Update on the ECS Global Business Initiative

The First Part of the Experiment: Global Business Communication

Cynthia C. Fry

The Challenge:

- Business & Global Opportunities for ALL Baylor ECS Students
  - Get input from faculty, colleagues, students, best practices, literature, BOA, alumni
  - Determine what is needed within the curricula
  - No redesign of curricula

Our Answer to the Challenge

- ***Two-Course Sequence*** that would provide instruction and practice in a global context
- Replace 6 existing hours:

Possible Substitutions:	Comp Sci	Mech Egr	EC Egr
Technical & Professional Writing	X		X
Engineering Economic Analysis		X	X
Technical Speaking			
Technical Elective		X	
History/Social Science Elective	X		

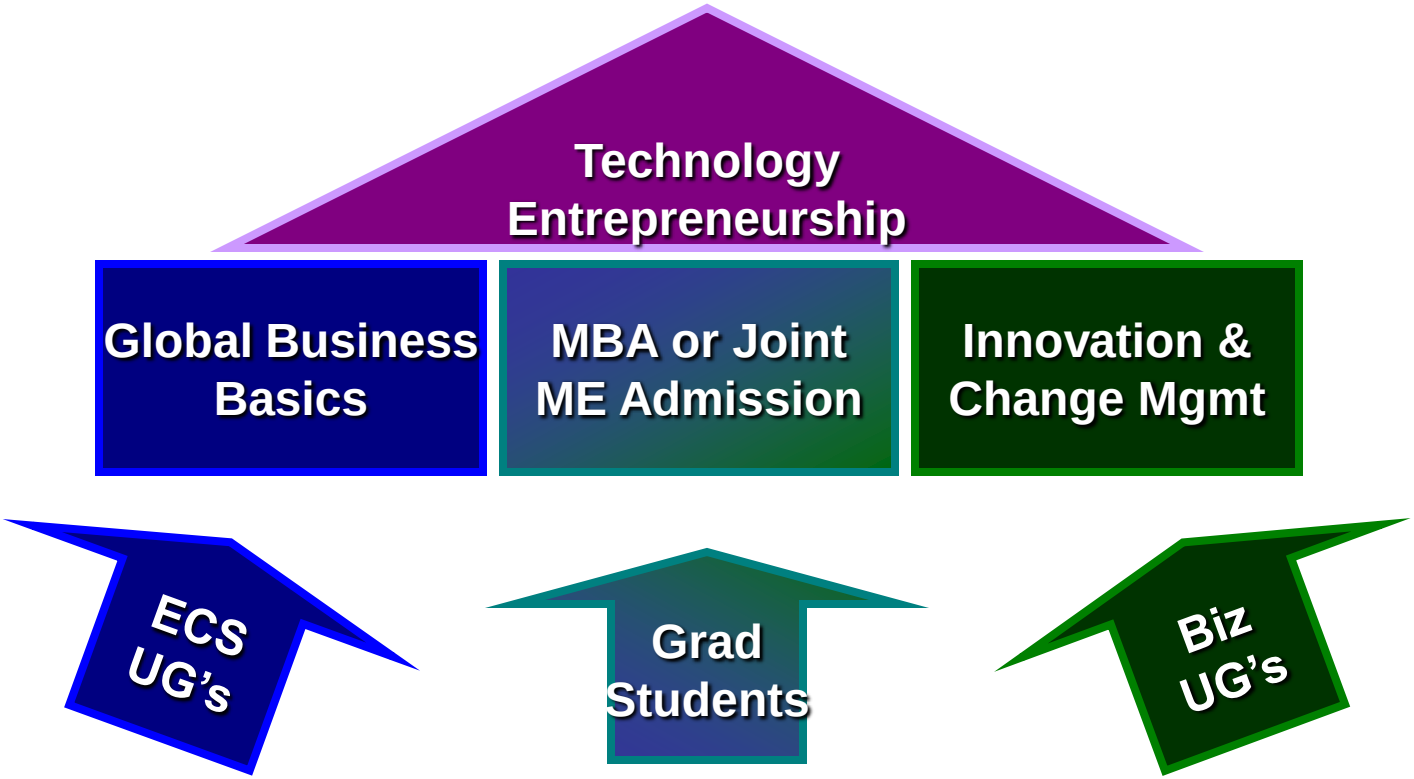
Global Business Communication

- Instruction in:
  - Engineering Economic Analysis
  - Technical and Professional Writing
  - Technical Speaking
- Implementation of what is learned:
  - Discussions and Guest Speakers
  - Papers
  - Presentations

Technology Entrepreneurship

- Key Elements in Course Design
  - Overview of the Technology Commercialization Process
  - Multi-disciplinary Student Composition
  - Hands-on Projects with Real Business Sponsors

