

# MOBILE COMPUTING

Report on a Fall 2010 Case Study  
of the Efficacy of Mobile Computing Platforms  
in Higher Education Mathematics



# WHAT IS THE ACU MOBILE LEARNING INITIATIVE?

Mobile-learning initiative at ACU undergraduate school for iPod touches this fall

One of the biggest challenges so far in ACU's mobile-learning initiative has been how to reach students who don't have a computer or internet access.

## AT&T provides \$1.87 million to support ACU's mobile-learning initiative

ACU's mobile-learning initiative continues to expand. AT&T has reaffirmed its commitment both to education and to the use of mobile technology. In May, the company presented the university with a check for \$1.87 million, a contribution that will bring two important components of the mobile-learning initiative to the next level.

The Mobile-Learning Research Program at ACU conducts research on the effectiveness of mobile-learning initiatives and strategies. AT&T's contribution will support the work of the program.

## ACU shares iPad spotlight on 'NBC Nightly News'

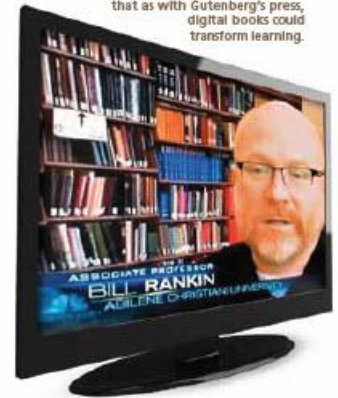
On Jan. 27, 2010, Apple announced its newest product: the iPad, a hybrid tablet device somewhere between a computer and a mobile media device. "NBC Nightly News" featured a segment on Apple's new iPad during its broadcast on Jan. 27, 2010.



ACU's mobile-learning initiative, showing how the iPhone and iPod touch are being integrated throughout the academic environment.

Anchor Brian Williams introduced the story by George Lewis, which has footage from an Abilene Christian biochemistry class taught by Dr. Autumn Sutherland, assistant professor of biochemistry, and a brief comment from Dr. William Rankin, ACU's director of educational innovation and associate professor of English.

In his comments, Rankin noted that as with Gutenberg's press, digital books could transform learning.



# WWW.ACU.EDU/CONNECTED

## ACU faculty in mobile learning

From the beginning of its mobile-learning initiative, ACU has investigated how devices might create a new, collaborative higher education. For two years, we've been in classes, equipping our campus and faculty and students to imagine the future. And throughout it all, we've been busy about how these efforts are changing our lives.

Following the seven research projects during our first year, researchers this year conducted an additional 10 studies, and the results revealed an interesting pattern of similarities and differences. We continue to find that most faculty are positive about the program, that iPads have an advantage over the iPod touch, and that learning activities can be transitioned to mobile platforms. And faculty still report that mobile devices are helping increase the communication and engagement with their students.

Yet comparing data from the current survey with data from the previous year, we've seen significant changes, including increased, class-related use of mobile devices, the number of positive assessments of the success. Strikingly, 14 percent of faculty now report that they have students use mobile devices in every class meeting.

Even more notably, 40 percent of faculty report that their primary device use was in a "major" way even though devices were not provided for them and seniors this past year. But despite this, in what we've observed this year, one thing is clear: the diverse picture of success, challenges and opportunities presented in the 2009-10 Mobile-Learning Fellows, mobile-learning initiative is presenting ACU with unprecedented opportunities for discovery and exploration.

## Robust course blogs enrich student-faculty interaction

"ACU Blogs grew out of a desire among faculty at Abilene Christian to make course sites easier to update and more accessible from mobile devices," said Dr. Kyle Dickson, associate professor of English and director of the Digital Media Center. Many ACU professors also began using course blogs as an online forum for conversation, allowing students to dialogue with them and with each other.

Designed by Mike Wiggins, associate professor of art and design, and developed by Dickson, the ACU Blogs system is built on WordPress, a popular open-source blogging platform which gives faculty the option to host public or private course blogs.

Dr. Billie McConnell, assistant professor of teacher education, used a blog this year in his Educational Psychology class, requiring students to post weekly about "aha!" moments they had related to the coursework.

