Executive summary

The committee reviewed the emerging environment of tablet and mobile device use, focusing on educational applications. Many significant findings are presented, including the emerging opportunities for educational enhancement and the many financial and technological challenges. Several recommendations are provided that will require careful consideration and significant investments.

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Narrative

This team reviewed the issues regarding the change and impact of ever greater use of tablets and smart phones on campus, and the ability to provide support and resources for and to them. This document provides 1) a summary of the implications for Purdue and 2) recommendations for ensuring we are ready to support the changing environment as needed.

There are many studies, reports and predictions involving mobile device usage in academic environments. Many of these look at the potential for how the devices can be used to change the way teaching can be delivered. Few actually look closely at how mobile devices are currently being used and what expectations are from the diverse user groups. To further confuse things, some reports contradict each other on the impact mobile devices have when forced into a learning environment.

A combination of studies from Purdue and external resources, focused input from Purdue mobile device users and committee member experiences were used to produce the following answers to the finalized project scope (attached as the last page of this document).
Current and expected near term usages of tablets and mobile devices for educational purposes

Laptop, smart phone and tablet ownership among students is still increasing, although growth is slowing. Most students have access to at least one of these technologies and many own multiple devices. There has also been rapid growth in the ownership and use of mobile technology among faculty, administrators and staff. Despite the saturation of such devices, they are still primarily used for communication, note-taking and social media purposes rather than learning and research.

Current usage of mobile technology on the West Lafayette campus for education is sparse but it is growing slowly. Of the faculty surveyed, none were currently using mobile devices for classroom instruction directly. However, ITaP reports that instructors are requesting carts of iPads for classroom use at a rate of about two per year. In addition, several areas such as Veterinary Medicine, Pharmacy and Krannert are now providing devices to their students.

As some instructors and areas move towards eText versions of textbooks, student are using devices more for studying and for accessing internet resources. As these changes continue to unfold, student access to eTexts will mean heavier use of devices for learning both in and out of the classroom. However, students still have a preference for paper-based texts.

Development of content for mobile consumption is also moving slowly. Students report that they use their mobile devices for class work but it is a minor percentage of their daily, regular usage. External reports indicate that students are increasingly reliant on mobile devices and prefer blended learning environments. Students still greatly prefer face-to-face communication as much as possible but enjoy the augmentation that digital resources provide as long as it isn’t at the cost of the personal interaction. For the near future it appears that there is a slowly growing expectation of mobile-friendly content and interaction to augment traditional classroom environments. One question that deserves further study is what impact does providing mobile-friendly content to augment (instead of replace) traditional learning have on resources required. Development time and significant digital resources are needed to provide the type of additional material students want.

Although the team was asked to review mobile use for research and administrative use, we were unable to complete this part of the study in the timeframes given. The 2013 IT Resource Survey of Purdue owned devices does show an almost a 50% increase in Purdue owned tablets so these devices are certainly growing in popularity.

However, we would like to note that an increase in use can be expected in administrative use:

- Chronos can be expected to increase the need for mobile devices in the field, with implications for Wi-Fi anywhere access
- Products similar to the Microsoft Surface Pro which combine the laptop and tablet into a single device will probably increase the use of devices outside of the office for note taking, calendar and email access, and secured data access such as SharePoint, SAP and other administrative systems.
To the extent possible respond to the specific questions in the committee’s charter:

1. How can we predict in five years what our needs will be?

The committee reviewed recent survey reports from organizations such as Educause, Pearson, Pew, and input from surveys of Purdue students and faculty. Educated guesses about where mobile technology will be in five years include the following.

For students, the capability of using mobile devices to enhance their learning process is currently available but the resources aren’t. There is an expectation that course materials and captured lectures will be available but this will require time and money to accomplish and will need to be justified.

