You Want Them To Remember? Then Make It Memorable!

James J. Cochran
Bank of Ruston Endowed Research Professor
Louisiana Tech University
jcochran@cab.latech.edu

EURO 2010 Conference
Lisbon, Portugal
Wednesday, July 28, 2010
MY BACKGROUND?

• BSEC, BSBA, MSEC, MBA, PhD (Statistics & Operations Research)
• Endowed Research Professor of QA
• Two-term President of INFORM-ED
• Director of INFORMS/IFORS International Education Initiative
• Editor-in-Chief of INFORMS Transactions on Education
• Editor-in-Chief of Wiley Encyclopedia of Operations Research and Management Science
• Taught since 23 years old -100+ sections, 18 preps, 8000+ students, six universities
• Have never taken an education course
MY JOB?

Create, promote, and foster human dignity (my definition)

Teach scheduled classes and maintain reasonable (?) office hours, perform the necessary service, and publish as much as possible in the highest quality journals possible (guess who’s definition…)
MY GOALS FOR EDUCATION?

• Promote deep comprehension/understanding
• Encourage long-term retention
• Develop critical thinking & problem solving skills
• Encourage independent thought and intellectual self-reliance
• Enhance self-confidence
• Improve society
MY GOALS FOR ORMS?

- Solve interesting, relevant, important problems
- Extend the discipline
- Find/develop enthusiastic, bright, and creative students to encourage (i.e., mobilize ORMS)
- Demonstrate the value of ORMS to colleagues, students, decision makers, and general public (i.e., ennobilize ORMS)
In order for this strategy to be effective, this must

- be taught from a liberal perspective
- evolve from a partnership of academia, government, industry, and public service oriented organizations
Reinforcement is critical – make the most of opportunities to revisit and re-emphasize important points.
Most students will not be clever unless you give them permission to be clever (the scholastic risk and reward system discourages cleverness)
LET ME READ YOUR MIND........

ITS ALL VERY SIMPLE - JUST PICK ONE CARD FROM THE SIX PROVIDED BELOW AND MEMORIZE THE CARD YOU HAVE SELECTED.

I WILL NOW IDENTIFY THE CARD YOU HAVE SELECTED, BUT YOU NEED TO GIVE ME A LITTLE TELEPATHIC ASSISTANCE. NOW FOCUS INTENTLY FOR FIFTEEN SECONDS ON THE CARD YOU HAVE SELECTED.
I HAVE READ YOUR MIND........

AND I HAVE REMOVED YOUR CARD FROM THE DISPLAY!

WOW!

EURO 2010 Lisbon, Wednesday, July 28, 2010
Most of my students don’t learn the same way I learn.
A SIMPLE MAGIC TRICK

1. Pick a natural number and write it on a sheet of paper
2. Show the audience – but do not show me
3. Write the next largest natural number on the same sheet of paper
4. Square each of these numbers and write these values on the same sheet of paper
5. Write down the difference between the larger and the smaller of these squares and tell me this value
6. Fold the sheet of paper and place it in my coat pocket
7. Concentrate on the original natural number you selected
A SIMPLE MAGIC TRICK

1. Pick a natural number \( x \in \mathbb{N} \)
2. Show the audience – but do not show me
3. Write the next largest natural number \( x + 1 \in \mathbb{N} \)
4. Square each of these numbers number \( x^2, (x + 1)^2 \in \mathbb{N} \)
5. \( (x + 1)^2 - x^2 = (x^2 + 2x + 1) - x^2 = 2x + 1 \)
6. \( x = [(2x + 1) - 1]/2 \), i.e., I
   • Subtracted 1 from the value you gave me
   • Divided this result by 2
7. Why ask you to fold the sheet of paper and place it in my coat pocket, then concentrate on the original natural number you selected? Subterfuge!!
I don’t have to teach the same way I was taught.
### A SIMPLE CARD TRICK

Pick a card...

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>J</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>K</td>
<td>Q</td>
<td>J</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>Q</td>
<td>6</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

In which column is your card?