Technology Entrepreneurship



Meeting ABET / FE Requirements:

Instruction & Assessment

Implementation & Assessment

Analysis of First Part of the Experiment: GBC

Plans for Completing the Experiment

GBC Overview (Fall 06)

Robert Doty,
Professor of Mechanical Engineering

Global

Business

Communications

Faculty Participants

- Dr. Anne Grinols (Technical Speaking)
- Mr. Rishi Sriram (Technical Writing)
- Dr. Robert Doty (Engineering Economics)
- Prof. Cindy Fry (Guest Lecturer)
- Dr. Greg Leman (Guest Lecturer)
- Prof. Bill Booth (Course Evaluator)

Class Profile

- Number of Students Enrolled: (16)
- Declared Majors: ECE (12), ME (4)
- Expected Graduation Date: Dec 2006 (4), May 2007 (8), Dec 2007 (0), May 2008 (4)
- Degree Credit: ECON 3308 (16)
- Post-graduation Plans: Entry Level Engineering Position (5), Engineering Graduate School (9), Law School (1), Military Service (5)
  Note: Multiple response by some students.

Instructional Strategy

- A series of two-week instructional cycles was employed.
- Each cycle began with the introduction of a relevant research topic designed to provide the “global business flavor.”
- Lectures followed in technical speaking, technical writing, and engineering economics.
- The cycle culminated in an evaluation day where written assignments were submitted by half of the students and video-taped oral presentations were made by the other half.
  (A brief in-class written quiz was also taken by all.)
- A new research topic was then introduced and the two-week cycle was repeated with the role of the students reversing with regard to written and oral submittals.

Instructional Cycle 1

- TOPIC: Foreign Currency Exchanges
- TS: Communication Principles and Overcoming Barriers/Executive Presentations
- TW: Introduction to Technical Writing
- ECON: Spreadsheet Analysis/Discount Factors

Instructional Cycle 2

- TOPIC: International Stock Exchanges
- TS: Team Presentations
- TW: Nuts and Bolts of Writing Well
- ECON: Cash Flow and Equivalence

Instructional Cycle 3

- TOPIC: Basic Financial Statements
- TS: Assigned Presentations and Critiques
- TW: Lists, Tables, Graphics, Proposals
- ECON: Depreciation and Book Value

Instructional Cycle 4

- TOPIC: Business Plan Components
- TS: Interpersonal Communication and Team Dynamics
- TW: Internal Planning Documents
- ECON: Bonds and Inflation

Instructional Cycle 5

- TOPIC: Business Plan Overview
- TS: Think-On-Your-Feet Communication
- TW: Professional Secrets/Email
- ECON: Comparison of Alternatives

Instructional Cycle 6

- TOPIC: Business Plan Submittals
- TS: Think-On-Your-Feet Application and Closure
- TW: N/A
- ECON: Fundamentals Review/Diagnostic Examination

Evaluation

- Evaluation of each student's performance in the course was based on three technical papers, five formal oral presentations, five engineering economics spreadsheets, five in-class quizzes and a final examination.
- Statistical comparisons were made between the performance of the GBC students and their peers who were in the respective traditional courses.
- Student perception of the value of the course was documented through written feedback at midterm and at semester's end.
- An open forum for students and faculty was held at the end of the semester to provide a summary of the experience.

Student Feedback

- 87.5% indicate that the course met their expectations with regard to content.
- 93.8% indicate that the instructors were well-prepared and effective in their presentation of the material.
- 93.8% indicate that the course stimulated their thinking.
- 100% indicate that they learned a great deal from the course.

