

12-1-2010

# Use of Mobile Phone Computing for Development of Student 21st Century Skills

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## Recommended Citation

Merritt, Susan M. and Lara Lee, R., "Use of Mobile Phone Computing for Development of Student 21st Century Skills" (2010).  
*Cornerstone 2 Reports : Community Outreach and Empowerment Through Service Learning and Volunteerism*. Paper 21.  
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*The Thinkfinity Center for Innovative Teaching,  
Technology and Research*

*Final Report*

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Pace University

December 2010

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Final Report: Use of Mobile Phone Computing  
for Development of Student 21st Century Skills

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**Abstract**

Mobile phone computing enables immediate capture and transfer of data, images, notes and experiences from the field to a repository where retrieval, analysis, edits, aggregation, and further development are possible. Immediate findings and later results can be shared on the Web with local and global communities, and development of integrated service learning projects in concert with underserved communities is possible using this mode of information gathering and sharing.

Mobile phone computing incorporates moments when participants build tomorrow's skills while addressing today's learning goals. Use of digital tools and supporting resources bring real world problems into focus. Mobile phone computing enables understanding of 'real-time' exploration and acquisition of "21<sup>st</sup> Century Skills."

To be effective in the 21st century, students must be able to exhibit a range of functional and critical thinking skills related to information, media and technology. The project, *MOBILE PHONE COMPUTING FOR DEVELOPMENT of STUDENT 21<sup>ST</sup> CENTURY SKILLS*, offers unique 21<sup>st</sup> Century Skills development through a combination of diverse and complementary classroom, field and experiential learning moments captured in 'real-time.'

The mobile phone computing project uniquely enables and enhances acquisition of the 21<sup>st</sup> Century skills identified by Thinkfinity.org, Partnership for 21st Century Skills, and International Society for Technology in Education [4]. Through the use of such mobile tools and applications, students can, in fact, authentically work "from the field" to collect and share real-time data with each other, extend their learning to larger local and global communities, and develop integrated service learning projects with underserved populations.

## Introduction

*“We have not yet properly begun to exploit the real benefits and potential of information technology in education. My big interest is in how you personalize education and how you customize it, rather than how you standardize it.*

*“And one of the ways we do it, I’m sure, is by making much more imaginative and creative use of information technology.*

*“I think we’re only on the cusp of all this just now.”*

**Sir Ken Robinson**

Students must be able to exhibit a range of functional and critical thinking skills related to information, media and technology to be effective participants and potential leaders in the 21<sup>st</sup> century and beyond [1, 4]. The project, *MOBILE PHONE COMPUTING FOR DEVELOPMENT OF STUDENT 21<sup>ST</sup> CENTURY SKILLS*, offers unique 21<sup>st</sup> Century Skills development through a combination of diverse and complementary classroom, field and experiential learning moments captured ‘real-time’ through use of ‘smartphone’ technologies.

Smartphone technologies enable immediate capture and transfer of data, images, notes and experiences from the field to a repository where retrieval, analysis, edits, aggregation, and further application are possible. Increased deployment of high-speed cellular networks and increased affordability of ‘smartphones’ make unique exploration and development of 21<sup>st</sup> Century Skills with Mobile Phone Computing for students possible.

The Mobile Computing medium of choice for this project is the Droid Android Mobile Cellular Smartphone. The Android operating system, developed by Google, was chosen because an extensive Android Developers’ website offers extensive free development tools, support, and an Application Programming Interface that includes an Android-phone Emulator capable of being integrated into other well-known developer interfaces such as Eclipse. A vast library of free applications from Google’s website and from Google’s Android Market (specifically developed for Android phones) is available for adaptation to a variety of creative student learning experiences as well.

The Android operating system is Java-based but uses its own compiler - the smaller, more efficient Dalvik Virtual Machine, rather than the more widely used Java Virtual Machine. As a ‘smartphone,’ such as Droid, iPhone, Blackberry, and others, these mobile phones are really small portable computers with telephony capability. Onboard memory size is a functionality-limiting parameter for all mobile phones. The Dalvik Virtual Machine, although based on Java, makes efficient re-use of its built-in modules, rather than duplicating them as the Java Virtual Machine does. This re-use permits a smaller, more efficient operating system that is ideal for

smartphone use where processing speed and current onboard memory is subject to physical constraints. These efficiencies make the Android Smartphone an ideal medium for Mobile Phone Computing exploration.

To be effective in the 21st century and beyond, students must be able to exhibit a range of functional and critical thinking skills related to information, media and technology [1, 4, 7]. As noted above, the project, *MOBILE PHONE COMPUTING FOR DEVELOPMENT of STUDENT 21<sup>ST</sup> CENTURY SKILLS*, offers unique 21<sup>st</sup> Century Skills development through diverse field and experiential learning moments captured in ‘real-time.’ These 21<sup>st</sup> Century learning moments are capable of being captured ‘real-time’ with the use of a ‘smartphone’ such as the Android platform Eris Droid.

## Goals

- To utilize smartphone mobile computing for real-time data collection and sharing
- To enable use of unique applications for collection and collaborative sharing of real-time data
- To offer collaborative data collection and sharing experiences to various levels of students and faculty, i.e., elementary, high school, and college
- To offer smartphone mobile computing experiences to students from various cultural, socio-economic backgrounds who otherwise would have limited opportunity for these kinds of experiences
- To enable further data analysis and collaboration by students and faculty after a real-time field experience

## Project Implementation and Activities

### Mobile Computing Devices

Fourteen Droid ‘smartphones’ were obtained from Verizon through Pace University; Service that permitted Internet and web services access were set up.

### Applications

Numerous applications have been tested and evaluated on the Droid smartphones by students, instructors, and evaluators for appropriate implementation and use in acquiring various kinds of field data.

## Support Sites

Various free web accounts have been created that support real-time data sharing among group members. These include various accounts that require registration for short and media messaging services [SSM, MMS]; sites for data storage and retrieval to facilitate collaborative group work; web sites that enable immediate upload and posting of data/media from the field for real-time collaborative group work. Included, but not limited to these, are Google Apps, Gmail, Word Press, WikiSpaces, Picasa, GeoBeagle, and geocaching.com.

## Collaboration

Collaborative discussions were held with educators from several schools to gauge participation in collaborative field experiences with their schools; Positive enthusiastic responses were received from several educators and several events have taken place in June as well as during the fall semester.

Collaborative field experiences – Two trial field experiences have been performed for pre-event evaluation of devices and applications; of particular interest were the functionality of the smartphones as well as application performance for acquisition of specialized field data. Specifically, GPS, photo sharing and acquisition, blogging, mapping and recording applications were investigated and utilized in the course of this grant by several student and instructor groups.

Field guides were developed (appendix) to assist users in the field with application-specific content; these guides were very helpful to students and instructors during field events.

Field experiences during the fall semester were held for college students as part of their course work. Utilized were global positioning acquisition and subsequent data, image acquisition and sharing, group data sharing with a blogging site, inter- and intra-group commentary by students via blogging, and experience analysis and survey via Google Apps.

## Assessment

Online surveys for students and faculty developed with Google Apps were prepared to assess:

- prior knowledge/skills of mobile phone usage
- prior knowledge/skills of mobile phone computing
- anticipatory thoughts toward specific field events
- kinds of data collected and shared during specific field events
- evaluation of skills used/acquired during specific field events
- post-event thoughts about specific field events

## Impact

Over sixty students from three different schools and three different levels, i.e., two elementary student groups, four high school student groups, and one college student group participated in and were positively impacted by this study.