EURO 2010 Lisbon, Wednesday, July 28, 2010
A SIMPLE CARD TRICK

In which column is your card now?

EURO 2010 Lisbon, Wednesday, July 28, 2010
A SIMPLE CARD TRICK

45 rows & 54 columns

EURO 2010 Lisbon, Wednesday, July 28, 2010
- EPIPHANY NUMBER 5 -

Doers are Learners

and

Learners are Doers
A SIMPLE IN-CLASS MODELING LAB

Student teams are given zip-top baggies containing several pieces of Legos™ interlocking toys – they are instructed to:

1. Remove the Legos™ from their team’s zip-top baggie

2. Build the optimal number of chairs and tables from these Legos™

How do we build a chair or table from these Legos™?

1. You have 8 small (2x2) Legos™
2. You have 6 large (2x4) Legos™
A SIMPLE IN-CLASS MODELING LAB

3. A table is built from 2 small (2x2) Legos™ and 2 large (2x4) Legos™

4. A chair is built from 2 small (2x2) Legos™ and 1 large (2x4) Leggo™
A SIMPLE IN-CLASS MODELING LAB

So if we let $X = \# \text{ of tables produced}$

$Y = \# \text{ of chairs produced}$

$2X + 2Y \leq 8 \left( \text{number of small Leggos}^{\text{TM}} \text{ available} \right)$

$2X + Y \leq 6 \left( \text{number of large Leggos}^{\text{TM}} \text{ available} \right)$
A SIMPLE IN-CLASS MODELING LAB

If we recognize we cannot produce a negative number of tables or chairs, the region of feasible solutions is:

2X + Y ≤ 6 (number of large Leggos™ available)

2X + 2Y ≤ 8 (number of small Leggos™ available)
A SIMPLE IN-CLASS MODELING LAB

How do we compare/evaluate solutions?

1. Tables sell for $32.00

2. Chairs sell for $21.00

3. Small (2x2) Legos™ cost $3.00 each

4. Large (2x4) Legos™ cost $5.00 each
A SIMPLE IN-CLASS MODELING LAB

So

- profit per table is
  \[ \$32.00 - 2(\$5.00) - 2(\$3.00) = \$16.00 \]

- profit per chair is
  \[ \$21.00 - 1(\$5.00) - 2(\$3.00) = \$10.00 \]

...so our objective function is

maximize \$16.00X + \$10.00Y
A SIMPLE IN-CLASS MODELING LAB

…and the LP formulation is

Max $16X + 10Y$

s.t. $2X + 2Y \leq 8 \left( \text{number of small Legos}^{\text{TM}} \text{ available} \right)$

$2X + Y \leq 6 \left( \text{number of large Legos}^{\text{TM}} \text{ available} \right)$

$X, Y \geq 0 \left( \text{nonnegativity} \right)$
A SIMPLE IN-CLASS MODELING LAB

Profit is increasing as we parallel shift the objective function away from the origin.

The optimal point is 2 tables, 2 chairs, profit of $52.00.
Now stress the geometry of the problem through the *Fundamental Theorem of Linear Programming* - the optimal point must lie on at least one extreme point.
A SIMPLE IN-CLASS MODELING LAB

Do we have any Legos left over?

• We originally had 8 2x2 Legos available
  • We used 4 to make our 2 chairs (2 per chair)
  • We used 4 to make our 2 tables (2 per table)

so we have no 2x2 Legos left over

• We originally had 6 2x4 Legos available
  • We used 2 to make our 2 chairs (1 per chair)
  • We used 4 to make our 2 tables (2 per table)

so we have no 2x4 Legos left over
A SIMPLE IN-CLASS MODELING LAB

Let’s extend the example – now suppose we obtain three additional 2x2 Legos.

The LP formulation is now:

Max $16X + 10Y$

s.t. $2X + 2Y \leq 11$ (number of small Legos™ available)
     $2X + Y \leq 6$ (number of large Legos™ available)
     $X, Y \geq 0$ (nonnegativity)
A SIMPLE IN-CLASS MODELING LAB

The new feasible region is:

\[ 2X + Y \leq 6 \] (number of large Legos available)

\[ 2X + 2Y \leq 11 \] (number of small Legos available)
Profit is still increasing as we parallel shift the objective function away from the origin.