"They're looking for ways they can connect the content in class to the outside world," McConnell said. "Those are their 'aha!' moments. When they're out at the Bean (ACU's dining hall),

when they're with their roommates or thinking about their family members, they realize something we talk about from learning theories or an educational standpoint actually fits into the real world. So they get a chance to process that on the blog." Since McConnell and students can then read and comment on each other's posts, the blog extends the class conversation far beyond the boundaries of class time.

In Fall 2009, 180 faculty members maintained 291 course blogs, used by more than 3,000 students. The figures for Spring 2010 are similar, with further growth expected in Fall 2010. In addition to class blogs, departmental and campus blogs make it easier for students, faculty, staff and alumni to stay informed about what's happening in different areas of university life.

In the spirit of fostering connection through mobile learning, ACU Blogs provide the ACU community with another user-friendly way to share insights, exchange ideas and have thought-provoking conversations.

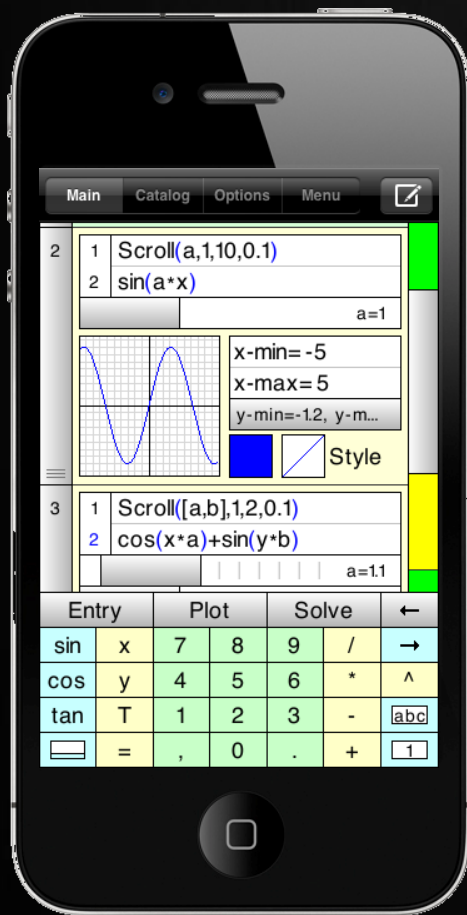
To learn more about ACU Blogs, visit [blogs.acu.edu](http://blogs.acu.edu).



# CASE STUDY GOALS

- »» What are the usability differences in the two platforms?
- »» Can a mobile computing app enhance student learning?
- »» What is the future direction of current graphing calculators in the mobile market?
- »» How does a mobile computing platform effect instructional design?

# SPACETIME BASICS



- ✓ Available on the Apple iTunes store for \$19.99 in both iPhone® and iPad® formats.
- ✓ Leverages multitouch input to move, zoom, and rotate graphs.
- ✓ Uses the robust MobileCAS® engine to support advanced symbolic calculations.
- ✓ Supports a powerful scripting interface and animation tools.
- ✓ Comes with PC and MAC software for in-class demoing.