Over ten faculty members from elementary, high school, and college settings were directly impacted by this study. This study also positively impacted many more faculty who collaborate with those directly impacted by this study.

This study and field events significantly impacted elementary grade and high school young women from diverse cultural and socio-economic backgrounds. Most of these participants had limited access and exposure to mobile phone computing with smartphones. Students in all groups in this study, elementary, high school, and college, had no prior experience with the applications and assessment tools used.

Among the applications used during field events for this study were unique global information systems (GIS) positioning applications for real-time event status and navigation, unique GIS applications for real-time data sharing, unique real-time image capture and sharing applications, and applications for unique real-time recording and sharing.

Data sharing and commentary at the end of field experiences also occurred, with upload and posting of commentary, data and images to shared, group-specific, password-protected blogging sites where students and teachers could continue to collaborate post-event.

Student groups reported xxx.

## Discussion

In order to provide students with a mobile phone computing learning experience, several Eris Droid smartphones were obtained for sharing within groups of 2-3 students per phone. The Eris Droid smartphone has wireless, Internet, Bluetooth, and Geospatial Positioning Satellite [GPS] connectivity. These capabilities provide the backbone on which various student learning experiences have been designed. Once students become familiar with the various capabilities of the Eris smartphone, students will suggest and design additional custom group projects.

Student learning experiences include real-time capture and sharing of individual and group data among group members and ultimately with the faculty/student group as a whole. Data collected in various formats from experiential learning exercises in real-time may include, as

examples,  
the following:

Data Collection and Sharing – Fieldtrip/Geocaching/Research  
[ custom-created online forms to collect/share data ]

- a. Real-time analysis / commentary
  - b. e.g. Soil/Water/Air Sampling and Reporting
  - c. e.g. Site Analysis
    - i. EPA Compliance / Violations
    - ii. Green Technologies
    - iii. Recommendations
  - d. Upload/Download/Analysis data via Google Docs website
2. Journalistic Reporting / Recording – Fieldtrip/Geocaching/Research
- a. Creative Writing
    - i. posting / sharing via
    - ii. WordPress, WikiSpaces, Google Docs
  - b. Photo Journals
    - i. posting / sharing via
    - ii. Flickr, Picasa, WordPress, Google Docs
  - c. Video Journals
    - i. posting / sharing via
    - ii. Vimeo, YouTube, QIK, Google Docs, Camtasia
3. Geocaching / Geo-Location Activities
- a. Traditional Geocaching
  - b. Virtual Geocaching
  - c. Investigation of Geospatial Information Systems (GIS) Applications

Feedback from students and instructors was obtained by means of survey as well as free commentary on the experiential learning moments, the use of smartphones for data collection and reporting, and perception of acquisition of skills at the conclusion of the Project. Assessment of these responses was performed to identify strengths and weaknesses of the learning experiences, student innovation and creativity, and areas for future investigation.

## Outcomes

Through collaborative identification of appropriate types of field experiences, instructors and students then selected appropriate types of data for real-time collection and sharing from the field. Subsequently, selected smartphone applications that enable appropriate types of data collection, storage, and sharing of real-time data by student participants were used in the field.



For example, ‘real-time’ field work may include such experiential learning moments as:

- Reflections upon sculpture/paintings at an art exhibit
- Creation of a ‘real-time’ photo montage that reflects a field experience
- Historical economic snapshots of local towns and villages
- Sustainability observations made during field experiences
- Personal reflections during a hike or a field experience
- Collection of ‘real-time’ data through observation/interview for planning and implementation of microfinance opportunities to underserved or less advantaged groups

After students develop and participate in collaboratively planned field experiences where the smartphone is used as a data collection/sharing tool, it is anticipated that these experiential learning moments will enhance development of 21<sup>st</sup> Century Skills [1, 4, 5, 9] such as:

- How to cooperatively plan a field experience
- How to identify types of data that can be collected
- How to propose and use interactive field applications with web sites
- How to utilize applications during ‘real-time’ field experiences
- How to utilize/create basic web sites as data repositories
- How to publish and share real-time data
- How to extend personal learning experiences to local multi-cultural environments and underserved populations

### Skills for the 21st Century

Skills for the 21<sup>st</sup> Century, as defined by the Partnership for 21<sup>st</sup> Century Skills, include proficiency in the areas of *Information Literacy*, *Media Literacy*, *Media Creation*, and *Information, Communications and Technology (ICT) Literacy*. These Skills, as delineated by the Partnership [4], are described in detail below:

#### **INFORMATION LITERACY**

- How to access and evaluate information critically and competently
- How to use and manage information accurately and creatively for the issue or problem at hand
- How to manage the flow of information from a wide variety of sources
- How to apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information
- How to integrate and extend their learning to diverse, multi-cultural environments and underserved populations

#### **MEDIA LITERACY**

- How to understand both how and why media messages are constructed and for what purposes

- How to examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors
- How to apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media
- How to integrate and extend their learning to diverse, multi-cultural environments and underserved populations

### **MEDIA CREATION**

- How to understand and utilize the most appropriate media creation tools
- How to understand and effectively utilize the most appropriate expressions and interpretations for use in diverse, multi-cultural environments
- How to integrate and extend their learning to diverse, multi-cultural environments and underserved populations

### **ICT (INFORMATION, COMMUNICATIONS AND TECHNOLOGY) LITERACY**

- How to apply technology effectively
- How to use technology as a tool to research, organize, evaluate and communicate information
- How to use digital technologies as communication/networking tools
- How to appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy
- How to apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies
- How to integrate and extend their learning to diverse, multi-cultural environments and underserved populations

The Partnership for 21<sup>st</sup> Century Skills and others state that, beyond traditional literacy skills in reading, mathematics, and science, today's students require additional preparation in essential "soft skills" to attain marketability, employability and readiness for citizenship in the 21<sup>st</sup> Century's globally connected, rapidly evolving world environment [1, 4, 6, 7] . These "soft skills", among others, include the following [1, 4, 5, 7] :

**Critical Thinking** – The ability to think critically and evaluate information reasonably and with good judgment empowers students to assess the credibility, accuracy and value of information. This empowerment then leads to an enhanced capability to analyze and evaluate information, to make reasoned decisions, and to take insightful, purposeful action.

**Problem Solving** – The ability to find solutions to complex, multidisciplinary, open-ended problems is encountered in every aspect of 21<sup>st</sup> Century life. Challenges found in today's world typically don't have a single right answer -- At all levels, the ability to identify problems, to think through various solutions and alternatives, and to explore new options if one solution

does not work, are the kinds of skills today's students need. Building these kinds of skills increasingly involves working among groups of people with different knowledge and skills who, collectively, add value to the entire organization.

**Creativity** -- the ability to think unconventionally, to question the status quo, and to imagine new scenarios are the building blocks for generating new ideas and new solutions. Garrison et al [5] describe the sandbox of creativity as a "cognitive presence" where a community of inquiry constructs new meanings from their shared learning environment through "sustained communication" and cooperative ideas. Cognitive Presence, says Garrison, has two main components: 1) Critical Inquiry, which involves behaviors that demonstrate creativity, problem-solving, intuition and insight, and 2) Practical Inquiry, which includes behaviors that reflect imagination and reflectivity which alter individual and group experiences and practices [5].