The optimal point is 0.5 tables, 5 chairs, profit of $58.00.

This suggests the 3 additional 2x2 Legos were each worth $2 (why?)
A SIMPLE IN-CLASS MODELING LAB

By how much did the optimal solution change when we added the 3 2x2 Legos to the formulation?

• When we had 8 small (2x2) Legos and 6 large (2x4) Legos, the optimal solution of 2 tables and 2 chairs yielded a profit of $52.00

• When we had 11 small (2x2) Legos and 6 large (2x4) Legos, the optimal solution of 0.5 tables and 5 chairs yielded a profit of $58.00
A SIMPLE IN-CLASS MODELING LAB

Ask the students how the geometry changes if we limit our solution \((X,Y)\) to integer values.

What is the impact on the algebra of solution algorithms?
What changes if we limit our solution \((X, Y)\) to integer values?

Rounding our solution up from \((X, Y) = (0.5, 5)\) to \((X, Y) = (1, 5)\) yields a profit of $66 but is an infeasible solution.
What changes if we limit our solution \((X,Y)\) to integer values?

Rounding our solution down from \((X,Y) = (0.5, 5)\) to \((X,Y) = (0, 5)\) yields a feasible solution that generates a profit of $50 (inferior to a previous integer solution - 2 chairs, 2 tables, $52 profit).
A SIMPLE IN-CLASS MODELING LAB

What changes if we limit our solution \((X, Y)\) to integer values?

Parallel shifting the objective function yields an optimal integer solution of \((X, Y) = (1, 4)\) that generates $56 profit.

---

EURO 2010 Lisbon, Wednesday, July 28, 2010
A SIMPLE IN-CLASS MODELING LAB

How did we go from building 2 chairs and 2 tables (at $52 profit) to building 4 chairs and 1 table (at $56 profit)?

When we acquired 3 2x2 Legos we saw that

1. we couldn’t use them because we had no available 2x4 Legos
2. we could use these to make another table if we took the 2x4 Legos from two chairs
3. This results in $16 profit for the table and $20 loss for the 2 chairs (net loss = $4)
4. we could use these additional 2x2 Legos to make 2 additional chairs if we took the 4x4 Legos from a table
5. This results in $20 profit for the chairs and $16 loss for table (net gain = $4)

Thus our profit increased from $52 to $56 (and we have one unused 2x2 Lego and no unused 2x4 Legos)
A SIMPLE IN-CLASS MODELING LAB

Finally, have students note:

1. The solution to LP problems could be found by solving for each extreme point.

2. MP can be generalized to any number of dimensions/decision variables.

3. Rounding up or down from the optimal LP solution to satisfy integer restrictions may not be feasible or may not be optimal.

4. Excel™ includes a software (Solver) that can be used to solve these problems.
We don't need to make OR useful, interesting, and fun for students - we need to help students understand **why** OR is useful, interesting and fun.
The Primary Characters

*Peanut Butter & Company* – manufacturers of the new Dark Chocolate Dreams™, a spreadable blend of peanut butter and dark chocolate (www.ilovepeanutbutter.com or 1-800-ILOVEPB)

*Jiztuzgud, Ltd.* – a relatively successful manufacturer of knock-off products

*Leah Gumme* – Director of Product Engineering for Jiztuzgud, Ltd.

*Al Monde, Phil and Hazel Burt, Kay Sheu, Pauline Cann, Mac A. Damea, Wally Nutt, and Peter Stassio* – Jiztuzgud, Ltd.’s staff of product engineers

*Pete R. Pann and twins Skip and Jiffy Goober* – Product Engineering department interns
NUTS TO YOU:
THE GREAT PB CAPER

Background

Peanut Butter & Company introduces the new Dark Chocolate Dreams™, a spreadable blend of peanut butter and dark chocolate

Jiztuzgud, Ltd. decides to produce and market a similar product

Leah Gumme is assigned the task of developing this product
NUTS TO YOU:  
THE GREAT PB CAPER

