As Vice President for Information Technology and Chief Information Officer at Duke University since 2002, Tracy Futhey has presided over programs such as the pioneering Duke Digital Initiative (http://dukedigitalinitiative.duke.edu/) and its inventive use, beginning in 2004, with the distribution of iPods and iTunesU in higher education. Before Duke, Futhey spent seventeen years at Carnegie Mellon University, where her career spanned the range of information technology, from computer consultant to CIO.
**EDUCAUSE Review:** What are the goals of the Duke Digital Initiative (DDI) today? Are you exploring mobile technologies?

**Futhey:** The Duke Digital Initiative is aimed at exploring new and emerging technologies in terms of their effective use in or application to the university’s mission. It’s the university’s mission broadly stated, so much of the DDI relates to classroom activities. But some of it also relates to co-curricular activities or service programs that students might participate in.

Mobile has been an emphasis from the outset. The mobile technologies we explore vary from year to year. For the last couple of years, we’ve been looking at technologies and evaluating technologies as they relate to both the production of content and also the consumption of content in a mobile setting. Thus we have put significant emphasis on making available technologies such as Flip cameras and high-end HD recording devices so that students can film projects and record fieldwork and interviews. That’s what I’d call the production side of the mobile world. On the consumption side, devices like the iPad are available for our faculty and our students either to use as a platform to build apps or, more likely, to use for the consumption of some of these media in a mobile environment.

**EDUCAUSE Review:** How does a mobility paradigm that is based on constant connectivity, access to cloud-based resources, and lightweight apps that bypass the web affect scholarly activity in higher education?

**Futhey:** Key here are two components of mobility: consumer orientation and pervasiveness. The mobility paradigm involves a consumer-level and market-driven access to devices, to content; and as a result, it is everywhere. Before we had these easy-to-use consumer devices, we didn’t have such a level of reach for some of our work.

In some senses, I think this has the potential to further reduce the digital divide issues. My cellphone is becoming my computer, and my computer is becoming or able to become my television. As these devices push down into smaller and smaller footprints, they become at the lower end more affordable and more capable because the apps are getting pushed down.

But these technologies are also leading to, over time, a disaggregation of content and applications. So students no longer need to read a textbook from cover to cover or carry it with them in all of its five- or ten-pound glory. All they need to do is call up one piece of it, a component of it—whether it’s text-based or video-based material. Materials can be consumed in little chunks that are disaggregated in various courses. Likewise, this is pushing us, and will push us even harder, to think about how we disaggregate the applications that we provide at the institution. For years we’ve been putting out enterprise-level systems that are the amalgamation of all the possible features we might ever want in a student information system or in a learning management system. But now, because of these small devices, what consumers really want is the applet that takes a little piece of course registration or a little piece of the assignment calendar that might come from the learning management system. Disaggregation of materials is important.

**EDUCAUSE Review:** It’s been said that the mobility revolution is fundamentally shifting the balance of power in our institutions. The role of faculty...
as academic gurus is being threatened by crowd-sourcing and social networks while the role of institutions as stewards of institutional data is being compromised by cloud-based storage. What approaches should IT organizations take toward this shift in power?

Futhey: One of the things we need to do is embrace this change as much as possible, recognizing it as a fundamental shift in the way people are consuming information and the role they are taking in producing information. We can no more hold off that tidal wave of change than we could stop our students from using Facebook five years ago, if anyone had even wanted to stop them. Certain changes may not be the way we would have designed them, but it does us little good to fight.

For example, ten to fifteen years ago, when I was at Carnegie Mellon University, we were looking at deploying wireless. Some people outside of Carnegie Mellon wondered why we thought wireless would be so important, because the bandwidth was lower. At the time, everybody had wired connections. Technologists were talking about a push to enable gigabit networks to the pillow using wired ports, and we were talking about wireless everywhere. The prevailing wisdom of those who hadn’t gone too far down the wireless path was that no one would knowingly accept lower bandwidth. Of course, as we know today, the reality is very different: people are making a trade-off of convenience for what is, in some cases, a lower-bandwidth experience but is also, in many cases, a very full-citizen, respectable experience.

The idea is: “Look, this is coming. Embrace it.” Whether that means developing materials yourself or simply finding already developed ways to use and consume materials differently, this is an important part of the process—as is also inviting students to engage in how we develop those materials and use them. Rather than viewing this change as threatening, let’s view it as gaining more resources if we can appropriately direct them. Of course, the only way to appropriately direct them is to get out in front of them.

