TOWSON
UNIVERSITY

Department of Computer and Information Sciences

Dr. Blair Taylor

Towson University

- 17,000 undergraduates
- 4000 graduate students
- Small class sizes
- More than 85% of freshman live on campus
- More than 60 majors

Department of Computer and Information Sciences

- 32 full-time faculty
- Over 45 undergraduate courses
- Over 20 twenty graduate courses
- serving approximately 800 undergraduate and graduate majors
- 8 smart classrooms
- 15 computer laboratories

Department of Computer and Information Sciences

- B.S. in Computer Science
- B.S. in Information Systems
- B.S. in Information Technology
- B.S. in Computer Science with a track in Computer Security
- B.S. in Computer Science with a combined major in Mathematics
  - Minors in Computer Science,
- B.S. in Information Systems with a combined major in Business Administration
- B.S. in Information Systems with a combined major in E-business
  - Minors in Information Systems,

Department of Computer and Information Sciences

- Master of Science in Computer Science with tracks in Software Engineering, Computer Security and E-Commence,
- Doctorate of Science in Information Technology

Security

- CAE - Center of Academic Excellence in Information Assurance Education by the National Security Agency and the Department of Homeland Security since 2002.
- Security Track in Computer Science
- Security Track in IT (Under development)
- Cybersecurity Competitions
- Security Projects

Building Security In:
Injecting Security throughout the Undergraduate Computing Curriculum

Participants: Blair Taylor (Towson University), Siddharth Kaza (TU), Claude Turner (Bowie State University), Shiva Azadegan (TU), Mike O'Leary (TU)
Presenter: Sagar Raina , Hui Liu
http://triton.towson.edu/~cssecinj

PROBLEM STATEMENT

- With the advent of 2011, secure coding is more important than ever.
- Security education is a crucial component in addressing the current Cybersecurity crisis.
- Though universities have added security tracks and courses, the Computer Science (CS) community has been slow to incorporate secure coding in the *entire* curriculum.
- Training the next generation of computing professionals to build secure software will require an emphasis on teaching computer security foundations, principles, and skills.
- If students are to learn these skills (as opposed to insecure bad habits), security can no longer be an *afterthought*, but instead must be seamlessly integrated in undergraduate computing education, beginning with the *first courses*.

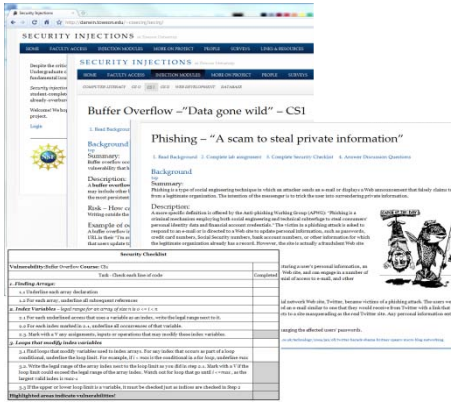
OUR PROJECT
Security Injections @ Towson

- Security Injection Modules
- Early and Often
- Introductory Courses – CS0, CS1, CS2, and Computer Literacy
- Faculty Workshops
- Security Checklists
- Rigorous Assessment
- Five institutions (2 universities and 3 community colleges)

EXPECTED OUTCOMES

1. Increase number of security aware students
2. Increase students' security awareness
3. Increase students' ability to apply secure coding principles
4. Increase faculty security awareness

SECURITY INJECTION MODULES



DATA AND MEASURMENT

- Pre and Post Surveys
- Applied Code Checks
  - Find + Identify + Mitigate
- Faculty Surveys
- Split sections

STUDENT AWARENESS SURVEY

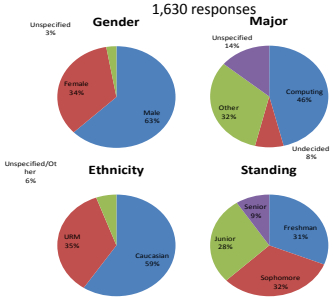
Table 1. Sample Survey questions from CS0, CS1, and CS2

General Security Awareness
What are the possible consequences of insufficient computer security?
Phishing is …
The conversion of data into a ciphertext that cannot be easily understood by unauthorized people is known as …
When developing secure systems, where does security fit in?
Which of the following is an example of a strong password?
How interested are you in security …
Secure Coding
Invalid input can come from the …
Which of the following should your well-designed program do before processing user input?
When developing secure systems, where does security fit in?
Security Software and Software Security are the same thing (true/false)
Integer overflow is caused by …
Integer overflow occurs …

RESULTS -1

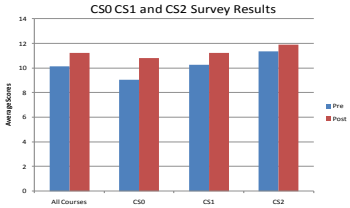
Increased number of security aware students.

1,630 responses



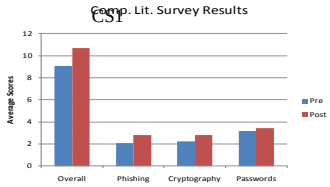
RESULTS -2

Increased students security awareness



Significant

- 1,026 survey responses, 40+ sections, 5 institutions
- Significant increase in all courses, CS0 and CS1



Significant
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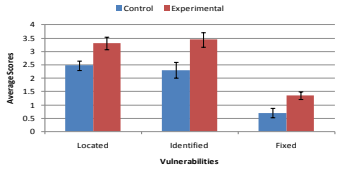
- 384 survey responses, 4 institutions
- Significant increase in all modules in comp. lit.

RESULTS - 3

Increased student ability to apply secure coding principles



- In four sections of CS0 and CS1 students using the modules are significantly better at Finding, Identifying, and Mitigating vulnerabilities

RESULTS - 4

Increase faculty security awareness

Institutions	5
Workshop attendees	55+
Participating faculty	38 (integrated and control)

KEY FINDINGS

- Our project increased number of security aware students across five institutions
- Security injection modules significantly improved students' security awareness
- Modules lead to increase in students' ability to apply secure coding principles
- Our project reached a number of faculty across five institutions
- The collaborative model for module development is effective.

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