ABSTRACT

Programs such as the month-long, NSF-funded Information Assurance (IA) Capacity Building Program at Carnegie Mellon University can help computer and information science faculty better understand information assurance/security topics, provide course material and offer networking opportunities with other faculty and researchers, but the program can only reach a limited number of faculty and schools each year. Hampton University and the Software Engineering Institute at Carnegie Mellon University are investigating additional ways to expand the transition of information security concepts and materials to other schools. This paper reports on the initial work in this area.

INTRODUCTION

From the inception of the Software Engineering Institute (SEI) until 1995, the SEI’s Education Program defined Master’s and Undergraduate Software Engineering Curricula, created materials and courses in those areas, and transitioned same to the academic and continuing education communities. Having been a member of the SEI’s Education Program, transitioning software engineering materials and courses to the academic community, Dr. Sledge understood what worked well and what barriers to transition existed under that Education Program model.

Successful transition meant the educational institution had the capacity to initially incorporate those software engineering materials and courseware, as appropriate, into their courses and curricula, and, over time, to continue to refine and expand the materials and courseware to better reflect that institution’s educational interests and strengths, and to incorporate changing technology. In other words, the SEI’s materials and courseware provided a ‘jumpstart’, enabling the institution to more quickly incorporate and offer software engineering subjects.

While materials and courseware might be shared among faculty at that particular institution, unless a faculty member moved to a different institution and used derivative materials at that new institution, the transition was basically 1:1, from the SEI to the original institution, and on a course by course basis. An annual Conference on Software Engineering Education provided opportunities for faculty to present new or adapted materials, but the sustained transition of applicable new materials and the ability of faculty to attend a second conference (the first conference being one in their primary field of interest) proved limited.

Given that experience, Sledge proposed a new model: a partnership which leverages the strengths of the SEI, the strengths of the partner educational institution, and which builds upon existing trusted relationships and infrastructure, to reach a far larger set of educational institutions than could be achieved by the old model, and which sustains the incorporation of new and evolving materials. Leveraging other complimentary programs, events and organizations broadens the offering and makes it more cost effective to all parties involved. Central to the new model is the concept of the Regional Collaborative Cluster.
REGIONAL COLLABORATIVE CLUSTERS

A Regional Collaborative Cluster (RCC) is a collection of educational institutions in a particular geographic region that at some level

- share a common vision and target student population
- have cooperated in the past, or can reasonably be expected to cooperate
- have a desire to incorporate or expand their information assurance content
- are within a day’s drive of one another

HUB EDUCATIONAL TRANSITION PARTNER

At the heart of the Regional Collaborative Cluster is the hub educational transition partner. Qualities of a successful hub educational transition partner include the:

- capacity to understand, adapt, refine and incorporate Information Assurance materials and courseware into existing courses and curricula
- support by the educational institution to accomplish the above
- active leadership and commitment by a faculty member respected by the community
- existence of trusted relationships with other Computer Science and Information Science Departments in the immediate geographical region and beyond
- commitment to advance the state of Information Assurance education in the region through the sharing of materials and courseware, facilitation of workshops and symposia, etc.
- ability to leverage other complimentary relationships and activities, and
- a somewhat central location with respect to the other educational institutions in the region to reduce travel time to workshops, symposia and other events.

OPERATION

The SEI Education Program model, of necessity, needed to transition on a 1:1 basis: to define, then nurture the establishment of Master’s Software Engineering programs (its stated goal.) It did not create an infrastructure that would encourage and empower the schools teaching those software engineering programs to transition and sustain the teaching of software engineering topics and courses in other educational institutions. Creating and sustaining such an infrastructure from scratch is problematic at best.

The new model leverages existing, trusted working relationships of the hub educational transition partner with other Computer Science and Information Science Departments to help create an infrastructure (the Regional Collaborative Cluster) capable of transitioning information assurance concepts, materials and courseware through workshops, symposia, etc. to additional educational institutions to increase the IA educational capacity in that region.

The SEI provides the hub educational transition partner with IA materials and courseware, speakers for a kick-off regional IA symposium, opportunity for free seats in any of the SEI public courses, other SEI materials and courseware (as appropriate), entrées into other Carnegie Mellon University outreach programs, etc. The hub educational transition partner adapts, refines and incorporates the
IA materials and courseware as appropriate to their particular environment and curriculum; shares the adapted and enhanced materials, courseware and experience with other educational institutions; sponsors and solicits attendees for the kick-off IA symposium (again leveraging its existing relationships); and hosts other IA-related workshops.