The *New Partnerships for Sustainability in the Knowledge Economy (NESKEY)*, in its 2003 report [7], emphasizes the 21<sup>st</sup> Century emergence of virtual work environments that create new social formats for business teams and modes of collaboration. This new virtual paradigm brought about by 21<sup>st</sup> Century ICT brings with it new social interactions, cross-boundary learning processes, extensive global and civil knowledge networks, and establishment of communities of 'best practice' to guide interactions between these nascent 'virtual worlds' of collaboration and sharing in the 21<sup>st</sup> Century.

Growing global 21<sup>st</sup> Century ICT capability supports the next generation of systems for sustainable economies and facilitates development and enforcement of accountability feedback loops [6, 7, 8]. As evidenced by the 2008 World economic crisis, ICT mechanisms for communicating and managing data provide a new spectrum of metrics for interpreting physical and economic environment, as well as societal health and environmental viability. ICT is capable of providing unique insight into intangibles previously unidentifiable by prior analytic methods. Innovations in ICT provide a new foundation for decision making by corporations, governing bodies, citizens, and civil society organizations [6, 7, 8]. Today's students are tomorrow's participants in these processes.

The systemic approach of ICT to data gathering, analysis, and dissemination of subsequent information supports transformation of socio-economic systems at an entire systems level. Data gathering, analysis, and dissemination of new-found insights on a global scale make reporting and analysis enormously potent vehicles for sustainable environmental, economic, and societal development. Mobile Phone Computing, as one of the most rapidly developing

ICT technologies [6, 7, 8], has fostered innovations for a new generation of Web-enabled and ICT-supported data with the added impact of 'real-time' capability.

Mobile Phone Computing makes 'real-time' socio-economic systems (including healthcare) more accessible to those in less advantaged, developing countries and communities [6, 7, 8]. Decreasing costs for communication devices and increased availability of network services through regional development of cellular networks have made significant improvement in quality of life not only a potential, but a reality [6, 7, 8].

Mobile Cellular phones especially are penetrating the global marketplace at an extraordinarily rapid pace. According to Wireless Intelligence [8], the first billion mobile phones were sold worldwide over a period of 20 years. The second billion mobile phones were sold in four years, and the third billion were sold in two. Eighty percent of the world's population now lives within range of a cellular network. [8]

By December 2008, over 4 billion, or 60.6%, of the World's more than 6 billion people were using cellular phones. In descending order from 150.5% to 101% of their respective populations, the following countries lead the World in cell phone use: Hong Kong, Lithuania, Estonia, Italy, Russia, Portugal, Germany, United Kingdom, Ukraine, Netherlands, Hungary, Spain, Romania, New Zealand, Taiwan, and Jordan. The United States, surprisingly, ranks 27<sup>th</sup> in the World (89% of US population) in cell phone usage. [10]

The UN's *2009 Millennium Development Goals Report* [6] states that by the end of 2007, there were more than 2 billion mobile cellular subscriptions in developing countries - a penetration rate of 39%. Fixed-line phone networks, expensive to build and maintain, require subscribers to have both a permanent address and the ability to pay a monthly bill and have become vastly out-numbered by mobile phone subscriptions worldwide. As cellular network access proliferates, countries are expected to abandon government-run telecommunications systems in favor of mobile cellular networks. [6, 8]

Increasing sophistication of smaller ICT technologies, as evidenced by Mobile Computing 'smartphones,' has extended data gathering capability to an expanding range of applications. These technologies and innovations enable a marketplace of information in which information demands of different users may be identified, data flows increased, and input solicited 'real-time' from a wider variety of sources. Additionally, various structures for data entry, validation, analysis, and dissemination are available. On-demand, real-time reporting can be configured for numerous existing, as well as yet-to-be-identified, information scenarios [6, 8].

Virtual collaboration that is not dependent on time and space has appeared in the 21<sup>st</sup> Century work place. New social forms must be learned to support this evolving transformation. More recently, emphasis on collaborative learning processes and communities of best practice are occurring as knowledge production reaches beyond physical organizational boundaries and is found in global and civil knowledge networks [1, 4, 6, 7, 9] such as *WirelessIntelligence* and *Wikipedia*, for example.

Successful, effective communication and collaboration with teams of people across multiple cultural, geographic and language boundaries are essential to successful personal development of today's students. Most 21<sup>st</sup> Century students now live in diverse, multinational communities and will participate in diverse, multinational workplaces. The ability to build mutually beneficial relationships and to experiment with and participate in rewarding, creative learning environments is essential to successful nurture of the 21<sup>st</sup> Century student's future accomplishments and development of satisfied, productive lives. Proficiency in 21st Century Skills—skills, knowledge and expertise students must master to succeed in work and life— are among the many anticipated productive outcomes of the project, *MOBILE PHONE COMPUTING FOR DEVELOPMENT of STUDENT 21<sup>ST</sup> CENTURY SKILLS*.

*“Young people spend their most formative and impressionable years at school. Their needs are not only academic. They are social, spiritual and emotional.”*

**Sir Ken Robinson**

## Furtherance and Future Plans

This project has stimulated significant interest in technology and its creative applications within the groups who participated in these investigators' research. We firmly believe, based on student and faculty formal and informal feedback, that 21<sup>st</sup> Century Skills have been enhanced by our project. We are excited to have generated a fresh excitement for learning, technology, and creative interaction in these groups (Survey Data Charts, APPENDIX).

Our projects will continue to enable unique learning and sharing experiences for students from varied cultural, socio-economic, and educational backgrounds. We have received subsequent requests from all groups who participated in this study to participate in our future projects. We anticipate furthering our research into novel modes of Innovation and Creativity with student groups and faculty from elementary, high school, and secondary levels, and from varied cultural and socio-economic backgrounds.



HANDOUT  
FOR  
MOBILE PHONE COMPUTING  
WITH THE  
ERIS DROID

May 2010

Susan M. Merritt - Lara Lee





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## OVERVIEW

Mobile phone computing with a ‘smart phone’ like the ERIS DROID enables immediate capture and transfer of data, images, notes and experiences from the field to a repository where retrieval, analysis, aggregation, and real-time project development are possible.

Real-time data and results can be shared on the Web with local and global communities as well. Mobile Phone Computing can enhance development of integrated service learning projects in concert with underserved communities through this kind of information gathering and sharing.

Use of digital tools like the ‘smart phone,’ with its unique mobile computing resources and applications, can help students build real world solutions to real world problems. While we apply *today's* learning goals to projects, ‘smart phones’ provide unique learning moments where participants can build *tomorrow's* 21<sup>st</sup> Century skills today.