It is expected that tablet technology will develop enough to become a desktop replacement within five years. As the power and capability of these devices grow there may be more need for spaces where a tablet could wirelessly connect to a larger screen and keyboard. Mobile computing and connectivity are also expanding to other devices that haven’t traditionally been thought of as computers including wearable computing in the near future.

Virtualized and cloud based applications and storage continue to grow. Within five years we should see significant progress toward a platform and device agnostic environment.

And as planning begins for the Active Learning Center facility (expected completion in 2017) special attention must be made to insure that the building infrastructure will support a variety of solutions to the identified (and yet to be identified) challenges in providing secure technology support, along with facilities within the ALC that will allow for optimal use of new technologies.

2. Will there be a day when the University moves from a PC/Microsoft based platform to a variety of platforms that meet specific use needs?

Yes, there is already a migration away from the desktop as evidenced from the referenced reports and studies. Apple Macintosh desktops, iPads, and iPhones continue to grow in usage in the university environment. As usage of mobile devices grows, the demand for cloud based applications and storage will also grow.

Management of devices becomes very problematic in this scenario where there is a large mix of personally owned and university owned devices. By providing software and storage as a service through virtualization the University can control security and use of the services provided while not having to worry as much about the device. Standardized mobile device management would provide a method of securing content as well as pushing out links to remotely provided services and storage.
Mobile device users will continue to want to use the device brands they are comfortable with and the expectation is that they should be able to access all resources no matter what device they have. Purdue should be taking this into consideration when developing and implementing all future resources.

3. Will it be necessary for the University to provide connectivity on a “plug and play” basis?

The committee believes that this is already in demand. While Apple devices dominate the mobile device category on Purdue’s campus, there is a very strong desire to use a wide variety of devices to connect to resources. These resources include classroom projectors and cameras, printers, storage and remote applications. There is also an expectation that configuration of devices should be minimal on the users’ part in order to connect. For resources that Purdue implements in the future, access and ease of use should be heavily considered.

4. What are the implications, if any, for the University?

(Note: Some items are repeated as they refer to several categories)

**Instructional**

- Instructional use of electronic resources should take mobile device display and capabilities into consideration. Emphasis should be on augmenting traditional interaction and learning rather than replacing.
- Some professors use tablet and laptop carts. This may become more common, increasing support needs. Some of these carts are used for just 1-2 courses each week. Should we identify methods for making these available for other faculty/courses to maximize their use?
- Based on library science literature, students seek one device and computing platform for all required reading. Current platforms are numerous and include eBooks, McGraw-Hill, Blackboard, CourseSmart, and VitalSource, to name a few.

**Wi-Fi**

- Increasing ownership of mobile devices places greater burden on wireless access points. Heavy saturation areas such as classroom, libraries, or common areas may require more access points or more bandwidth.
- Some schools provide tablets and/or laptops to students; this may become more common, increasing needs for power access and support expectations.
- Wi-Fi access is not provided to green spaces, severely limiting access to Purdue resources when not in facilities. Recommendation: Map geographic green spaces of greatest need for Wi-Fi access and then discuss whether to recommend installing Wi-Fi in all green spaces.
Electric Power

- Increasing ownership of mobile devices may require more public charging capability, thus classrooms, active learning centers and other physical facilities need public power access, often at significant expense to Purdue. Battery capacity continues to improve, but device use is predicted to increase. This should be reviewed as technology progresses.
- Some schools provide tablets and/or laptops to students; this may become more common, increasing needs for power access and support expectations.

Support

- Purdue will see increased expectations to provide support for BYOD from both faculty and students. This may require additional hardware/software in classrooms to provide links to the projection units, interaction with each other’s devices, etc.
- Some professors use tablet and laptop carts. This may become more common, increasing support needs. Some of these carts are used for just 1-2 courses each week. Should we identify methods for making these available for other faculty/courses to maximize their use?
- Some students are primarily tablet users, thus they encounter difficulty utilizing PC’s when required. This factor has implications for instruction and other academic requirements, complicating support, requirements on students, and increasing the need for platform independent computing. Possible recommendation: Virtualizing desktops or apps for use on mobile devices. The technology has been out a few years but has a few issues and heavy infrastructure requirements.
- The volume of apps available for teaching and learning is growing rapidly. We may expect to see growing requests for support with a variety of apps unless we pre-determine which we will support and the types of support we provide.
- Are there currently or will there likely become issues associated with printing from tablets?