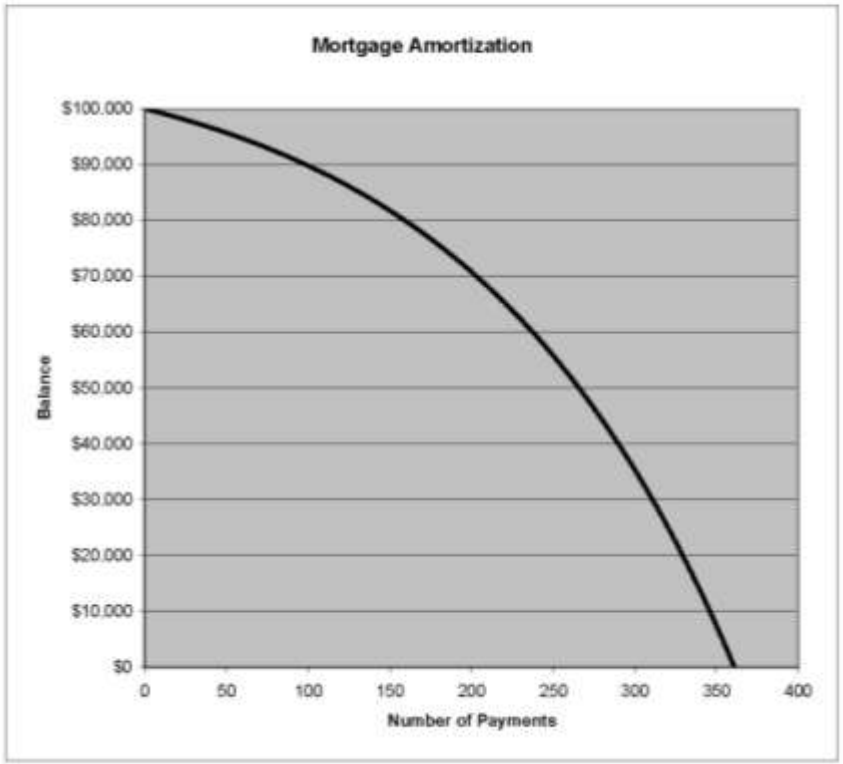
Economics Overview

- The objective of the engineering economics portion of the course was to provide the skills required for success on the engineering economics section of the FE Exam.
- A series of lectures and spreadsheet projects on relevant engineering economics topics was employed.

Amortization Table

Length of Mortgage	Interest Rate	Total Amount of Loan	Payment
360 Months	7.50%	$100,000.00	$699.22

Payment Number	Payment Amount	Interest Amount	Principal Reduction	Balance Due
0				$ 100,000.00
1	$ 699.22	$ 625.00	$ 74.22	$ 99,925.78
2	$ 699.22	$ 624.54	$ 74.68	$ 99,851.10
3	$ 699.22	$ 624.07	$ 75.15	$ 99,775.95
4	$ 699.22	$ 623.60	$ 75.62	$ 99,700.33
5	$ 699.22	$ 623.13	$ 76.09	$ 99,624.24
6	$ 699.22	$ 622.65	$ 76.57	$ 99,547.67
7	$ 699.22	$ 622.17	$ 77.05	$ 99,470.62
8	$ 699.22	$ 621.69	$ 77.53	$ 99,393.09
9	$ 699.22	$ 621.21	$ 78.01	$ 99,315.08
10	$ 699.22	$ 620.72	$ 78.50	$ 99,236.58
11	$ 699.22	$ 620.23	$ 78.99	$ 99,157.59
12	$ 699.22	$ 619.73	$ 79.49	$ 99,078.10
13	$ 699.22	$ 619.24	$ 79.98	$ 98,998.12
14	$ 699.22	$ 618.74	$ 80.48	$ 98,917.64
15	$ 699.22	$ 618.24	$ 80.98	$ 98,836.66
16	$ 699.22	$ 617.73	$ 81.49	$ 98,755.17
17	$ 699.22	$ 617.22	$ 82.00	$ 98,673.17
18	$ 699.22	$ 616.71	$ 82.51	$ 98,590.66
19	$ 699.22	$ 616.19	$ 83.03	$ 98,507.63
20	$ 699.22	$ 615.67	$ 83.55	$ 98,424.08
21	$ 699.22	$ 615.15	$ 84.07	$ 98,340.01
22	$ 699.22	$ 614.63	$ 84.59	$ 98,255.42
23	$ 699.22	$ 614.10	$ 85.12	$ 98,170.30
24	$ 699.22	$ 613.56	$ 85.66	$ 98,084.64
25	$ 699.22	$ 613.03	$ 86.19	$ 97,998.45
26	$ 699.22	$ 612.49	$ 86.73	$ 97,911.72
27	$ 699.22	$ 611.95	$ 87.27	$ 97,824.45
28	$ 699.22	$ 611.40	$ 87.82	$ 97,736.63
29	$ 699.22	$ 610.85	$ 88.37	$ 97,648.26
30	$ 699.22	$ 610.30	$ 88.92	$ 97,559.34



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Discount Factors

Input Values	
i	n
7.18%	10.00

Discount Formulas	
FP	2.0000
PF	0.5000
AF	0.0718
AP	0.1435
FA	13.9327
PA	6.9664
PG	27.3968
FG	54.7936
AG	3.9327

Algebraic Relationships		
PF=1/FP	0.5000	Reciprocal relationship
FA=1/AF	13.9327	Reciprocal relationship
FG=FP*PG	54.7936	Product relationship
AP=AG*GP	0.1435	Product relationship
i*n	72	Rule of 72 (i.e. i*n≈72 for FP=2; double your money)

