Digital applications development training achieves big successes

By Donell Walker

One of the greatest successes from the Connecting Soldiers to Digital Applications initiative since 2010 has been the course designed to teach military members and government civilians how to write native applications for smartphones.

The program at the Signal Center of Excellence started with two assumptions. The first assumption was based the fact that Apple's App Store on iTunes had been active for just over one year and there were over 100,000 iPhone apps. Additionally, the Android marketplace's first few months also saw the rapid development and deployment of 20,000 apps.

The staggering rise of these two distribution channels suggested that developing apps was not too difficult. The second assumption was that the military has members in its ranks that have the ability to develop apps. This assumption was tested and proven true during the Apps for the Army Challenge, in which 53 apps were developed over a 75-day period.

As it turns out, developing applications is not as easy as first presumed - or at least it was not a task that could be picked up by that vast majority of our workforce with the same ease as, say, HTML. The complexity of quality native applications comes with a cost, which varies greatly throughout the industry and could range anywhere from $5K - $250K depending on the content, graphics, and cost of maintenance. From that came the question of whether or not the Army could create in-house capabilities for mobile app development? It was asked if the Army has Soldiers and civilians within the workforce who, with some development training, could become capable of developing and deploying mobile apps within training or operational contexts? From this question, the SIGCoE was tasked with examining the possibilities for providing instruction for mobile apps.

(Photo by Bonnie Heater)

The AN/TSC-185 STT appears on a Signal Soldier's Motorola Zoom Android Tablet after the QR Code for the equipment was scanned. This gives the Soldier access to the equipment user guides, training modules, maintenance manual, how-to-videos, technical manuals anywhere he or she may be.

The first question was to determine the appropriate population for mobile app instruction. Many years ago, the Army had Soldiers who wrote applications, but that task faded during the past 30 years. Within the professional military education system employed at the SIGCoE, the only course that engaged in any sort of programming was the Information Systems Manager's class that served as the functional area 53 qualification course.

At the time, the course had a five day section on programming in ASP.NET that was designed to satisfied the Critical Task and Site Selection Board task # 113-493-4000 to "Develop an Application". For that that task, the condition was: Given an operational requirement that cannot be met with a currently available COTS/GOTS solution, programming software, network, unit SOP, AR 25-1, AR 25-2, AR 380-5, AR 700-138, DA PAM 25-1-1, FM 3-0, and FM 5-0. The standard was: Create an application that satisfies the operational requirement IAW applicable regulations, policies, and procedures.

Furthermore, the following

subtasks were identified: 1. Develop the requirements for the application; 2. Select appropriate application tool(s) to develop the application; 3. Create application; 4. Conduct security and acceptance testing; 5. Deploy the application; 6. Document application; and 7. Maintain the Application.

When this task was approved by the CTSSB, it was obviously not specific to mobile applications, but the subtasks are clearly all components required in teaching mobile application development. Therefore, for the purposes of a pilot, it was determined that ISM students were the most likely student group to benefit from mobile application development.

LTC Gregory Motes was the chief of the Information Dissemination Management Division in the School of Information Technology and was asked to examine the difficulty of mobile app development and to formulate curriculum for a 5 day class.

After some initial examination into the skills required to write mobile apps, LTC Motes enlisted the assistance of CPT Chris Braunstein and CPT Stacey Osborn, who were "Snowbirds" (a colloquial term for students between courses) and had backgrounds in computer science.

The result was the development of curriculum for a five day courses for Android and iPhone that were presented to separate ISM courses in December 2010 and January 2011. Prior to these pilot courses, it was speculated that students attending the course would not represent a homogeneous population and would have a mix of students qualified to attend the class with those who did not have a background suitable for object oriented application programming. In fact, of the 23 students that took the initial iOS class, five students adequately absorbed the instruction and were able to grasp the difficult concepts at the end of the week. Another seven students could follow the instruction and were able to complete the exercises without too much difficulty. For the remaining students, the pace of instruction was extremely overwhelming. The Android class that followed had similar ratios among the 18 students.

The issue centered on the programming course's prerequisites. The civilian courses that the ISM training was modeled on usually required programming experience in an object oriented programming language such as Java (Android) and Objective-C (iPhone/iPad). Even the "iPhone for Dummies" book series required the reader to have a background in C or Objective C - which is hardly a "Dummy". As CSDA began to mature, organizations from inside and outside of TRADOC struggled to master mobile application development and numerous requests were made to the Mobile Apps Branch to hold a course. Civilian equivalent classes costs around $2,500 for 5 days of instruction (and more with travel and per diem), which was a cost barrier for a number of organizations.

This led the SIGCoE to create a ten day course that included one week in object oriented programming fundamentals, with a focus on Java for the Android courses and Objective C for the iOS courses, followed by a second week that we designed to teach specific programming tasks for the designated operating system. After sending out an email to the CSDA working group and other organizations that had been encountered during the first year of the CSDA program, 38 students were enrolled for the initial Android class. As a point of reference, a similar 10 day class in the civilian sector would have cost over $5,000 per student, for a total cost of $190,000.

The School of Information Technology was well equipped with computers and a student training network, allowing the students to each have access to the Integrated Development Environments and Software Development Kits used to program Android phones. Additionally, using a combination of VMware Lab Manager and virtual Windows 7 operating systems, students were able to access and store their work on a storage area network.

One principal change from this class and the ISM classes was that students were required to submit a short bio outlining any programming education or training that they may have had, which allowed the class administrators to determine the probability of each students success in the class. Students were also told that the course would be very challenging and requested only serious inquiries. Subsequently, several students who did not have a background commensurate with the requirements were not allowed enrollment.

