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## Vision

To offer curricula with a computational thread that produce graduates who are competent and proficient in computational tools and skills and prepared to lead and succeed in the 21st century

## Goals

- Develop a faculty learning community through a regular seminar series and faculty fellows development
- Engage industry to provide guidance to the development of computational thinking within engineering
- Integrate computing into curricula and conduct classroom-based action research
- Disseminate findings and strategies to the engineering education community

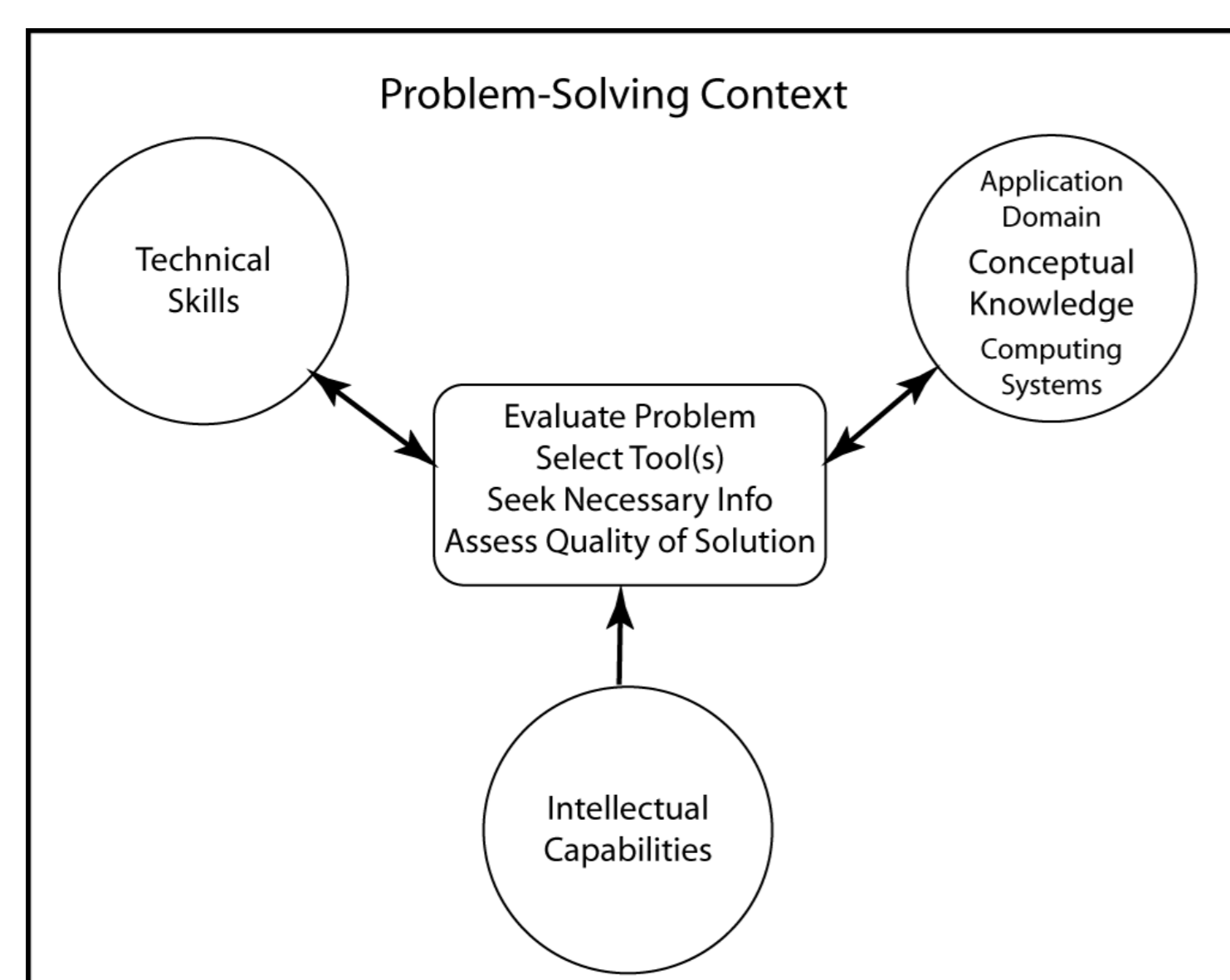


## Initiatives

- Reviewed the literature pertaining to computer literacy and developed a framework of computational capabilities
- Developed and held an industry workshop
- Employed the Delphi method to obtain feedback from industry partners regarding their expectations of new hires with respect to computing skills
- Carried out community pilot activities during the Spring 2008 semester and explored the use of action research
- Created and implemented a biweekly faculty seminar series focused on incorporating computational thinking into existing undergraduate courses