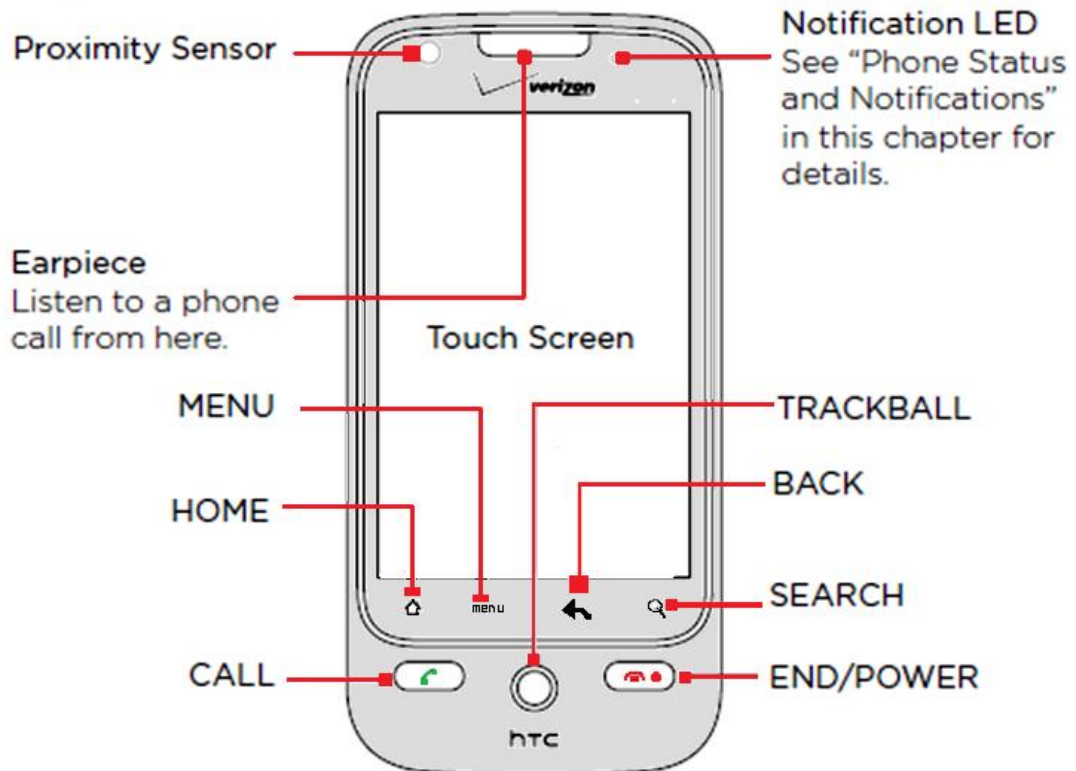




## SMART MOBILE PHONE OF CHOICE -

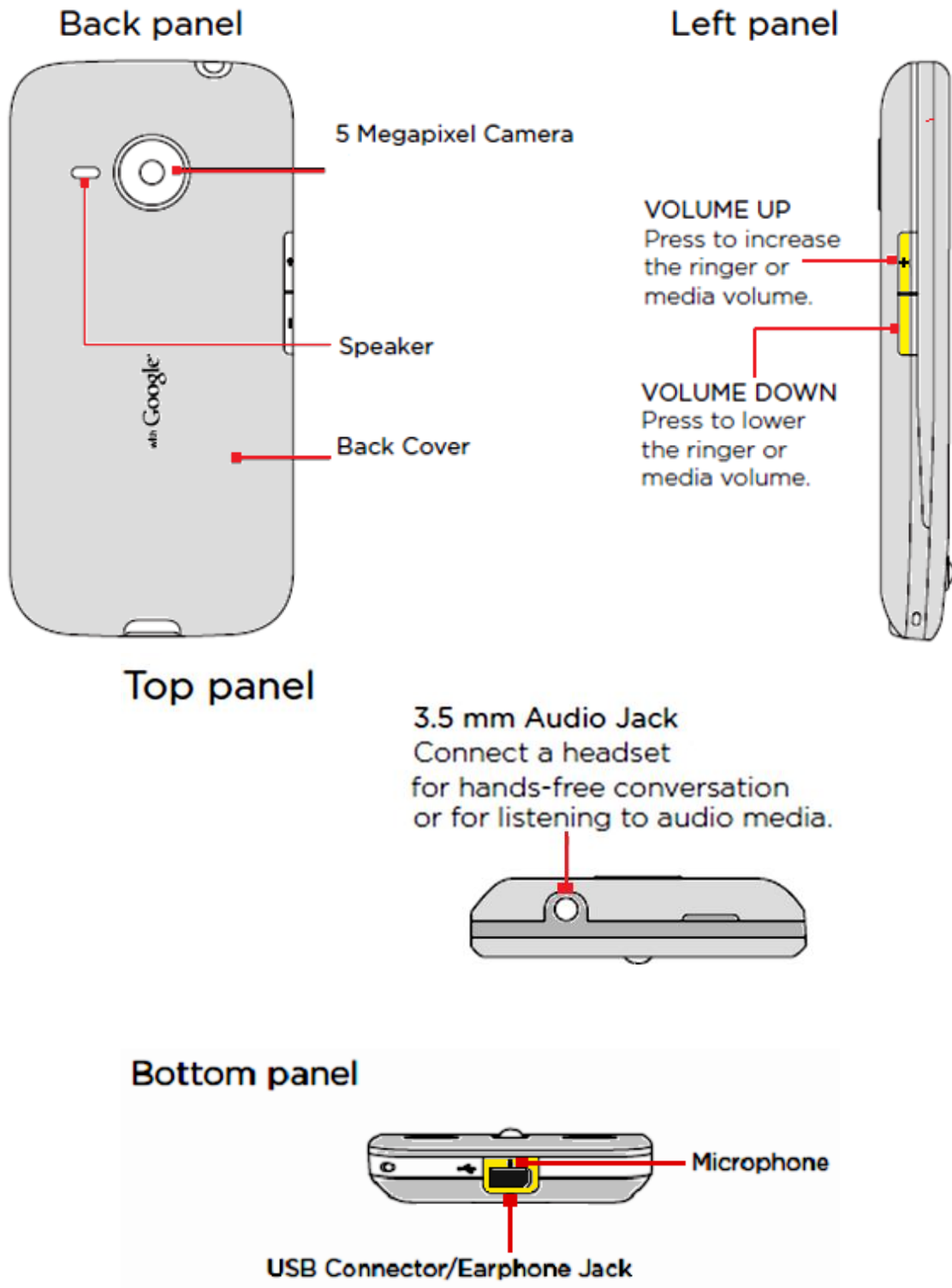
### VERIZON'S HTC ERIS DROID <sup>1</sup>

#### Front panel



<sup>1</sup> Data and Graphics from Verizon Eris Handout © 2009







## What the Eris Buttons Do

Button	Function
<b>CALL</b>	<ul style="list-style-type: none"> <li>• Press to open the phone dialer screen.</li> <li>• When a contact, contact number, or phone number is highlighted on the screen, press to call the contact or phone number.</li> <li>• During a call, press and hold to turn on speakerphone. Press and hold again to turn off speakerphone.</li> <li>• If you navigated to another application during a call, press to display the ongoing call on the screen.</li> </ul>
<b>HOME</b>	<ul style="list-style-type: none"> <li>• While on any application or screen, press to return to the Home screen.</li> <li>• Press and hold to open the recently-used applications window.</li> </ul>
<b>MENU</b>	Press to open a list of actions that you can do on the current screen or options menu.
<b>BACK</b>	Press to go back to the previous screen, or to close a dialog box, options menu, the Notifications panel, or onscreen keyboard.
<b>SEARCH</b>	See “Search button” later in this chapter for details.
<b>END/ POWER</b>	<ul style="list-style-type: none"> <li>• To end a call, press to hang up.</li> <li>• In standby mode, press to turn off the screen and lock the phone.</li> <li>• In standby mode, press and hold to open the phone options menu that lets you turn on/off Mobile network connection, turn off the phone, or switch your phone to silent mode, vibration mode, or airplane mode.</li> </ul>





## Getting Around Your Phone

There are different ways to navigate around the Home screen, menus and application screens on your phone.

### Tap

When you want to type using the onscreen keyboard, select items onscreen such as application and settings icons, or press onscreen buttons, simply tap them with your finger.

### Pinch

For some applications, like Albums or Browser, you can “pinch” the screen using 2 fingers (for example, thumb and index fingers) to zoom in or zoom out when viewing a picture or a webpage.