In addition, we need to understand that much of what we do in our classrooms is create context, help our students understand not just the facts but how the facts fit into the larger goal of learning, of being able to develop and exercise their critical thinking skills. That’s not going to go away just because there is a lot of data out there. Just because Wikipedia or online course materials exist does not mean that there is no longer a valuable role for our faculty in our classrooms today to help put the fact-based materials together in a context that works for the students and that helps to develop their critical thinking.

EDUCAUSE Review: On what principles should institutions operate with respect to interacting with commodity voice and data services? What is it time to let go of, and what should we fight to keep control over?

Futhey: As I’ve mentioned, we’ll need to embrace some of the commodity data and voice services, but at the same time, we need to try to get ahead of them and help to direct where they’re going. An example could be that as mobile broadband networks become more pervasive, they have the potential to provide nearly as good or as good coverage as—or even, for some institutions, better coverage than—their more traditional 802.11-style wireless networks. So how do you use that to your advantage? I’m all for trying to find ways not only to see the directions of those developments in the industry but also to get ahead of where
you think you need to be. The one thing we still need to pay a lot of attention to is the privacy of the information. We need to be very careful and deliberate with our evaluation before we simply assume a free service is a free service. Many times, a service is free because users are giving away private information. Contest holders gain information about tens of thousands, even millions of people when they give away an iPod or a Flip video-camera. There is a clear cost-benefit in that equation. Data has become a very powerful and valuable commodity, and people need to be careful about what they do with their private data.

**EDUCAUSE Review:** What platforms should be targeted? Is it best for all apps to be platform-agnostic, or is it OK for some to be iPhone-only or Android-only?

**Futhey:** For those of us in higher education, it is essential that we have applications, content, and materials that apply across the range of the heterogeneous environments we support. That's not to say that the experience you want is the lowest common denominator across all those platforms. Where we've tried to set our path at Duke is to identify the common denominator of what you can do in everything. But if you can do more on an iPhone or if you can do more with an Android, then by all means you should look at supplementing the capabilities for that platform. So start with a common base, but then differentiate higher-end functionality and capabilities as the devices allow.

We have a tool here called DukeMobile that we built with TerriblyClever (now a division of Blackboard). It was first just an iPhone app, because at that time that was what we could deliver and what the market had the infrastructure to distribute. Soon after, we built a web-based-only version. Then we built a BlackBerry app, and just recently we've released our Android app. They all have the same basic set of six, eight, or ten apps, but some have video tours. Some have maps that work interactively; some have stagnant maps. They're all quite different in terms of features, with each taking best advantage of the capabilities of the particular platform.

**EDUCAUSE Review:** What apps should be developed in-house versus adopting from the increasingly large off-the-shelf supply?

**Futhey:** Those of us in central IT organizations in higher education need to think long and hard about whether the apps we're developing are truly unique to our institutions, or whether many of them are actually general-purpose apps that are common to every institution. I believe the latter is the case for 90 percent of what we're doing, and so I think there's a role for apps to be developed not by each of us separately and independently but in common. Developing separately ends up creating complexity that we have to manage over time.

There is complexity on two levels as we think about the general-purpose needs of our students. There is complexity on the device side based on the sheer number of devices in the marketplace and the fact that new devices are cropping up every day. Then there is also complexity in the many applications that we support and that we're trying to make accessible from those devices.

So if I want to develop a course registration application for students, we have tools like PeopleSoft to manage that process. Adding a directory app means we also need to support LDAP. If we want to give access to library information, we...
may need an app that connects to Ex Libris. If we aggregate all the systems that Duke users need to access and all the devices that I need to support, it becomes a daunting task for me to manage on my own. If we do that, though, for twenty institutions, the number of apps we’re trying to support doesn’t grow twenty-fold since some of us use the same systems; and the number of devices is probably constant. So the more we can aggregate our general-purpose needs, the more efficient we can be in delivering the service.

On the other hand, the course-specific materials are, of course, a case where we’re not going to have that same level of commonality. Although some intro-level courses may have (relatively) common core materials, the majority of our courses become institution-specific based on distinctive programs and curricula. The approach useful to think about here is combinations of faculty and students working together (again, the crowd-sourcing notion) to develop some of those projects, versus being developed by the institution and the central IT organization.