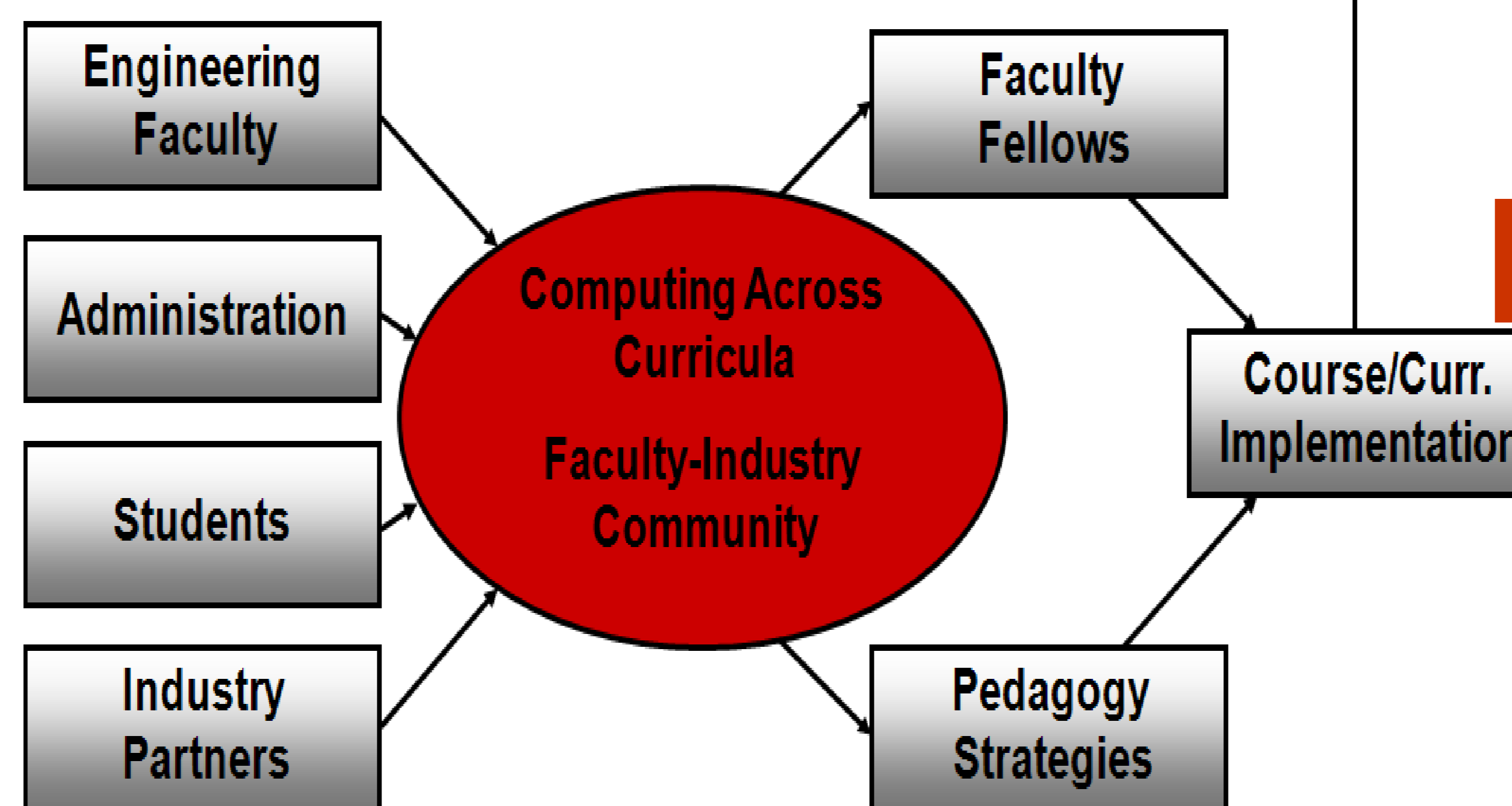
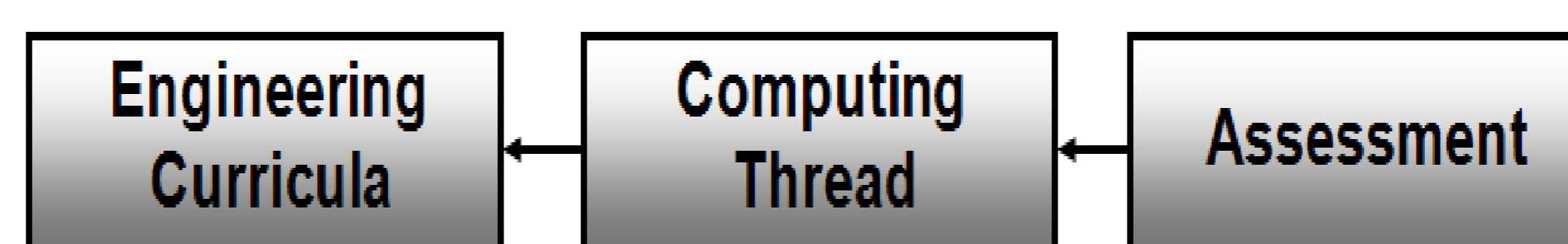
## Model of Computational Capabilities