### Using the Trackball

Roll or press the TRACKBALL to select or highlight items on the screen. The TRACKBALL also flashes when you receive an incoming call or a notification.

### Press and hold

To open the available options for an item (e.g. contact or link in a web page), simply press and hold the item.

### Swipe or slide

To swipe or slide means to quickly drag your finger vertically or horizontally across the screen.

### Drag

Press and hold your finger with some pressure before you start to drag. While dragging, do not release your finger until you have reached the target position.

### Flick

Flicking the screen is similar to swiping, except that you need to swipe your finger in light, quicker strokes. This finger gesture is always in a vertical direction, such as when flicking through the contacts or message list.

### Rotate

For most screens, you can automatically change the screen orientation from portrait to landscape by turning the phone sideways. When entering text, you can turn the phone sideways to bring up a bigger keyboard.

**Note** The **Orientation** check box in **HOME > MENU > Settings > Sound & display** needs to be selected for the screen orientation to automatically change.





## Turning your phone on and off

### To turn on the phone

Press END/POWER.

**Note** When you turn on the phone for the first time, you will be prompted to sign in to your Google™ Account. For more information on how to set up your phone for the first time, see “Setting up your phone for the first time” in this chapter.

### To turn off the phone

1. Press and hold END/POWER for a few seconds.
2. When the Phone options options menu appears, tap Power off.
3. Tap OK when prompted to turn off the phone.

## Turning off the screen when not in use

To save battery power, the phone automatically turns off the screen when you leave it idle after a certain period of time. You will still be able to receive messages and calls while the phone’s screen is off.

**Tip** For information on how to adjust the time before the screen turns off, see “Display settings” in Chapter 10.

You can also turn off the screen by pressing END/POWER. Pressing END/POWER or incoming calls will turn on the phone screen and show the lock screen.





## A QUICKVIEW OF GROUP PROJECTS and APPLICATIONS

### JOURNALISTIC REPORTING

#### PHOTOS

DOCS PICS, PICASA, PHOTOBUCKET, Others  
upload to many sites

#### VIDEOS

PICASA, PHOTOBUCKET, WIKISPACES, WORDPRESS, GOOGLE DOCS  
upload to many sites including YOUTUBE (GOOGLE), VIMEO, QIK

#### WRITING

EASYNOTE, WORDPRESS, WIKISPACES, GOOGLE DOCS  
upload to many sites

#### VOICE RECORDING

GMAIL, GOOGLE DOCS

### GEOCACHING

#### C:GEO

Finds nearby Geocaches for instant searches along a hike or outing.  
Includes Google Maps, step-by-step navigation, and other helpful features.

### LETTERBOXING

#### ATLAS QUEST

An online community for this creative activity with guides, tutorials, tips, and  
stamp-making guides, and locations to search for hidden letterboxes.

### DATA COLLECTION and SHARING

#### GOOGLE DOCS

Spreadsheets, Forms, Presentations, Drawings can be created, modified, and shared;  
Drawings and charts can be created to illustrate findings from data;  
Photos can be added to files and presentations to further support data findings

### JOURNALISTIC REPORTING







Journalist Reporting is one of the most highly publicized uses for ‘smartphones.’ For years, headline news agencies used ‘smartphones’ to share breaking news stories. CNN’s worldwide real-time coverage, the people’s uprising in Iran, and reporting of conditions in post-earthquake Haiti are a few examples. Not through familiar Facebook and MySpace websites, students in this project learn an essential 21<sup>st</sup> Century Skill - to evaluate data through photos, videos, voice recordings, and learn to make meaningful commentary and offer ‘informative’ creative interpretations of each other’s ideas.

## PHOTOS

### ANDRAWING APPLICATION – You can

- a. Draw on photos
- b. Add text on top of photos
- c. Crop photos
- d. Upload and Share

This is AnDraw’s  
start screen →



### ALBUM APPLICATION – You can

- a. Crop photos
- b. Upload and Share Photos
- c. Save to the smartphone’s memory card, the ‘SD Card’



Text has been added to a photo using **AnDraw**,  
and the photo can be cropped and shared using **Album**

### DOCS PICS APPLICATION – You can

- a. Easy Access to Google Docs – to View/Download them
- b. Login to Google Account for email and access to documents
- c. Use Tabs for Easy Access: DOCS, PICS, FILES
  - i. DOCS - Google Docs
  - ii. PICS - Links to PICASA uploads
  - iii. FILES – Shows mobile phone’s memory storage card – ‘SD files’
  - iv. You can download files as pdf, doc, xls, and more ...





## VIDEO APPLICATIONS

Short videos can be captured with the Eris Droid. These self-made documentaries can be uploaded and shared to many sites including Picasa, Photobucket, Wikispaces, Wordpress, Google Docs, Youtube (Google), Vimeo, and Qik. Pre-established accounts on these sites require login to upload and share any video.

## WRITING APPLICATIONS

Easynote, Wordpress, Wikispaces, Google Docs can be used to post text to many sites including blogging sites, sent as text messages for rapid sharing. Many applications also offer Bluetooth messaging for intra-group discussions and collaborations.

## GEOCACHING







Geocaching is an outdoor activity in which participants use a Global Positioning System (GPS) receiver or other navigational techniques to hide and seek containers (called "geocaches" or "caches") anywhere in the world. These caches are able to be located by 'smartphones' that are GPS-enabled, meaning they have an antenna and software capable of communicating with the satellites that are part of the Global Positioning System (GPS) network.

A cache is usually a small waterproof container that contains a logbook and larger containers often contain items for trading - such as small, inexpensive trinkets. Geocaching is frequently described as a "game of high-tech hide and seek" and is similar to other GPS outdoor activities such as benchmarking, orienteering, treasure-hunting, and letterboxing.

According to GroundSpeak, the largest Geocaching listings website in the world, Geocaches are currently placed in over 100 countries around the world and on all seven continents, including Antarctica. As of May 2010, there are over 1,055,904 active Geocaches around the world.

### C:GEO

C:GEO is a powerful Geocaching application that offers both simplicity of setup and use. C:GEO does not need to be set up through another Geocaching interface. It is almost all you need to find cache! Caches, the "hidden treasures," appear automatically on the smartphone screen and C:GEO's menu allows you to see, zoom, and navigate to the caches with an integrated Google Maps interface.

### LETTERBOXING

#### with ATLAS QUEST.COM

Letterboxing is an intriguing pastime combining artistic ability with "treasure-hunts" in parks, forests, and cities around the world and frequently uses geo-location very much like Geocaching. Letterboxing participants (known as 'Letterboxers') seek out hidden journals called 'caches' by solving coded messages and then following clues to find the hidden 'cache' or journal. The 'prize' found is a beautiful collection of images placed in the journal by way of hand-carved rubber stamps – each a unique, miniature work of art.



AtlasQuest.com started out as a set of tools for creating stamps and tips on letterboxing for participants, but has grown into a worldwide community who share their art in a very unique way.

