From Computer Science Degrees to Information Technology (IT) Careers

Challenges When Integrating Computer Science Undergrads Into DOD IT Workforce

Naval Postgraduate School and Hartnell College Collaborative Partnership

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Our Goal
Prepare Students for the IT Industry
Help us Innovate
Overview

• The Naval Postgraduate School (NPS) Mission

• Our Need: Educated and trained personnel in computer science fields for government and the Department of Defense (DoD).

• Challenge: Meeting the needs with the local labor pool. Outsourcing not an option.
Overview

- Our Solution: “Socializing” the student and imparting institutional knowledge.
- The Intern Story
- Our Success/Results and Lessons Learned
- Can we apply our concepts to other schools and situations?
Naval Postgraduate School
NPS Mission

• Education (post graduate) of mid-level officers and Defense Department military research.
• Purpose is to fill billets (jobs) that require a post-graduate degree.
• Through education and research increase the combat effectiveness of the Naval Services, other Armed Forces of the U.S. and our partners, to enhance our national security.
Naval Postgraduate Alumni

- Over 50,000 Graduates
  - Representing all U.S. Military Services and many government agencies
  - 5,180 Officers from 102 countries
  - 33 Astronauts
  - 16% of U.S. Navy active-duty Flag Officers
  - About 28,300 Non-Degree Participants annually (includes Regional Security Education Program (RSEP))
    - Resident and Nonresident

ADM Mike Mullen
Chairman, Joint Chiefs of Staff

GEN Michael Hagee
Former Commandant U.S. Marine Corps

King Abdullah of Jordan

James G. Roche
Former Secretary of the Air Force
Core Characteristics

- Integrated
- Systems-Oriented
- Flexible
- Partnered for Strength

2 Institutes

The Cebrowski Institute
For Innovation and Information Superiority

The MOVES Institute
Modeling, Virtual Environments, and Simulation

4 Schools

Graduate School of Engineering and Applied Science

Graduate School of Operational and Information Sciences

Graduate School of Business and Public Policy

School of International Graduate Studies

Institutes provide opportunities for interdisciplinary focus
Where We Are
Our Team

Hartnell

Cebrowski

Students

Faculty
Student Support

- Science and Math Institute
- MESA Program
- STEM Internship Preparation Course
- Annual STEM Internship Symposium

Grant Support

- NASA CIPA
- CSF STEP
- NSF ATE
- Dept of Ed HSI
- STEM Title V

Paid internships for 275 students at over 20 institutions

Over 82 interns placed at NPS since 2006
World class research faculty at NPS guide interns on non-sensitive/non-classified projects during each summer. Research areas have included:

- Computer Security
- Space Systems
- Renewable Energy
- Humanitarian Assistance and Disaster Response
- Modeling virtual environments
At Hartnell College

SUCCESS

2007 – 2010 3C Alumni Rates

Graduated/transferred from Hartnell

46%

Currently in 4 year university working towards a STEM degree

42%

Have earned BS in STEM degree
currently in a Masters program or the work force

12%

At Hartnell College
Andrew’s Story
Faculty

- Hartnell
- Students
- Faculty
- Cebrowski
Distributed Information Science and Experimentation (DISE)

NPS Faculty

• Tony Kendall
  (Information Sciences)

• Arijit Das
  (Computer Sciences)
DISE Mission

- Within the Information Sciences Department
- A “Consumer Reports”—Trusted Agent
- The process of experimentation (preparation, execution, reporting) includes collaboration and exchange of documents in a web workspace.
- Seen as a source for solutions and innovation in Knowledge Management
Knowledge Flow

Knowledge (actionable)

Reports

Decisions

Analytics

Portal
KM Portal
Collaboration

Beehive
Collaboration

Beehive
Our Goals
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Support

Computer Science → Faculty Involvement → Information Technology

Support
Needs

• Versatile young people in the fields of computer science.
• We must innovate and create to stay competitive.
• Work in three enclaves: unclassified, secret and top secret with minimum IA work.
• Limited resources: small team of IT personnel and faculty
HR Challenges

• Limited Resources
  • Compete with Silicon Valley – 1 hour away
  • U.S. Citizen – outsourcing option limited

• Monterey/Santa Cruz/San Benito County Labor Pool
  • 48% Hispanic
  • 4.7% Hispanic in computing and math workforce
  • 49% Women
  • 23.8% Women in computing and math workforce
The Solution (the process)
The Faculty Perspective

- Integrate the student socially and collaboratively
- Educate and respect
  - Students are not always gofers
  - Share your knowledge but don’t overwhelm
  - Provide scaffolding and incrementally add responsibilities.
- Trust and Risk
The Solution (the process)
The Faculty Perspective

• Mistakes = learning opportunities but minimize risk
• Schedule time to learn
  • One time to learn
  • Allow to take some courses
• Need to be “socialized” while still free thinkers
• Internalize behaviors and values
Elements of Organizational Culture

- Practices
- Norms
- Values

Research/Learning

• Have test servers and use prototyping approach
• Understand risk
• It’s about collaboration. No lone wolves
• Be professional
• Understand production
• Innovation versus practicality
• Return on investment: it’s about the mission
Lessons Learned

• Document
• Meet with students every day if possible.
• Know your students
• Every day is a teaching and a learning day for both the faculty and student.
• Don’t assume students understand all of “your world.” Be reflective.
Our Success

• 4 interns now employed by us
  • Published and conference attendance
• 3 working on Computer Science masters at NPS
• 1 finishing Computer Science undergraduate degree at NPS
• Classified clearances – 1 with Top Secret
• Bright future (IT or Academic—CS)
• Able to spend more time on innovation.
Discussion

• Could our method be used in other schools?
  • Similarities?
  • Differences?

• What other things can you do to either develop talent or deal with scarce resources?

• What are your stories?
Questions?