Background

Ms. Gumme gives the project to her staff of product engineers (Al Monde, Hazel and Phil Burt, Kay Sheu, Pauline Cann, Mac A. Damea, Wally Nutt, and Peter Stazzio)

The product engineers Ms. Gumme send interns Pete R. Pann and twins Skip and Jiffy Goober to purchase jars of Dark Chocolate Dreams™ from local grocers

Ms. Gumme asks you (the student) to use the nutritional information from a label of Dark Chocolate Dreams™ to deduce the product’s recipe
NUTS TO YOU: THE GREAT PB CAPER

Case Issues

1. How does one formulate a mathematical programming model (i.e., a blending model) that will determine (reverse engineer) the appropriate mix of ingredients to replicate Dark Chocolate Dreams™?

2. Where does one obtain the additional information needed on the values of the model parameters?

3. How does one test the developed recipe?
# NUTS TO YOU: THE GREAT PB CAPER

## Relevant Information
(from the label Dark Chocolate Dreams™ and provided in the case)

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
<th>Amount/Serving</th>
<th>%DV *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size 2 Tbsp. (32g)</td>
<td>Calories 170</td>
<td></td>
</tr>
<tr>
<td>Calorie from Fat 110</td>
<td>Total Fat 13g</td>
<td>20 %</td>
</tr>
<tr>
<td></td>
<td>Saturated Fat 2.5g</td>
<td>13 %</td>
</tr>
<tr>
<td></td>
<td>Trans Fat 0g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cholesterol 0mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sodium 35mg</td>
<td>1 %</td>
</tr>
<tr>
<td></td>
<td>Total Carbohydrate 12g</td>
<td>4 %</td>
</tr>
<tr>
<td></td>
<td>Dietary Fiber 2g</td>
<td>6 %</td>
</tr>
<tr>
<td></td>
<td>Sugars 7g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protein 6g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitamin A</td>
<td>0 %</td>
</tr>
<tr>
<td></td>
<td>Vitamin C</td>
<td>0 %</td>
</tr>
<tr>
<td></td>
<td>Calcium</td>
<td>0 %</td>
</tr>
<tr>
<td></td>
<td>Iron</td>
<td>4 %</td>
</tr>
</tbody>
</table>

*Percent Daily Values (DV) are based on a 2,000 calorie diet.

**Ingredients:** peanuts, evaporated cane juice, cocoa, cocoa butter, organic palm oil, vanilla, lecithin (from soy) salt.
NUTS TO YOU:
THE GREAT PB CAPER

What other information will the students need to find?
What are the decision variables?
What is the overriding goal?
What are the limitations on this goal?
What is the objective function?
What are the constraints?
Formulation

- Decision Variables – how many grams (or ounces) of each ingredient (peanuts, evaporated cane juice, cocoa, cocoa butter, organic palm oil, vanilla, soy lecithin, salt) to replicate some amount of Dark Chocolate Dreams™
- Constraints – correspond to each nutrient (total calories, calories from fat, saturated fat, trans fat, cholesterol, sodium, total Carbohydrates, dietary fiber, sugars, protein, vitamins A & C, calcium, iron) in Dark Chocolate Dreams™
- Goal Programming - minimize constraint deviations
NUTS TO YOU: THE GREAT PB CAPER

The additional information needed on the values of the model parameters – nutritional information on the ingredients is available from

– product labels from individual ingredients
– http://www.calorie-count.com/
– http://www.nutritiondata.com/
Nutritional Information for PEANUTS - DRY ROASTED UNSALTED

Nutrition Facts

Serving Size 1 serving (28.0 g)

Amount Per Serving
Calories 160  Calories from Fat 126

% Daily Value*
Total Fat 14.0g  22%
Saturated Fat 2.0g  10%
Total Carbohydrates 6.0g  2%
Dietary Fiber 2.0g  8%
Sugars 1.0g
Protein 8.0g
Vitamin A 0%  Vitamin C 0%
Calcium 0%  Iron 2%

* Based on a 2000 calorie diet

This is exactly what the students need to find for each ingredient...
Testing the results