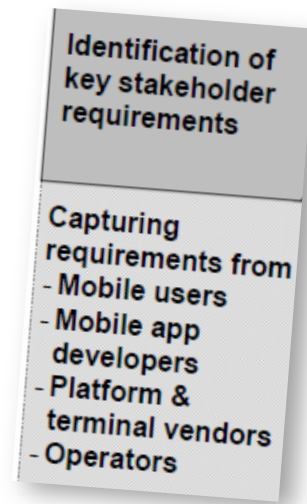




## DATA COLLECTION and SHARING

### GOOGLE DOCS

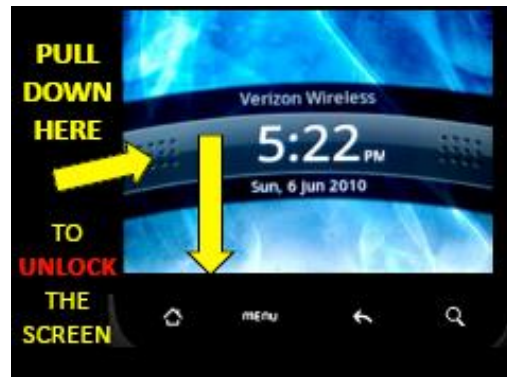
- Spreadsheets can be created, modified, and shared;
- Forms can be created, customized to capture information;
- PowerPoint presentations can be created;
- Drawings and charts can be created to illustrate findings;
- Photos can be added to support data findings.

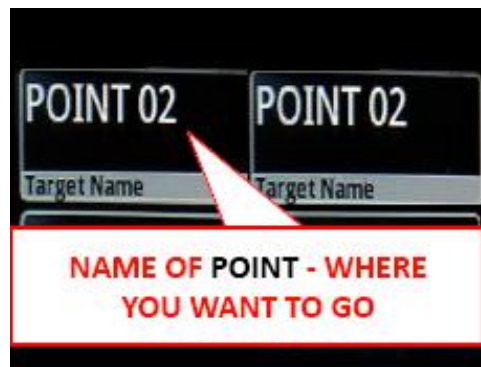




**DROID  
SMARTPHONES**

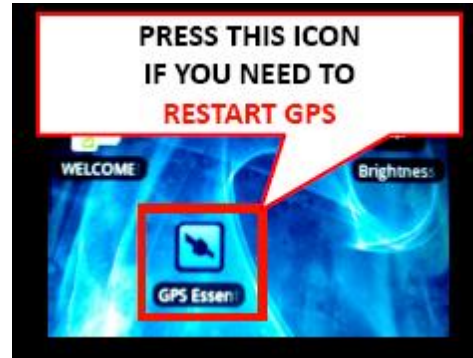
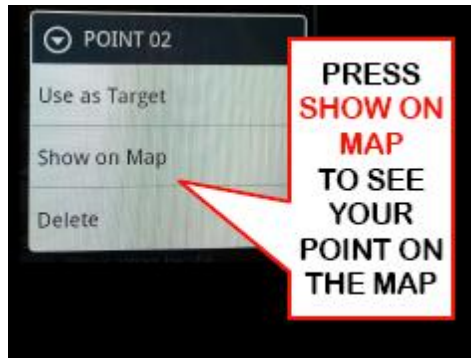
**GEOCACHING TODAY!**







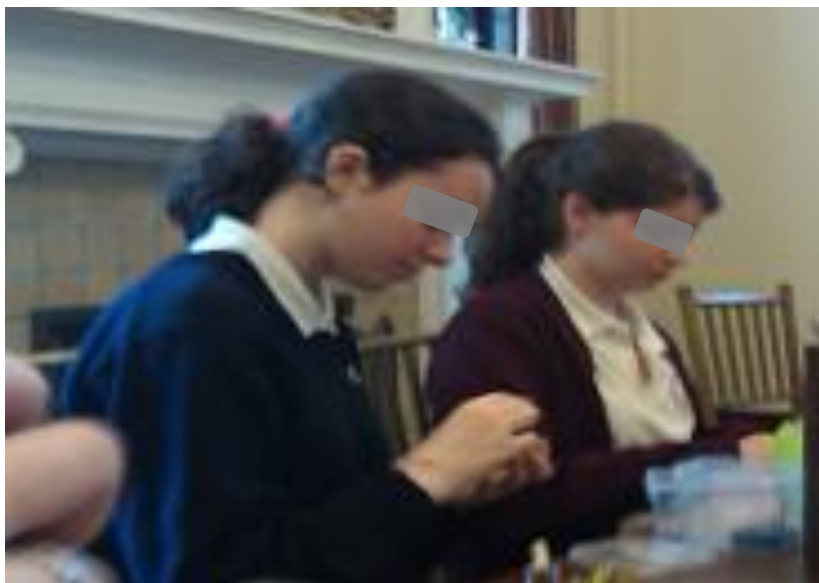




Student Photos – They Enjoyed the Experience!









HANDOUT  
FOR  
MOBILE PHONE COMPUTING

September 2010

Susan M. Merritt - Lara Lee









START BY TAPPING THE “MY GPS STATUS” ICON. IT LOOKS LIKE THIS ON THE DROID’S HOME SCREEN





THIS SCREEN WILL OPEN AND DISPLAY THE LATITUDE AND LONGITUDE OF WHERE YOU ARE OUTSIDE AS WELL AS ANY NEARBY WIRELESS NETWORKS



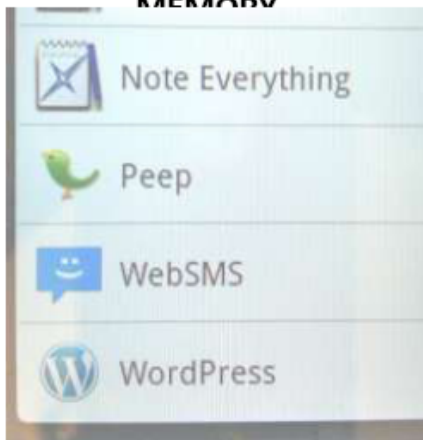
SUPPOSE YOU WANT TO COPY YOUR GPS LOCATION FROM THIS DISPLAY TO A WORDPRESS ACCOUNT - YOU CAN USE THE 'EMAIL' FUNCTION - CLICK THE 'EMAIL' BUTTON





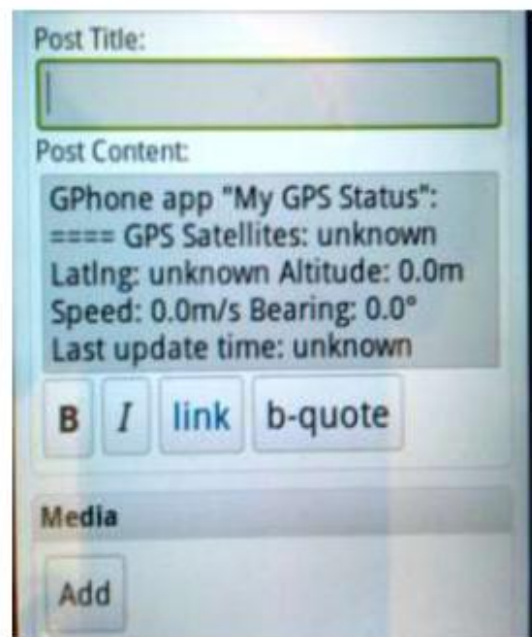


**YOU WILL SEE A LIST OF WAYS TO COPY  
YOUR LOCATION TO YOUR DROID'S**



**YOU NEED TO COPY YOUR LAT/LONG  
INFORMATION TO YOUR DROID SO  
YOU CAN PASTE IT INTO YOUR  
CIS101HONORS WORDPRESS BLOG  
SELECT 'WORDPRESS' FROM THE LIST**

