

Evolution of a Computer Science Program toward Globalized Technological Education

Edward J. Wilkens
Mikhail S. Brikman

Computer Science Department
Salem State College
Salem, Massachusetts, USA

Why Bother with Globalization?

Undergraduates

Salem State	~5000
Computer Science	~150

International Undergraduates

Salem State	265
Computer Science	36

Computer Science Graduates

2004

Total	15
International (+permanent residents)	9
Countries Represented	9
Total Highest Honors	3
International	1
Total High Honors	5
International	5
Total Honors	3
International	3

Why Computer Science at Salem State?

- SSC's Center for International Education uses placement agencies
 - ◆ Japan Study Abroad Center
 - ◆ National Collegiate Institute (Japan)
 - ◆ KAJU Overseas Educational Center (Korea)
 - ◆ Aspect (Europe)
- Cost is a big factor, just as for American students

International vs. Local Students

International students often have

- stronger Math and Science skills
 - ◆ Necessity to spend class time on simple math / science examples for local students bothers some international students
- little or no prior access to computer technology
 - ◆ Open labs are intimidating for some
 - ◆ Increased use of Closed Labs helps solve
- experienced different educational systems
 - ◆ More rigid path through pre-chosen major
 - ◆ Fixed schedule for all with the same major
 - ◆ Very different grading systems
 - ◆ All these are a problem for advisors

Early Steps

- Large percentages chose "practical" majors like business and computer science on admission
 - ◆ Many initial CS majors quickly transfer to MIS
- Possible causes of major change
 - ◆ Difficulty with simultaneous ESL and CS1 courses
 - ◆ Late arrival, yielding poor choice of first courses
- Use of Preprogramming course
 - ◆ The original intent of this course was to provide problem solving skills in a simple programming environment to prepare for CS1.
 - ◆ Schedule around the time consuming ESL courses to make sure it is available to new International students

Multicultural Opportunities

- In previous experiences, international students were large groups from a few countries.
- Salem State has a broad range of countries, especially in those choosing computer science.

Origins of CS International and Permanent Resident Students at SSC

Albania	Cyprus	Columbia	Afghanistan	Cape Verde	Cambodia
Bosnia	Greece	Dominican Republic	Israel	Kenya	China
Lithuania	Italy	Ecuador	Morocco	Nigeria	India
Romania	Netherlands	Haiti	Pakistan	Senegal	Korea
Russia	Sweden	Venezuela	Syria		Nepal
Serbia					Vietnam
Ukraine					

Team Composition in Human Computer Interface Course

Spring 2003					Spring 2004			
Albania	US	Cambodia	Cyprus	Kenya	Japan	Greece	Albania	
Dominican Rep.	US	Kenya	US	Pakistan	US	Morocco	China	US
Ecuador	US	US	US	US	US	Palestine	Kenya	US
Nigeria				US		Syria	Vietnam	

Home Country Interaction

- Summer visits home:
 - ◆ Kenya – quick return visa approval
 - ★ Consulted about Kenyan oriented senior project
 - ◆ Morocco – one semester delay
 - ★ Summer job, no exit notification
 - ◆ Palestine – two semester delay
 - ◆ Pakistan – no renewal
 - ★ five year student visa expired
 - ★ Transferred two courses from a Karachi university

Capstone Project and Internship Definition

- Current – informal by student or supervisor
- Proposed - externally supportive: website based
 - ◆ invitation to propose projects
 - ◆ descriptions of departmental interest
 - ◆ student resumes for specific country and local internships
 - ◆ internship descriptions
- Proposed - departmental relationships with a few countries of origin
 - ◆ Japan and Kenya have more than 70 SSC undergraduates each, and Albania more than 20

Curriculum Issues

- Internationalization and Localization are required by Curriculum 2001, the definition of required Bodies of Knowledge for accreditation
- A large body of international students adds additional relevance and immediacy to these topics
 - ◆ Both local and international students will learn what is expected of exported software and interfaces
 - ◆ Cultural differences and other issues may be knowledgably discussed

Comments in Class

- So what *is* an American job?
- If a person who speaks many languages is multilingual, and one who speaks two languages is bilingual, what is a person who speaks one language?
- American!

Course Topics for Globalization

- Internationalization
 - ◆ Identification and isolation of culturally specific parts
- Localization
 - ◆ Creation of culturally specific instances of the isolated parts
- Courses
 - ◆ Software Engineering
 - ◆ Human Computer Interfaces
 - ◆ Database
 - ◆ Social and Professional Issues

Components

- Some culturally specific parts:
 - ◆ GUI
 - ◆ Text
 - ◆ Numbers
 - ◆ Currency
 - ◆ Dates
 - ◆ Images
 - ◆ Color usage

- Multiple languages create multiple localizations

- Common use of English for most technological applications may lead to a single localization
 - ◆ Care must be taken to isolate other cultural issues even under a single language

Tools

- Java Unicode base
- Design Patterns to implement localization
 - ◆ e.g. Abstract Factory and Strategy
- Localization of icons and sounds
- Dialog, menus, and message boxes
 - ◆ room for expansion with message size
 - ◆ Configuration or properties files to hold the localizations
- Dates should use names of months to avoid format confusion
 - ◆ This arises in our classes as well, with so many countries represented