- In-class – bring peanuts, evaporated cane juice, cocoa, cocoa butter, organic palm oil, vanilla, soy lecithin, salt, and a food processor to class and make one group’s Dark Chocolate Dreams™ formula
- Out-of-class – students groups purchase the ingredients (peanuts, evaporated cane juice, cocoa, cocoa butter, organic palm oil, vanilla, soy lecithin, salt) and produce their replicate of Dark Chocolate Dreams™ (they can also obtain nutritional information from these labels)
- Taste test – ask Can you taste a difference? Which is superior? (also stress use of controls!)
Why Goal Programming?

- Nutrition information on product labels is imprecise
- If this level of imprecision is appropriate, constraint deviation variables can be used to define boundaries for an interesting response surface experiment
SHOW THEM THE BEAUTY
SHOW THEM THE BEAUTY
SHOW THEM THE BEAUTY
SHOW THEM THE BEAUTY
SHOW THEM THE BEAUTY

Can you guess the identity of this celebrity?
SHOW THEM THE BEAUTY

Hint 1: This celebrity is female.
SHOW THEM THE BEAUTY

Hint 2: This celebrity is an actress.
Hint 3: This celebrity has also been immortalized through the art of Andy Warhol and Elton John.
SHOW THEM THE BEAUTY

Hint 4: This celebrity committed suicide in 1963.
SHOW THEM THE BEAUTY

Some work by Tom Dial
Stimulated Senses Heighten Mental Receptivity
A SIMPLE ACTIVE LEARNING EXERCISE

Students have trouble discerning levels of data measurement (particularly with the distinction between \textit{ordinal} and \textit{interval} levels on typical marketing research satisfaction questions):

- Poor ( )
- Fair ( )
- Average ( )
- Good ( )
- Excellent ( )

Likert \textit{Rankings}

vs.

Rate this product on a 100 point scale: _________

100 Point Scale \textit{Ratings}

How do you demonstrate the difference between the \textit{ordinal} \& \textit{interval} levels?
A SIMPLE ACTIVE LEARNING EXERCISE

ALTOIDS!

EURO 2010 Lisbon, Wednesday, July 28, 2010
How can *candy* help students learn to discern between levels of data measurement?

Collect data from students and look for inconsistencies between Likert rankings and 100 Point Scale Ratings:

<table>
<thead>
<tr>
<th></th>
<th>Sigmund</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likert Ranking</td>
<td>100 Point Scale</td>
<td></td>
</tr>
<tr>
<td>Licorice</td>
<td>Fair (2)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Ginger</td>
<td>Poor (1)</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Erica</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likert Ranking</td>
<td>100 Point Scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor (1)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fair (2)</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

The difference between *Fair* and *Poor* is much greater for Erica (25) than for Sigmund (10)
A SIMPLE ACTIVE LEARNING EXERCISE

The data collected from the class can also be used as an example in discussions of:

- confidence intervals and hypothesis tests for a population mean and a difference between population means

- let half the class have ginger then licorice, the other half of the class have licorice then ginger – demonstrate an order effect

- Pearson’s & Spearman’s correlations
Every student will remember something from your course (so why not make it something worth remembering?)
TELEVISION GAME SHOWS IN THE CLASSROOM?

Who Wants To Be A Millionaire® - The Classroom Edition - (WWTBAM-TCE)
TELEVISION GAME SHOWS IN THE CLASSROOM?

Who Wants To Be A Millionaire® - The Classroom Edition - (WWTBAM-TCE)

A frustrated instructor is an instructor who is not communicating with her/his students.
A NONCOMMUNICATIVE STUDENT IN A CAPSTONE

• Student From Nigeria
• A capstone course (participation is key)
• He says nothing for the first five weeks of a ten week course
• How to get him to open up?

Kí l'o rò nípa ìyen?
An instructor can recover from almost any earnest mistake in the classroom.
A FEW OF MY MISTAKES?

- Why is Turtle Wax so expensive?
- The Electronic White Paper Debacle…
- Even Professionals have gaffes…
A FEW OF MY MISTAKES?