# USABILITY COMPARISON

## TI-8x SERIES

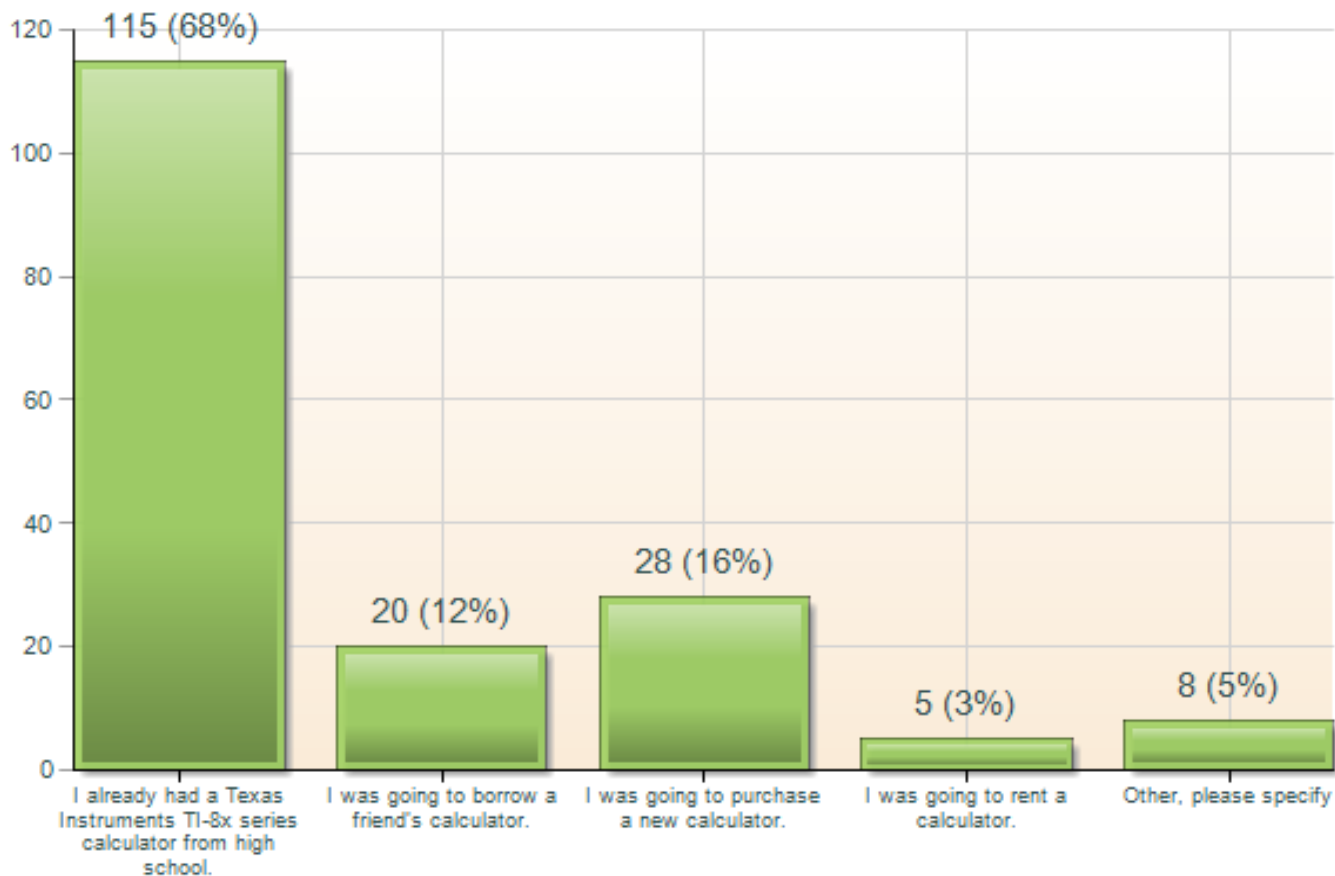
- ✓ Students are more familiar with the device initially, but this gap closes quickly.
- ✓ Managing graphing windows can be difficult.
- ✓ Graphs lack color making it difficult to distinguish graphs.
- ✓ Easier to get help outside of a class environment.
- ✓ Supports more built in commands.

## SPACETIME

- ✓ Superior graphics and intuitive control over graphs.
- ✓ No support for multiple functions in the table interface.
- ✓ Small key sizes contribute to increased data entry errors.
- ✓ Catalog allows for quick repeated calculations.
- ✓ Large statistical data sets can be preloaded saving class time.

# WHERE ARE THE DEVICES COMING FROM?

Which of the following, best describes how you were going to obtain a calculator for this course (MATH 120)?