The partnership between the SEI and the hub educational institution, and through its efforts, the Regional Collaborative Cluster, is ongoing: the better to sustain and enhance the IA educational capacity in that region.

Whenever possible, both the hub educational transition partner and the SEI seek to leverage other complimentary programs and efforts (such as the Carnegie Mellon University Information Assurance Capacity Building Program). The purpose is not to compete with other opportunities to enhance and improve educational IA capacity, but to build upon them.

**Information Assurance Capacity Building Program**

Since 2002, Carnegie Mellon University has offered a month-long Information Assurance (IA) Capacity Building Program (IACBP) during the summer. The primary IACBP faculty are from the Software Engineering Institute, in particular from the Networked Systems Survivability Program, which includes the CERT® Coordination Center.

The NSF-funded IACBP primarily targets faculty in computer and information science at Minority Serving Institutions (MSI's). Due to the structure of the program, participation is limited to 7 or so schools and fewer than 14 faculty.

While opportunities exist to discuss research during the program, the primary focus is increasing the educational capacity with respect to IA at the participating schools. One of the requirements during the program is to describe how the faculty member will inject comments, materials, topics, lectures, modules or courses relating to information assurance into their existing courses or curriculum, both in the coming year and beyond. This is accomplished during the Course and Curriculum Development Week (CCDW), the third week of the program.

The CCDW is kicked off with a number of presentations, including one by Dr. Corey Schou, University Professor of Informatics and Professor of Information Systems at Idaho State University. Dr. Schou’s presentation includes additional sources of materials on information assurance, national training and education standards in information assurance, curriculum development, etc. Dr. Schou is also present to work individually with faculty for a portion of the CCDW.

In addition to the course materials received earlier in the program (including a text by Anderson [1]), faculty receive a complete copy of the CERT Training and Education Center course “Information Security for Technical Staff” (ISTS) at the start of the CCDW.

The Course and Curriculum Development week culminates with presentations by the faculty describing how they plan to incorporate IA into their existing courses and curricula.

**Hampton University and the 2003 IACBP**

The month-long program provides many opportunities for interaction and further discussion between the faculty program attendees, the faculty and staff at Carnegie Mellon University and the invited external speakers. A series of discussions between the SEI and Hampton University (Mr.  

---

1 © CERT and CERT Coordination Center are registered in the U.S. Patent and Trademark Office
Willis, Chairman of the Department of Computer Science) during the 2003 IACBP defined how to leverage the strengths of both organizations with the goal of promoting the inclusion of information assurance/information security topics and courses in the curricula of HBCU’s in Hampton’s region. Hampton University would be the prototype for the hub educational transition partner and its associated Regional Collaborative Cluster. On a complimentary note, discussions during the CCDW between Mr. Willis and Dr. Schou resulted in a commitment by Schou to offer an IA Workshop at Hampton University, including many of the materials he had covered at the IACBP, plus additional IA topics.

During its 2003 IACBP Course and Curriculum Development Week presentation, Hampton University described its goals to integrate information assurance and computer security topics into existing computer science courses and to create a number of elective courses which will serve as a minor in information assurance. In addition, Hampton University described a series of regional workshops and an IA symposium they planned to hold to further transition and share information and materials related to information assurance.

HAMPTON UNIVERSITY AND THE MID ATLANTIC REGIONAL COLLABORATIVE CLUSTER TO DATE

Materials, labs and tools from ISTS course received during the IACBP have been adapted and incorporated into the lab portion of CSC 395 Fundamentals of Information Security by Ms. Marietta Gittens, another Hampton University Department of Computer Science faculty member who attended the 2003 IACBP.

The first regional workshop, Information Assurance Workshop, sponsored by Hampton University and featuring Dr. Schou, was held on November 15, 2003 and was attended by 9 HBCU schools.

Dr. Schou workshop was attended by representatives of all three local HBCU’s and four Community colleges. It focused on the development of course material and the large database of information that can be found at the National Information Assurance Training and Education Center.

