Collaborative Opportunities with ITTC

Improving the Quality of Software Engineering and Management for Kansas City Metro Industries

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Presentation Organization

- Teaching Interests/Program Development Goals
- Research Interests

Collaboration is Essential

- Studies have shown that information-intensive industries are a major component of the area economy and will become increasingly important because of the role they play in providing the community the greatest potential for future economic growth and development
- Studies have further indicated that the enhancement of the education and research infrastructure related to information technology is one of the keys in achieving this growth and have recommended the establishment of educational and business consortia to support the technological needs of the area's information-intensive industries
- The EECS department has deep interests to be a partner in such consortia and to establish cooperative and collaborative frameworks for providing quality education as well as research expertise

Demand for Quality Education in Software Technology

- The demand for software professionals is very high and is expected to continue for many years to come

  A *New York Times* article (January 3, 1998) predicted that in 2006, a million additional professionals would be needed in the U.S. than present in 1996

- Kansas City metroplex is no exception; there are many software-intensive corporations that need well-educated expertise in software (and computing) technology

Our Goal and Commitments

- Establish a "professional" graduate program in software engineering

  We characterize the program as "professional" since it is targeted to experienced software developers as well as managers working in industry

- Regularly offer a variety of evening courses at the Edwards campus

- Maintain a permanent presence and point of contact

Professional Graduate Program in Software Engineering

- Project-intensive, team-oriented courses
- Emphasis on professionalism
- Modern concepts and proven practices
- Integrate theory with practical applications
- Emphasis on both technical and managerial aspects

Professional Graduate Program in Software Engineering (continued)

- Models and Methods of Software Development
- Managing Software Projects
- Architecture of Software Systems
- Requirements Engineering and Management
- (Distributed) Object Technology
- Quality Assurance and Testing
- Supporting Courses (e.g., Database Systems, Computer Networks)

Research Philosophy

- Positively advertise home institution and increase its standing among its peers; establish groundwork for collaboration across administrative boundaries of the institution and enhance its chances for obtaining external funding
- Industrial collaboration: tackle real problems — there are great opportunities for applied software engineering research

Research Interests

- Engineering quality software
- Quality
  - A key issue in the field of software engineering
  - Popular view: difficult to define and measure
  - Professional view: quantifiable, controllable, manageable, improvable
  - A definition: "conformance to requirements"

    P. Crosby, *Quality is Free: The Art of Making Quality Certain,* McGraw-Hill, 1979

Conformance to Requirements: Implications

- During the production process, measurements must continually be taken to determine conformance to the those requirements:
  - *measurement model*
  - *project tracking and oversight*
  - *validation criteria*
  - *quality assurance system*
  - *Plans, commitment to improvement*

  } Managerial aspects

- The use of process models is encouraged

Process Management Principles

- The quality of a product is largely determined by the quality of the process used to build it
- By extension, the quality of a software product is largely determined by the quality of the software process used for developing and maintaining it
- *To improve the quality of a software product, the process for producing it must improved*
- To improve a software process, a *software process improvement (SPI)* model is needed
- There are a number of such models: CMM, SPICE, PSP, ISO9000-3

An Evaluative Framework for SPI Models

- Which model to select?
  - Suitability to business needs
  - Effectiveness of the model
  - Costs and benefits
  - Scope and duration
  - Structure and evolution
- Research Goal: develop, define, and apply a framework (i.e., a portfolio of attributes) for the evaluation, selection, and application of SPI models

Research Status Report

- Research initiated in 1998
- "An Evaluative Framework for Software Process Improvement Models," *Journal of Systems and Software*, July 1999.
- Application of the framework to the existing SPI models (in progress)
- Two related research topics:
  - Development of a scaled-down SPI model for small organizations
  - Integration of the metrics and measurement into the improvement process

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- Entertain questions