- Why is Turtle Wax so expensive?
- The Electronic White Paper Debacle…
- Even Professionals have gaffes…
- A NONRANDOM THOUGHT -

People will forget what you said, people will forget what you did, but people will never forget how you made them feel.

Maya Angelou

But wait – it is now time for the commercial messages…
ENHANCING APPRECIATION

Example – Using a network flow model to design a system to bring potable drinking water to everyone living in a remote Kenyan Village (Kangaru)
Example – Using assignment modeling to place volunteers in low achieving urban high schools for Teach For America
Example – Using combinatorial optimization and network flow models to
– decide where to dig wells
– design and implement an irrigation plan, and
– place vehicles for transporting produce between small villages and markets

in a remote region of KwaZulu Natal - and…
– use TSP heuristics to decide on the vehicle routes
Example – Using conjoint analysis and combinatorial optimization to design a public transit system in Johannesburg
THE FINAL REVELATION

These activities can feed into and feed off each other...
BRINGING IT ALL TOGETHER

Case-Based Learning

- Develops Comprehension/Understanding

Active Learning

- Promotes Interest/Engages

Enhances Appreciation & Proficiency

Project-Based Learning
Close the Loop!

- Use these projects
  - as examples in introductory classes
  - to develop cases (and share these cases)

- Industry, Government, & NPO Involvement
  - work with academicians to develop cases based on your applications and experience
  - provide instructors with good student projects
BRINGING IT ALL TOGETHER

How to Get Industry, Government, & NPOs to Partner with Academia?

• Operations Research Practice for Africa (ORPA)
• INFORM-ED
• INFORMS Transactions on Education (ITE)
• Statistics Without Borders (SWB)
• Network of Operations Research Educators for Africa (NOREA)
• Union of Concerned Scientists (UCS)
• International Teaching Effectiveness Colloquia
SITE STATISTICS
MAY 31, 2009 – DECEMBER 31, 2009

11,667 visits came from 139 countries/territories
INFORMS/IFORS TEACHING EFFECTIVENESS COLLOQUIA

- 2006 - Montevideo, Uruguay with the XIII CLAIO 2006 Latin-Ibero-American Conference on Operations Research
- 2007 - Cape Town, South Africa with the annual conference of the Operations Research Society of South Africa
- 2008 - Cartagena, Colombia with the XV CLAIO 2008 Latin-Ibero-American Conference on Operations Research
INFORMS/IFORS TEACHING EFFECTIVENESS COLLOQUIA

• 2009 - Jaipur, India with the Triennial Conference of the Association of Asian Pacific Operational Research Societies
• 2010 - Buenos Aires with the Joint ALIO/INFORMS International Conference
• 2011 - Nairobi, Kenya with the annual International Conference of the Operations Research Society of Eastern Africa
• 2011 - Melbourne, Australia with the Triennial IFORS conference
### INFORMS/IFORS TEACHING EFFECTIVENESS COLLOQUIA

- Argentina
- Brazil
- Cameroon
- China
- Ethiopia
- India
- Japan
- Madagascar
- Mali
- Nigeria
- Portugal
- Spain
- Taiwan
- Uganda
- Venezuela
- Austria
- Burkina Faso
- Canada
- Colombia
- France
- Iran
- Kenya
- Malawi
- Mexico
- Panama
- Rwanda
- South Africa
- Tanzania
- United States
- Zambia
- Botswana
- Burundi
- Chile
- Cuba
- Guatemala
- Italy
- Lesotho
- Malaysia
- Namibia
- Peru
- Senegal
- South Korea
- Thailand
- Uruguay
- Zimbabwe

EURO 2010 Lisbon, Wednesday, July 28, 2010
WHERE DO YOU AND I GO FROM HERE?

- Greater European involvement in
  - *INFORMS Transactions on Education*
  - the International Teaching Colloquia
  - other initiatives

- Formal Establishment of a EURO Working Group on OR Education
  - Four successful education oriented sessions at EURO 2010
  - An OR Education keynote at EURO 2010
THANK YOU!!