Policies & Funding

- Funding policies are not keeping up with technological change and need review and reconsideration. Apple, specifically, is problematic.
- The use of mobile devices introduces a series of security concerns including cloud-based apps which may store secure data, security of instructor account details (such as passwords), and the possibilities of ‘hi-jacking’ the presentation system in a classroom. Identifying supported apps could ensure these meet security requirements.
Summary of recommendations for the university’s educational mission

Purdue will need to invest heavily to fully support and enable education via mobile devices. Support includes access to readings, text, video, lecture, and other education content across many platforms used by students, enablement of collaborations, Wi-Fi anywhere, large bandwidth, storage, and security. Further study should be made of the cost, scope, and extent of providing mobile friendly content to augment traditional learning. More specific recommendations include:

- Purdue should invest to provide high speed Wi-Fi anywhere access throughout its campuses and other properties where students are involved in education and research.
- Wi-Fi access should include the capability to seamlessly connect to presentation screens and other devices located in numerous classrooms and active learning rooms.
- Purdue’s facility planning and facility upgrades must thoroughly consider the needed infrastructure for mobile devices. For example, the Active Learning Center facility (expected completion in 2017) must support a variety of solutions to the identified (and yet to be identified) challenges in providing secure technology support, along with facilities within the ALC that will allow for optimal use of new technologies.
- Purdue’s IT resource planning should include and support a broad range of mobile platforms, to accommodate the broad range of devices owned and used by students, and to support expectations that configuration of devices should be minimal.
- Purdue should support virtualizing desktops or apps for use on mobile devices. The technology has been out a few years but has a few issues and heavy infrastructure requirements.

Resources used for this study:

The team accessed several resources including:

- Adam Stark’s (CLA IT Service Desk Manager and PhD student) survey on Purdue University College of Liberal Arts Faculty Mobile Device Usage
- Meetings with the Undergraduate Student Libraries Advisory Council and Graduate Student Libraries Advisory Council
- Discussions with Rey Junco, associate professor and First Year Experience and Emerging Technologies Specialist, Purdue University Libraries
- Forrester - 2013 Mobile Workforce Adoption Trends
- Purdue’s The Active Learning Center Academic Program Statement
- Purdue 2013 IT Resource Survey
- Gartner Research
- Educause
- Pew Research Center reports
- Pearson
- Internal Purdue surveys, such as those conducted by Pat Reid’s IDC group
The committee will assess current and near term (next two years out) usage and expected usage of tablets and mobile devices and provide findings and recommendations to support the university’s missions. Assessment and input methodologies will include:

1. Review of selected Purdue and other studies of this topic
2. Focused input from:
   • Incoming first year students during Gold Rush
   • Undergraduate students (late August or early September)
   • Faculty who do not use tablets and mobile devices (late August or early September)
   • Faculty who use tablets and mobile devices (late August or early September)
   • Administrators (late August or early September)
3. The experience and knowledge of the committee members

Report out:

The committee will consider both the studies and the in-person input from the above groups. To the extent practical from this short study time period, the committee will provide the following:

• Current and expected near term usages of tablets and mobile devices for educational, research, and administrative purposes
• To the extent possible respond to the specific questions in the committee’s charter:
  1. What are the implications, if any, for the University?
  2. How can we predict in five years what our needs will be?
  3. Will there be a day when the University moves from a PC/Microsoft based platform to a variety of platforms that meet specific use needs?
  4. Will it be necessary for the University to provide connectivity on a “plug and play” basis?