# BRINGING YOUR CALCULATOR TO CLASS

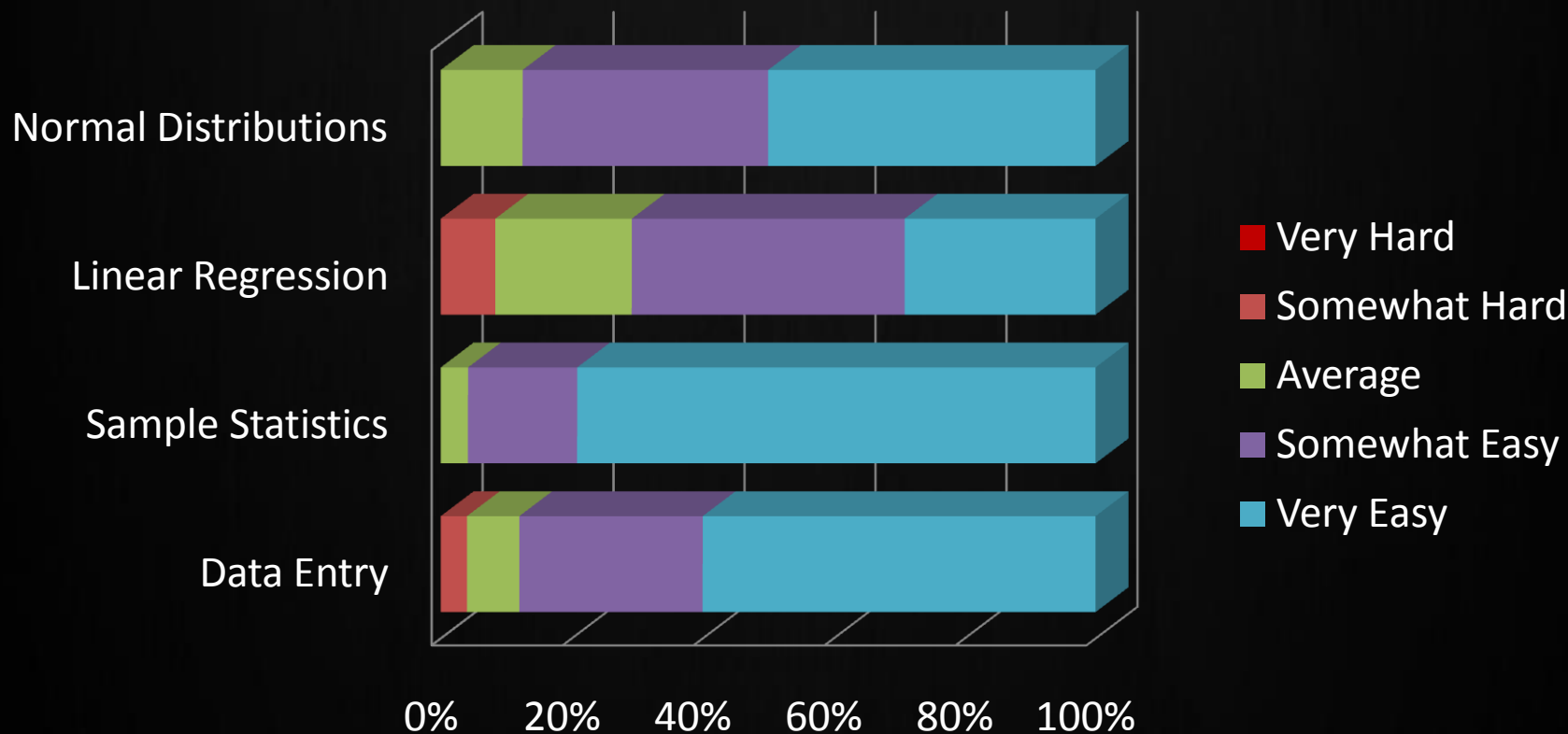
	Total*	How many times have you forgotten to bring your calculator to class with you this semester?					How many times have you brought your calculator to class and been unable to use it because of a low battery?				
		Never, had it at every class.	1-2	3-4	5-6	More than 6	Never, I always make sure my device is charged.	Once, I forgot to charge it.	On two to three separate occasions.	Four or more times.	Other, please specify
	42	27	12	3	0	0	32	4	4	1	1
Texas Instruments (TI-83, TI-84 series)	24 57.1%	13 48.1%	9 75.0%	2 66.7%	0 0.0%	0 0.0%	22 68.8%	1 25.0%	0 0.0%	0 0.0%	1 100.0%
SpaceTime (iPhone platform)	18 42.9%	14 51.9%	3 25.0%	1 33.3%	0 0.0%	0 0.0%	10 31.3%	3 75.0%	4 100.0%	1 100.0%	0 0.0%

Although you can see more students forgot their TI calculators over the course of the semester, due to the low sample size this is not statistically significant.

Notice that students were far more likely to encounter battery issues with their iPhones, but this was improved considerably in the iPhone 4.