At the completion of the first open class, three students actually published apps to the Android market, which demonstrated an immediate value to the course. This also led to an interesting talking point position where, on one hand, we were saying that writing apps is difficult and requires advanced training, but on the other hand we could point to the Army Values iPad app that took CPT Braunstein only four days to complete from inception to submission to the app store. It really validated the point that app development was not difficult for developers who had proper training. In CPT Braunstein's case, it was a computer science degree from the prestigious Rochester Institute of Technology.

On the other end of the spectrum was a handful of training developers and instructors who each presented information suggesting they had a background in programming. Their attendance at

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an iPhone programming class left them realizing that previous experience in scripting, modular, functional and procedural programming languages was inadequate to quickly grasp object oriented programming.

Further refinement of curriculum and instruction were contracted through Technology Center Incorporation in Norcross, Georgia, which provided appropriate training materials for 10 day classes for iPhone and Android. Ultimately, the classes were set to consist of the following topics: Introduction to Programming using Java or Objective C, Getting Started with Android or iOS Programming, Displaying Maps, Activities and Intents for Android, Table Views, Application Storages, Animation and Video Playback, Network Access and a final project.

Over the course of the program, the SIGCoE held 8 courses, with an average of 25 students per class - essentially providing the equivalent of over $1,000,000 in training for a fraction of the cost. The last classes taught in June 2012 filled up 10 weeks prior to the start date and had a waiting list of students who were not allowed to attend due to the classes being fully booked. Students have attended from every corner of TRADOC, including active duty noncommissioned officers, warrant officers and officers, reservists, and DA civilians from each branch of the service. Furthermore, attendees have come from the White House Communications Agency, the Defense Information System Agency, and the Federal Bureau of Investigation. The vast majority of the students have been training developers who will take their training back to their organizations have begun to integrate mobile apps into their work where applicable.

As a side note, training was not limited to on site instruction, group instruction, or even native application development instruction. At various times, members from the SIGCoE traveled to an off-site location to conduct training, notably train-

(U.S. Army photo by SGT Michael J. MacLeod)

A paratrooper with the 82nd Airborne Division's 1st Brigade Combat Team uses a Handheld Interagency Identity Detection Equipment, or HIIDE, system to verify the identify of the Taliban leader they captured 26 Jan 2012, on the simulated battlefield of the Joint Readiness Training Center, Fort Polk, La. The system identifies people in a database that catalogs iris and fingerprint data.

ing 35 people at separate sessions during the 10th Annual Army distributed Learning Conference in 2011 where LTC Motes, CPT Braunstein and Donell Walker received the dL Maverick Award as "Out-of-the-box" thinkers. Additionally, training was conducted for 10 people in 2012 to achieved certification as Appcelerator Titanium developers, and additional training was gained in Blackberry OS, JQuery and PhoneGap to further round out the profile of technologies used for mobile apps. On other occasions, the SIGCoE mentored student projects at Augusta State University and the Army's Telecommunications Systems Engineering course, and even presented a lecture for students at Syracuse University's iSchool. The culture of learning and teaching has been a grand part of the success of the CSDA program.

One other topic that has garnered the attention of the SIGCoE was the release of iBooks Author software to develop eTextbooks for the iPad. Within days of the release of the free software, the SIGCoE had written a book to be used for demonstration at a CSDA working group and for publication onto Apple's iBooks. In April 2012, the SIGCoE hosted a workshop to teach training developers how to easily put content from their classes into an iBook, including text, pictures, image galleries, videos, audio, interactive images and additional widgets. Two very promising implementations are the inclusion of review questions that can be integrated within a books chapter and the ease at which instruction developers can incorporate a robust glossary for their students. Although the software is specific for iPads, there is an expectation that ePub formats for other mobile devices will catch up to allow other devices to display similar information.

Looking down the road toward adoption, acceptance and compliance of the Army's Learning Model 2015 and Army Training Model in TRADOC Pams 525-8-2 and 525-8-3, "requires a major change in the way the Army's trainers and training developers think about enabling training," specifying that the Army needs "tools that are low overhead, are mobile and capable of being interoperable and integrated, are reconfigurable, and which can be networked together quickly and seamlessly with joint and Army MCS." Current models for developing Interactive Multimedia Instruction and delivering content to personally owned electronic devices require deliberate consideration in a new era of fiscal challenges.

While there will be many occasions for organizations to write contracts to have mobile applications developed, there ought to continue to be a means to teach training developers and instructors how to create their own applications within the security and information constraints of the Army.

Donell Walker ***retired from active military service in 2004 after 21 years of service; 18 in the Information Technology field. During his military and civilian career, he has served in a myriad of technical positions to include computer operations, networking, information dissemination, training, and mobile applications development. He previously served as the Deputy and Operations Chief for the U.S. Army Mobile Applications Branch at Fort Gordon, Ga, playing a vital role in the team's development of approximately 100 applications with over 1.5 million downloads from the Apple App Store and the Google Play. Currently serves as the Battle Lab Collaborative and Simulation Environment Branch technical manager.***

Acronym QuickScan

AR – Army Regulation
ASP.NET – Active Server Pages (using .NET framework)
COTS – Commercial Off The Shelf
CSDA – Connecting Soldiers to Digital Applications
CTSSB – Critical Task Site Selection Board
DA – Department of the Army
FM – Field Manual
GOTS – Government Off The Shelf
IDE – Integrated Development Environment
IDMD – Information Dissemination Management Division
IMI – Interactive Multimedia Instruction
ISM – Information Systems Management
MCS – Maneuver Control System
OS – Operating System
PAM – Pamphlet
SDK – Software Development Kit
SIGCoE – Signal Center of Excellence
SIT – School of Information Technology
TRADOC – U.S. Training and Doctrine Command