

Introduction to Research

CSE 118

9/30/2011

The research university

- Boyer report
 - Undergraduate education at research universities
- Problem
 - Research is separate from teaching
 - Passive learning
- Proposed solution
 - Inquiry-based learning (research)
 - Collaborative experience
 - Practice in communication (writing, speaking)

More from the Boyer Report

- Common goals
 - Investigation
 - Discovery
 - Creativity
- Skills to develop
 - Problem-solving, logical thinking
 - Communication (writing, speaking)
 - Goals: clarity, brevity
 - Convey results to all levels
 - Collaboration
 - Teamwork
 - Diverse, interdisciplinary perspectives

Research

Research is “*the search for knowledge*” (Wikipedia)

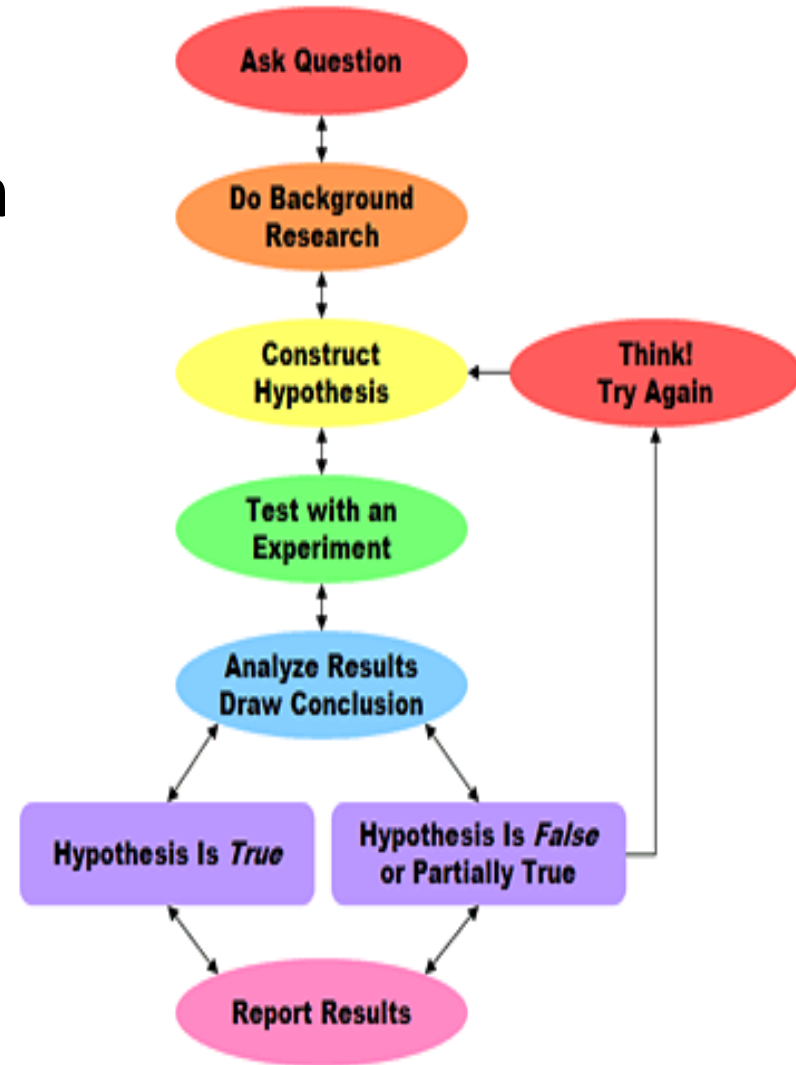
A systematic investigation to:

- Discover (explore, observe)
- Solve problems
- Develop theories

Scientific research relies on the scientific method

Scientific method

- Ask question (problem)
- Gather background information
 - Cite prior work
 - Don't repeat mistakes
- Construct hypothesis (solution)
- Test hypothesis
 - Design, perform experiment
 - Collect data (qual, quant)
- Analyze data, draw conclusions
- Report results



Research tips

- Build on existing knowledge
- Get feedback from peers
- Fail early, fail often
 - Learn from analyzing failure then try again
 - Rapid prototyping
- “Always deliverable” (XP)
 - Develop incrementally
- Urgent v. important

	URGENT	Not urgent
IMPORTANT	Urgent and important	Important but not urgent
Not important	Urgent but not important	Not urgent and not important

CSE 118 projects

- Groups
 - 2-4 people
 - Interdisciplinary teams encouraged
- Empirical (experimental)
- Some examples
 - Build prototype, evaluate system's performance
 - Build prototype, evaluate users' experiences
 - Observe current practices, inform future design

Required components

- **Proposal** (30% of project grade = 15% of course grade)
 - Draft milestones
 - Written proposal (1-3 pages, including bib.)
 - Short in-class presentation
- **Final presentation** (70% of project grade = 35% of course grade)
 - The project and its results
 - Longer in-class presentation
 - Peer assessments

Week 1 (suggested) Wednesday, 9/28	Form groups	
Week 3 Wednesday, 10/12	Motivation and claim (draft)	Turn in written draft
Week 4 Wednesday, 10/19	Related work and bibliography (draft)	Turn in written draft
Week 5 Wednesday, 10/26	Research questions(s) and solution approach (draft)	Turn in written draft
Week 6 Wednesday, 11/2	Proposal	Short presentation; turn in written proposal
Finals week Tuesday, Dec. 6, 11:30am-2:30pm	Final presentation	Extended presentation; turn in supporting materials and peer assessments

Resources, inspiration

- Class website, department website
- Department seminars
 - Ubicomp (Tuesday, 3:30pm, CSE 3119) – Bill Griswold
 - DCOG (Wednesday, 10:30am) – Jim Hollan, Ed Hutchins
- Conference proceedings
 - Ubicomp, Pervasive, CHI, UIST, CSCW, MobileHCI
- Author websites
- Google scholar (scholar.google.com)
- ACM digital library (dl.acm.org)

Exercises

- Example project ideas?
- Introductions
 - Name, major, goals / plans
 - Project ideas and interests (general or specific)
 - Topics
 - Methods
 - Tools
- Brainstorming