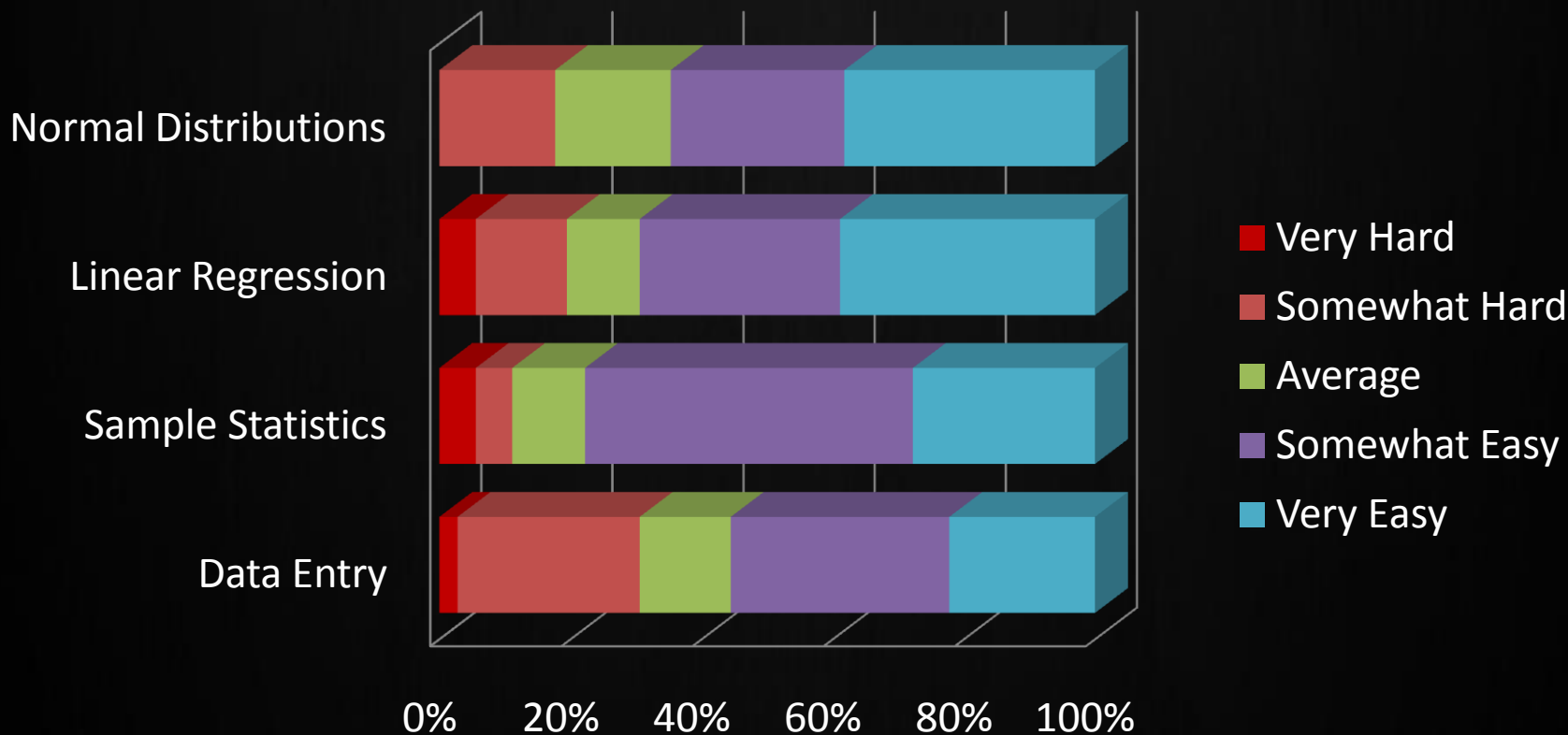
# STATISTICS USABILITY RESULTS

## Texas Instruments TI-8x Series



# STATISTICS USABILITY RESULTS

## SpaceTime® (iPhone Platform)



# CLOSING THOUGHTS

- »» Conversations with Texas Instruments have been rewarding.
- »» Many anticipated results...some surprising results.
- »» A longitudinal study is appropriate and desirable.
- »» Thank you for coming. Do you have any questions?