[Bob – Since I don’t have the list of the schools that attended, can you verify that my statement that they are all HBCU’s is correct and if not, correct it. Is there anything else you want to say about Corey’s Workshop?]

The SEI and Hampton University continued to work together to define the Mid-Atlantic Regional Collaborative Cluster and plan the kick-off IA symposium. The RCC was based on Hampton University’s and Willis’ existing relationships with Computer Science and Information Science Departments in HBCU’s and MSI’s within a half-day’s drive of Hampton. It encompasses 18 HBCU's/MSI's in 4 states and the District of Columbia.

[Bob – I’d like to include the graphic of the RCC – what do you think? And how should it be incorporated, if you are so inclined?]

IA SYMPOSIUM

The kick-off symposium, the 1st Annual Hampton University Information Assurance Symposium: Building Information Assurance Capacity and Improving Infrastructure at HBCU’s was held on February 28, 2004. In addition to Hampton University and the SEI, sponsors included the Advanced Networking for Minority Serving Institutions (ANMSI), the Institute for Infrastructure
and Information Assurance (IIA) at James Madison University, and the Association of Computer and Information Science Engineering Departments at Minority Institutions (ADMI). Registration was free.

The purpose of the symposium was threefold

- to provide an interface with governmental agencies and information assurance research institutions
- to provide a forum that will serve in the building of information assurance capacity and improving infrastructure at minority serving institutions
- to serve as a model for other regional workshops for minority serving institutions.

The one day symposium included

- Comments by Mr. Lawrence C. Hale, Deputy Director of the Department of Homeland Security, followed by a Q&A period
- Keynote address, “Computers Under Attack – What Can We Do?, by Mr. Richard Pethia, Director of the CERT® Centers at Carnegie Mellon University University's Software Engineering Institute
- Presentation, “Higher Education’s Role in National Efforts to Secure Cyberspace”, by Mr. Rodney Petersen, of EDUCAUSE:
- Luncheon address, “Development Principles for Secure Software”, by Mr. Watts S. Humphrey, founder of the Software Process Program at the SEI
- Presentation, “Developing Secure Software”, by Ms. Noopur Davis of the SEI
- Presentation, “Coding Flaws That Lead to Security Failures”, by Mr. Shawn Hernan of the CERT® Coordination Center at the SEI
- Presentation, “The Future of Security and Survivability Research”, by Dr. Thomas Longstaff, of the CERT® Research and Analysis Centers at the SEI

Faculty (including 6 department Chairs) and students from 14 universities in 7 states and the District of Columbia attended. Nine of the 18 HBCU’s in the Mid-Atlantic Regional Collaborative Cluster were represented, but a significant snowstorm to the south of Virginia prevented a number of registered attendees from coming. Two additional HBCU’s from outside the RCC attended as did three majority schools, two of which were co-sponsors.

The symposium proved successful, and a 2nd Annual Hampton IA Symposium is planned, tentatively scheduled for April 2, 2005.

[Bob, do you want to add any information about other IA-related workshops you have scheduled?] No

**FUTURE**

As additional IA courseware and materials become available, the SEI will transition that courseware and materials to Hampton University. Other SEI opportunities for faculty, e.g. the Software Architecture Educator’s Workshop, will be made available to Hampton University and through
them to other HBCU’s/MSI’s who already have an existing relationship with Hampton, such as those in the Regional Collaborative Cluster.

Hampton University will continue to co-sponsor the IA symposium, to offer IA-related workshops and work to sustain and improve its Regional Collaborative Cluster.

[Bob – feel free to change or add anything.] It’s fine.

CONCLUSIONS

Hampton University builds on its existing, trusted relationships with other computer/information science departments to share IA information with those other departments. These HBCU’s/MSI’s in relative proximity to Hampton form the regional collaborative cluster of schools, with Hampton University as its hub. The SEI views Hampton University as its educational transition partner, providing it with additional information security courseware, providing speakers in information assurance and software process for the symposium, and working with Hampton to establish and sustain a regional collaborative cluster of educational institutions which promote the inclusion and expansion of information security topics and courses in their curricula.

The work being done by Hampton University is a prototype for what the SEI hopes will be additional education transition partners and additional regional collaborative clusters to increase IA capacity.
BIBLIOGRAPHY

1. Anderson, Ross BOOK TITLE??