**A WORDPRESS SCREEN WILL OPEN  
WITH YOUR LATITUDE/LONGITUDE  
INFORMATION IN A TEXT AREA**



**"LONG" PRESS IN THE TEXT AREA  
AND HOLD - A POP-UP MENU APPEARS**





**PRESS ON "COPY ALL"**  
**NOW ALL YOUR GPS INFORMATION HAS BEEN COPIED TO YOUR DROID!**  
**EXIT THE 'MY GPS STATUS' APPLICATION BY PRESSING THE 'HOME' BUTTON ON YOUR PHONE.**



**THE HOME SCREEN SHOULD APPEAR BEFORE YOU CONTINUE ...**



**TAP THE 'WORDPRESS' ICON FOUND ON THE HOME SCREEN**



**THE WORDPRESS APPLICATION WILL OPEN A SCREEN THAT LOOKS LIKE THIS**



**PRESS 'CIS101 HONORS'**





**NOTICE THE THREE TABS AT THE TOP OF THE SCREEN:**

**COMMENTS, POSTS, PAGES**



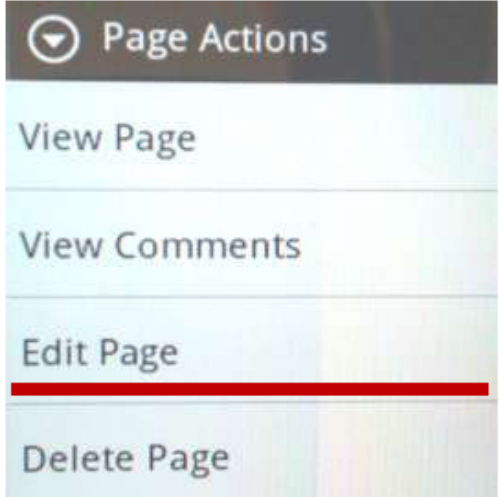
**CLICK ON THE TAB 'PAGES'**

**YOU WILL SEE A LISTING OF ALL THE PAGES IN THE WORDPRESS BLOG**

**TAP ON YOUR TEAM'S PAGE**

**A MENU WILL APPEAR WITH OPTIONS**

**- SELECT "EDIT PAGE" -**

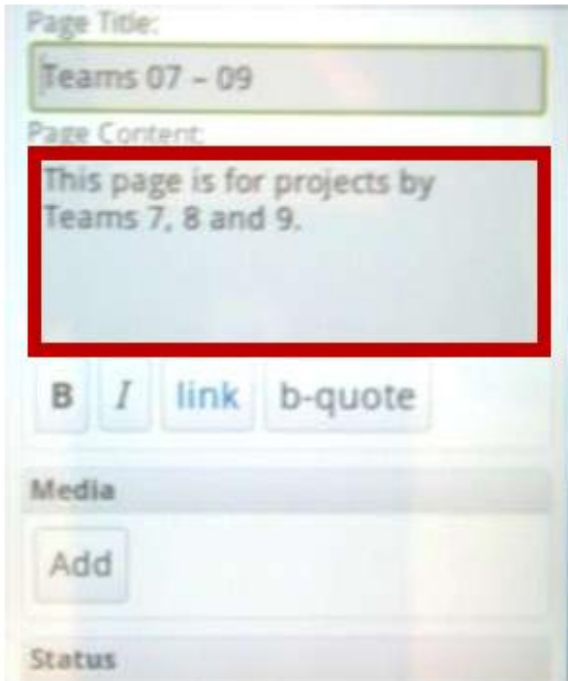


**THIS WILL OPEN A SCREEN WHERE YOU CAN PASTE IN YOUR GPS LAT/LONG INFORMATION, ADD COMMENTS, AND ADD MEDIA ALONG WITH YOUR POST**





**NOTICE THE TEXTBOX AREA FOR YOUR COMMENTS – ‘LONG’ PRESS IN THE TEXTBOX AREA – A MENU WILL POP UP WITH AN OPTION TO ‘PASTE’**



**PRESS ‘PASTE’ AND YOUR LAT/LONG INFORMATION WILL APPEAR IN THE TEXTBOX AREA –**





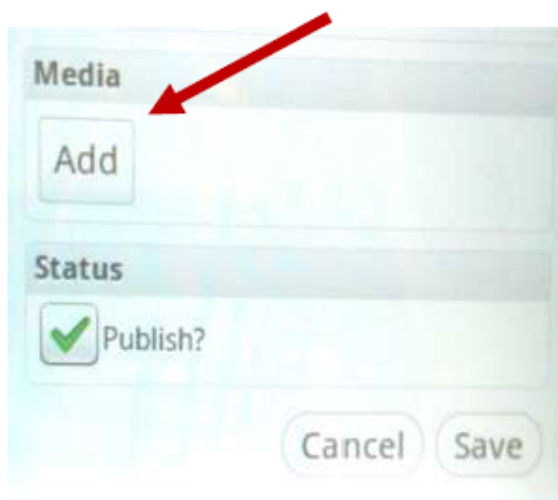
**YOU CAN USE THE DROID KEYBOARD SYMBOL**



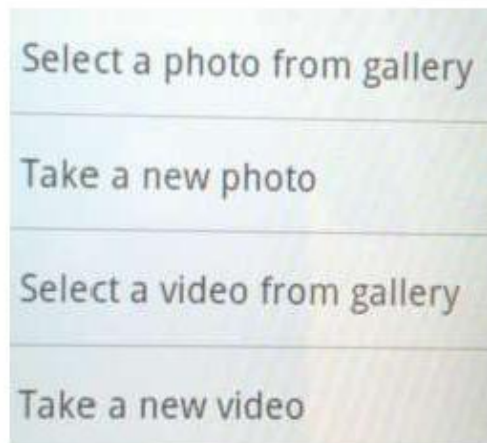
**TO ENTER A NEW**

**LINE INTO THE TEXTBOX AND MAKE ADDITIONAL COMMENTS**

**YOU CAN ADD MEDIA AS WELL!**



**TO ADD PHOTOS,  
CLICK THE 'ADD MEDIA' BUTTON –**



**OPTIONS TO TAKE/ADD  
PHOTOS/VIDEOS  
WILL APPEAR ON THE SCREEN**

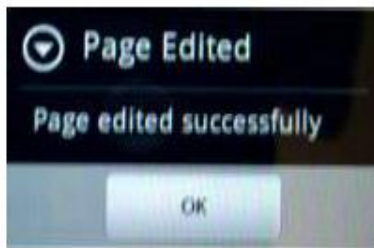
**TAKE A PHOTO OF YOUR CHOSEN  
ENVIRONMENT SITE**





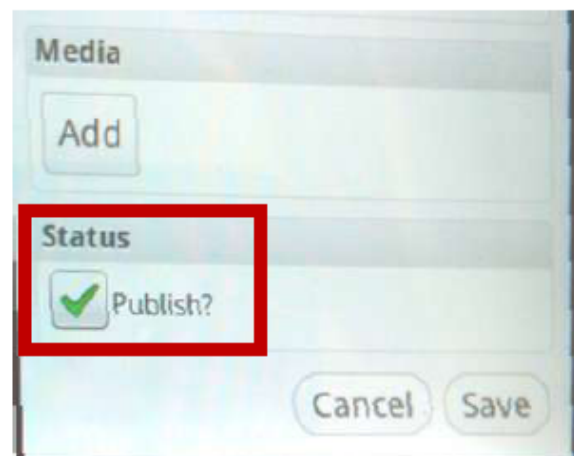


**THE SCREEN WILL CHANGE BACK TO THE WORDPRESS UPLOAD AREA AND YOUR PHOTO WILL APPEAR AS A THUMBNAIL IN THE 'ADD MEDIA' AREA**



