Where do we want OR to go in Education and Vice Versa?

John R. Birge
The University of Chicago Graduate School of Business
Themes

• Most INFORMS members are involved in education
• Education trends can help OR education
• OR can help education in general
• Questions: Can we better apply OR tools to ourselves? (And, if so, why haven’t we done so?)
Traditional OR Education

• Focus on OR methodology
• Derivation/proof of validity-deductive learning/direct instruction
• Stylized small examples
• Presumed learning by repetition (e.g., manual simplex method, simulation modeling, application of queueing formulas)
• Traditional areas: deterministic (optimization) models, stochastic models, simulation models, (decision analytic models, production examples)
Newer Trends

- Ubiquitous use of spreadsheets
- Direct instruction for software tools (not methods)
- Inductive learning/constructivism approach to examples
- Practical (-like) examples and cases
- Increasing view of what the learner needs to do
Results?

• How to view effectiveness?
  – Enrollments
  – Evaluations
  – Learning?
How to measure it? How to measure its value?
What should our objective be?
How do we help students continue to learn?
Some Results on Learning

- Practical contexts and associations increase learning and retention
- Use and reinforcement soon after introduction of concepts leads to greater retention
- Simple concept reinforcement preceding details increases learning
- Perceived need and relevance increases learning
- Engagement with simulated environments produces superior learning outcomes
Use of Concepts in OR Learning

- Re-structuring of classroom use toward active/cooperative learning
- Simulations of practical OR situations
- Understanding of the key concepts and skills needed by students
- Process of measurement and feedback
OR Role in Education

• Model of learning
  – Objectives
  – States
  – Actions

• Customization capabilities
  – Focus exercises/tasks/learning resources to optimize learning
  – Develop dynamic simulations targeted to individual and group learning
Conclusions

• OR education has changed to be more responsive to student needs
• Ongoing needs to understand the learning needs of students and to measure outcomes
• New potential for uses of education tools
• Opportunities for OR to play a greater role in advancing education