- Competency
- Proficiency
- Fluency



## Industry Workshop

New hires	After first year	Next few years
Specific applications (domain knowledge)	Technological tools	Architecture & technology skills
Problem solving skills (critical thinking)	Systems knowledge	Soft skills (global issues)
Communication skills	Self-motivated innovation	Accountability
Knowledge of a programming language	Understanding business needs (value proposition)	Data exploration
Database management skills	Data reporting	



## Feedback from Industry Leaders

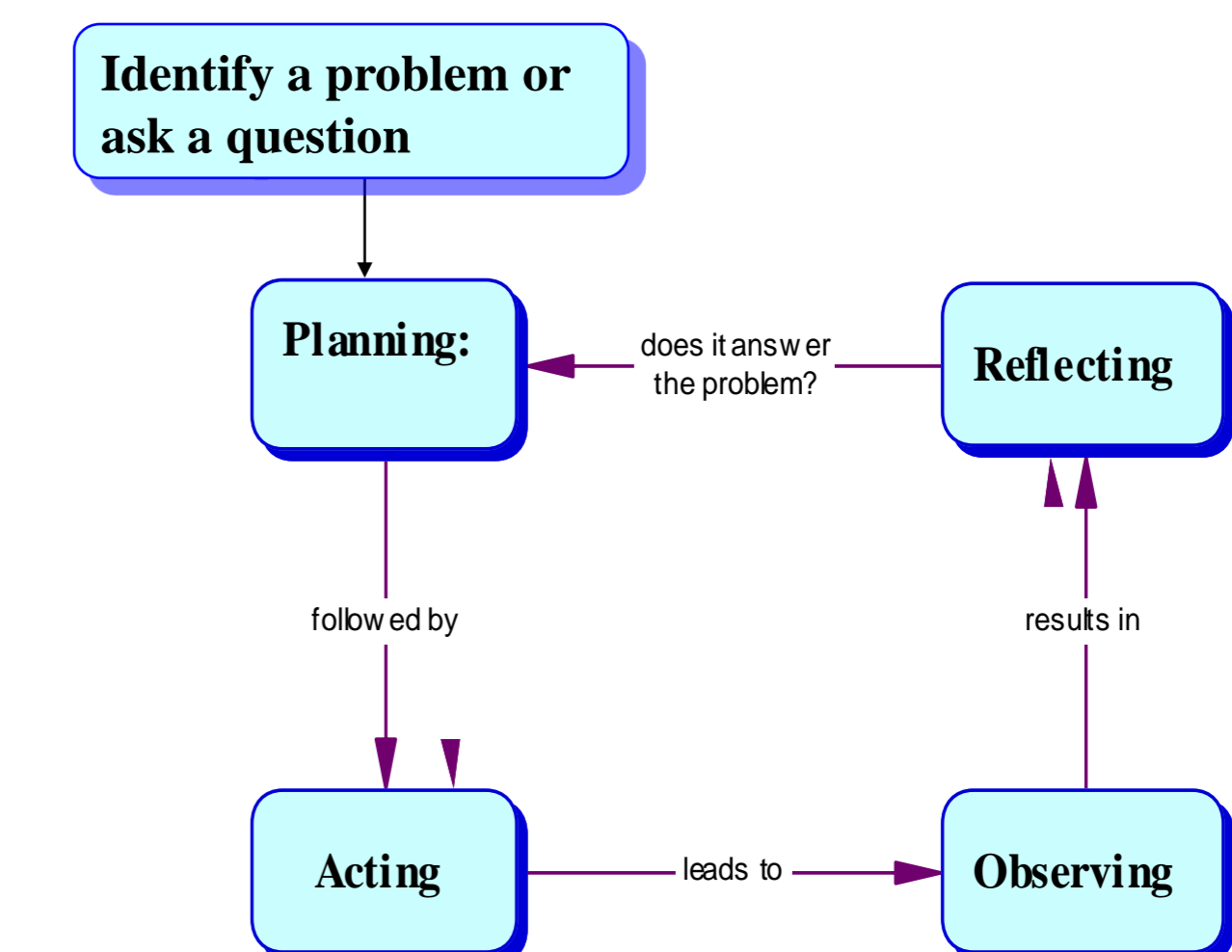
### Survey questions\_1st survey

- What computing competencies are required for new technical hires at your company?
- What computing proficiencies do you expect your technical employees to develop during their first few years on the job?
- What new computing skills and processes do you see emerging in the next couple of years in your field?
- Once fluent, what types of problems do you expect your technical employees (with 3-5 years of experience) to solve using computing tools?
- Once fluent, what types of projects do you expect your technical employees (with 3-5 years of experience) to design using computing tools?
- What computing capabilities do you expect technical employees to use to be successful in a global work environment?

### Delphi process

- Recruit Participants:** Focus on those who have expertise in the area
- Design 1st Survey:** Generate open-ended questions about the area of interest
- Content Analysis:** Tally like responses and themes to generate a comprehensive list.
- Design 2nd Survey:** Ask respondents to rate these on 4 or 5 point Likert scale.