**WHEN YOU HAVE FINISHED ADDING YOUR LAT/LONG, AT LEAST ONE PHOTO ABOUT YOUR CHOSEN ENVIRONMENT SITE, ADDED ANY OTHER COMMENTS YOU WISH TO MAKE,**

**PRESS THE CHECKBOX TO PUBLISH YOUR WORK TO WORDPRESS -- THE GREY CHECKMARK SHOULD TURN **GREEN** TO INDICATE READINESS TO PUBLISH TO YOUR WORDPRESS TEAM PAGE**



**CLICK THE 'SAVE' BUTTON IN THE LOWER RIGHT OF THE SCREEN**





**YOU HAVE NOW COMPLETED POSTING  
TO YOUR TEAM’S WORDPRESS PAGE!**

**RETURN TO THE WORDPRESS SECTION  
WITH THE THREE TABS BY PRESSING THE  
BACK ARROW ON YOUR DROID.**



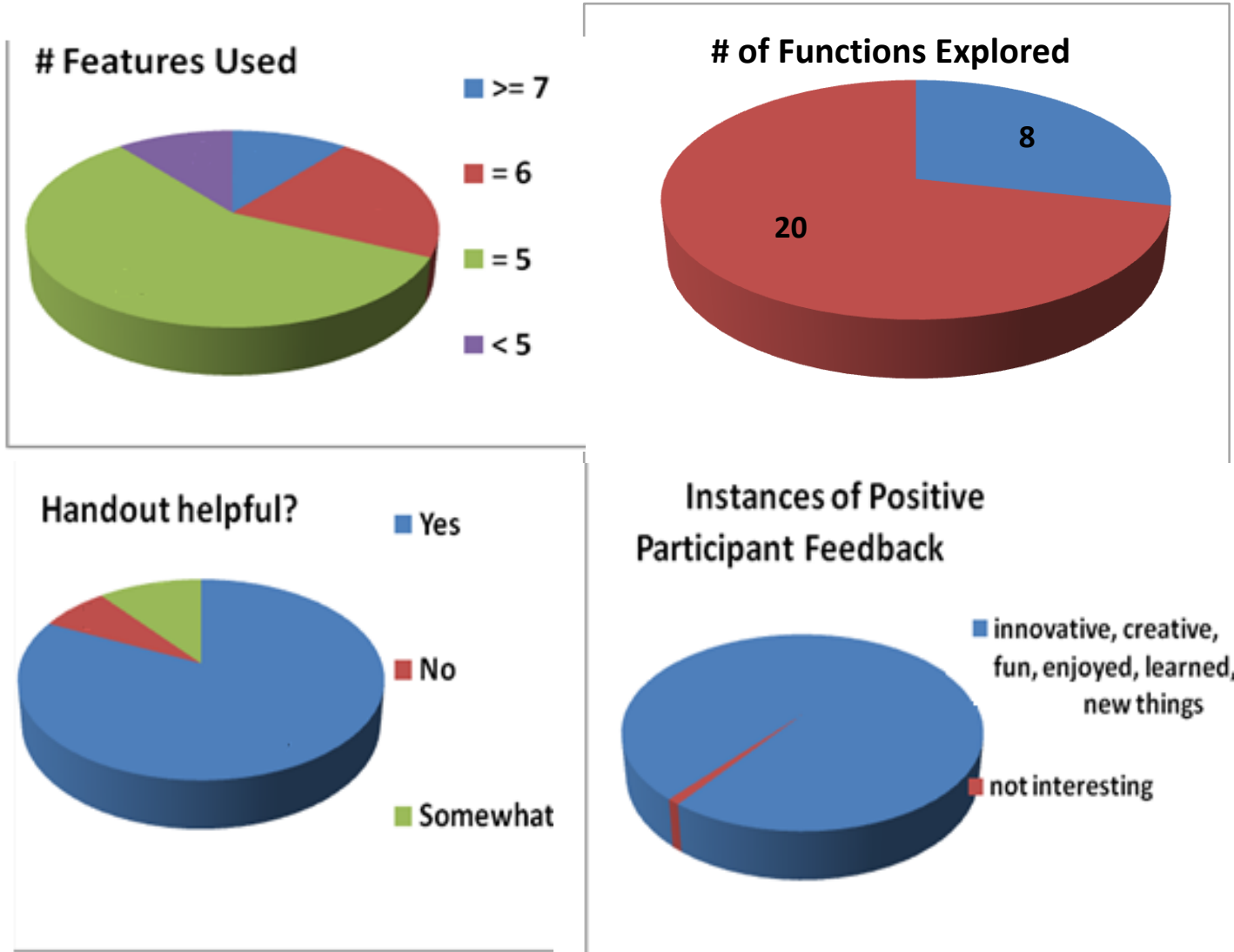
**CLICK THE PAGES TAB,  
SELECT YOUR TEAM’S PAGE,  
AND THEN SELECT  
‘VIEW PAGE’ TO SEE THE INTERNET  
VERSION OF YOUR POST**

**YOU WILL SEE THE LOGIN PAGE  
CHECK THE BOX “REMBER ME”  
THEN PRESS ‘LOG IN’**

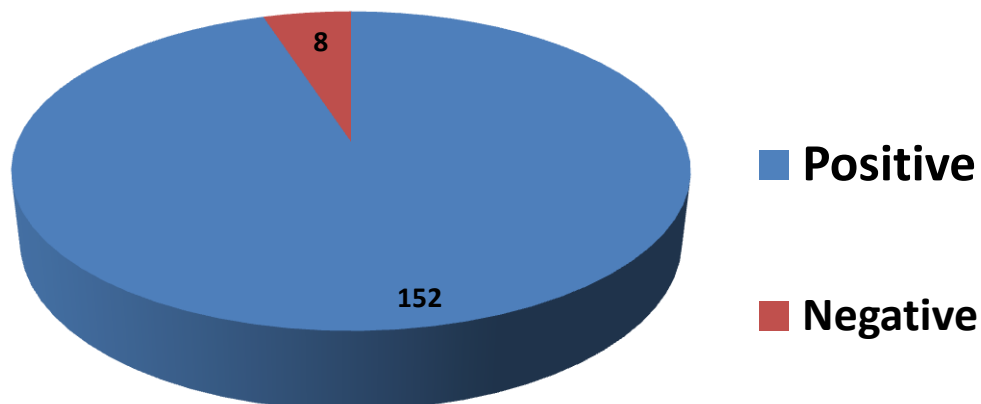




### Sample Survey Results - Data Charts



### Over all, My Experience with This Project Was



**REFERENCES CITED**

1. *"All Our Futures: Creativity, Culture and Education,"* Report to the Secretary of State for Education and Employment, the Secretary of State for Culture, Media and Sport, May 1999, National Advisory Committee on Creative and Cultural Education, Sir Ken Robinson, Chair.
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3. *"TED and Reddit asked Sir Ken Robinson anything -- and he answered,"* blog.ted.com/2009/08/ted\_and\_reddit\_1.php, retrieved March 2010.
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8. *"Quarterly World Review, Q2 2008,"* Wireless Intelligence, wirelessintelligence.com.
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10. Wikipedia, *"Countries by Numbers of Mobile Phones,"* [http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_number\\_of\\_mobile\\_phones\\_in\\_use](http://en.wikipedia.org/wiki/List_of_countries_by_number_of_mobile_phones_in_use), retrieved March 2010.