience and skills in using software for presentations and other assignments, which impacts their goals for students to learn how to present their new knowledge.

But most faculty told us they do not spend time teaching the software in their classes, and they did not necessarily know where on campus students could learn to use this software. At the same time the fact that students "are constantly with a cellphone, iTouch, iPhone, iPad" was an opportunity, as you can see from this quote. One faculty member we spoke with surveyed their students about "what's at home: computer, printer, internet, a quiet place to study" in order to better understand and support them. Others told us that they often suggested to students: "if you don't have a reliable computer at home, come to the college on that day."

The undergraduate experience is increasingly reliant on information and communication technology, from the simple to the complex. We found that CUNY students were ready to be engaged by digital technologies.

What can we do to mitigate differential access to and fluency with technology at CUNY? Learning about their needs, challenges, and satisfactions with technology is a good way to begin. Some of the methods we used can be easily adapted to use in your classes with quick surveys, discussion, etc.

There are also concrete steps that any college might consider:
- Though not inexpensive, consider adding computer labs for students on campus or in libraries, either with small-scale or large-scale renovation. For example, Bronx CC's new library has many more computers available for student use than did their old library.
- Laptop, ereader, or tablet loan programs can give students access to mobile technology when they need it. Baruch's library has a new laptop vending machine.
- Strengthening wifi availability on campus is enthusiastically appreciated by students, though we acknowledge that this comes with a cost (and the fact that students may well bring more devices if the wifi access improves).
- Brooklyn College's library installed dedicated express-print stations to streamline the student printing process, and students have used them heavily.

- Consider increasing the number of ebooks and other electronic texts for student use, which can be especially beneficial to commuter students.
- Experiment with new strategies to address undergraduate confusion around library and internet resources for coursework, perhaps increased collaboration between faculty and the library, or a stronger focus on evaluating internet resources during library instruction sessions.

Our CUNY campuses should find ways to increase access to and experience with technology for our students whenever possible. This will help our students focus on their academic work and the work of being students, not on the logistics of accessing academic technologies.

Thank you!