- Analysis:** Report means/medians, and standard deviations
- Re-rank the criteria:** If necessary, repeat the ranking process among the panelists until the results stabilize.
- Report/Discuss:** Report consensus items, but engage key audience in discussion

## Community Pilot Activities



Raubenheimer, C. D. & Myka, J.L. (2005). Using action research to improve college science courses.



## Faculty Seminar

- Utilizing student owned computing – Successes and pitfalls  
Jeff Joines, TE
- Moving computer work out of real-time  
Ted Branoff, Eric Wiebe, CED
- Computation in introductory Physics  
Bruce Sherwood, Physics
- The use of Pair Programming in the Classroom  
Laurie Williams, CS
- Computer games as instructional contexts  
Michael Young, CS

## Successes & Challenges

- Engaged industry to provide guidance to the development of computational thinking within engineering
- The faculty seminar series attracted interest faculty beyond the College of Engineering
- Attracting and sustain industry participation in our community has been a challenge

## Future Plans

- Develop the 2nd Delphi survey to gather consensus among industry leaders in an effort to identify critical computational skills for engineering professionals
- Attract and sustain faculty interest in the faculty seminar series
- Host a poster session and/or some form of dissemination of information to the faculty community
- Attract and sustain industry participation in our community
- Conduct a quasi-experimental study to evaluate the impacts of this project on community participants and student learning