**EDUCUSE Review:** Should the Apple App Store be involved in distribution, and if so, how?

**Futhey:** The question is, what are you distributing? If it’s an app for an iPhone or an iPad, then it makes sense to use existing channels. I don’t see much benefit that comes out of fighting against the market forces of an industry that’s well developed and larger than all of us in higher education. Apple has its App Stores. Android has its own distribution channels. Colleges and universities can certainly distribute their apps themselves, but I’m not sure what the advantage is in doing that, as opposed to leveraging what’s already out there.

**EDUCUSE Review:** At Duke, are you distinguishing between mobile apps targeted for the classroom use, perhaps even for particular classes, versus apps for general community use?

**Futhey:** The apps developed for general community use are some of the ones that we’ve produced—for example Duke-Mobile, which I mentioned earlier. It has everything from our directory to information about maps on campus. Thousands of videos and photographs of the campus are available in this little mobile app. Again, these are all general-purpose kinds of things. But we have plenty of course-specific or special-use apps too, including a computer science course in which students are building course-specific apps for professors in other disciplines. Our museum has an app that visitors can use as they tour through the museum. It’s of general interest, but it has a specific use—as opposed to the app that lets me check the news from the campus or check the sports scores.

**EDUCUSE Review:** Should higher education institutions be concerned about the security of location information for mobile app users? Have you heard security concerns from your community?

**Futhey:** I would encourage awareness of the security issues at the institutional level, but even more so at the personal level. There is certainly a lot going on in these little mobile devices that we may not have full knowledge of. A couple of researchers here at Duke have produced an app looking at what kind of data the Android apps are sending around. They found that a lot of specific information about users was being shared with advertising networks or with other locations.
So I do believe there are concerns at the institutional level, but even more so at the level of the individual, who has the responsibility to recognize that when he or she clicks a button that says, “Share my location information,” that information could be used in a variety of ways. This is a concern that we cannot easily address institutionally.

**EDUCAUSE Review:** How can an institution keep track of what’s going on in the mobile industry while also meeting the localized needs and desires of its community?

**Futhey:** The mobile industry is so large and so fast-moving that it may not be possible to fully track all of its movements while still attending to the range of IT needs and concerns of our campus community. For me, the best I can hope to do is keep an eye on the high-level industry trends and directions, and then once we’ve identified those trends, ride them as best we can to where we think they’ll take the market.

An example I mentioned earlier is the idea of the disaggregation of our own apps. So even if I’m not attending to every detail of what’s happening in the mobile app marketplace and don’t know who’s producing what product and who has the best widget type A, I’m thinking and urging our campus IT leaders and system managers to think about how we can start to take the big apps that we’ve had running on desktops and disaggregate the particularly high-use features and functions so that we can deliver those as small apps on mobile devices.

**EDUCAUSE Review:** Today’s freshmen are arriving with technology backgrounds very different from those of freshmen even just two or three years ago. How can we deal with the increasing and divergent student expectations?

**Futhey:** This is another case where the more we can harness that difference of background, difference of perspective, difference in experience and bring it into the fold and learn from it, the better off we’ll all be. One way that we’ve tried to do that at Duke is through Duke-Engage, which is a service program in which many of our students participate. They spend their summer at some foreign or domestic location involved in service projects. We’ve given many of them Flip video-cameras, as part of their starter kit as they leave Durham, and the students use those to produce videos to develop content. In this case, we have tried to take advantage of their interest and enthusiasm, their different experiences in a media-rich world, and
their direct engagement in producing materials, and we’ve put those together so that we can take advantage of what they know and how they like to work and marry that with a service program that has an academic value to Duke’s mission. Another example might be the video contests we’ve been holding for freshmen students over the past eight to ten years. Again, we are helping to give them access to the different technology tools that they see as relevant, even if not all their courses have adopted those tools in their classes.

EDUCAUSE Review: Many feel that colleges and universities need to find a way to share their experiences with mobile initiatives. Do you have any ideas on how we might best do that?

Futhey: Clearly, there’s no lack of enthusiasm within higher education for mobile devices. There’s also no lack of expertise. I believe that the situation we’re in now is probably not unlike the situation we find ourselves in throughout higher education and even on our own campuses, where the biggest challenge we have around technology is communicating its use and its value and coordinating across institutions. I wish I had the silver bullet for this one. I do think there are plenty of good forums where people get together to talk about their expertise. We just have to keep supporting and keep rallying around those venues—whether they are EDUCAUSE conferences or smaller, more focused groups of CIOs, technologists, or developers. These all provide opportunities. The challenge in such a rich marketplace of ideas and initiatives is how we pull it all together.

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