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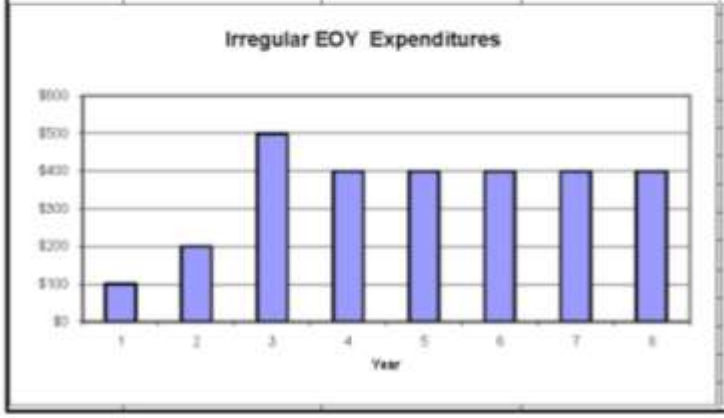
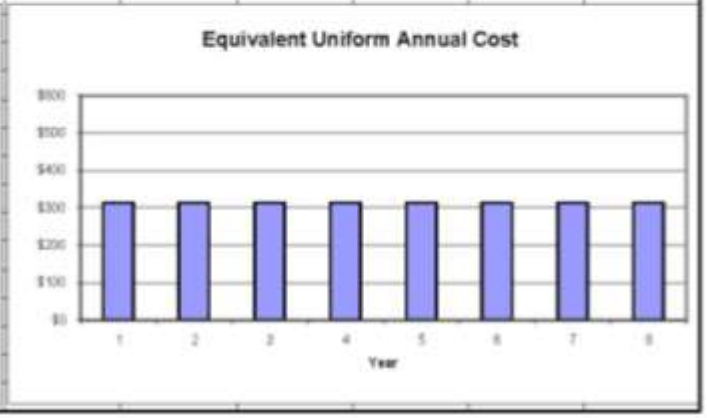
Uniform Annual Cost

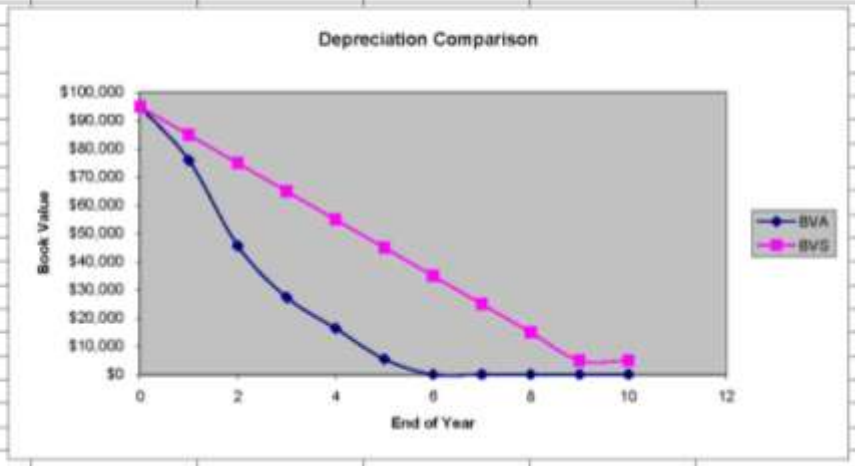
i			
20.00%			
EOY	**Cash Flow**	**Present Worth**	**Annual Amount**
0			
1	$ 100.00	$ 83.33	$ 313.73
2	$ 200.00	$ 138.89	$ 313.73
3	$ 500.00	$ 289.35	$ 313.73
4	$ 400.00	$ 192.90	$ 313.73
5	$ 400.00	$ 160.75	$ 313.73
6	$ 400.00	$ 133.96	$ 313.73
7	$ 400.00	$ 111.63	$ 313.73
8	$ 400.00	$ 93.03	$ 313.73
		$ 1,203.84	





Depreciation

RP	i	Cost	SV	Life			
5	10.00%	$ 95,000.00	$ 5,000.00	9			
EOY	RRA	DA	BVA	PWDA	DS	BVS	PWDS
0			$ 95,000.00			$ 95,000.00	
1	20	$ 19,000.00	$ 76,000.00	$ 17,272.73	$ 10,000.00	$ 85,000.00	$ 9,090.91
2	32	$ 30,400.00	$ 45,600.00	$ 25,123.97	$ 10,000.00	$ 75,000.00	$ 8,264.46
3	19.2	$ 18,240.00	$ 27,360.00	$ 13,703.98	$ 10,000.00	$ 65,000.00	$ 7,513.15
4	11.5	$ 10,925.00	$ 16,435.00	$ 7,461.92	$ 10,000.00	$ 55,000.00	$ 6,830.13
5	11.5	$ 10,925.00	$ 5,510.00	$ 6,783.57	$ 10,000.00	$ 45,000.00	$ 6,209.21
6	5.8	$ 5,510.00	$ -	$ 3,110.25	$ 10,000.00	$ 35,000.00	$ 5,644.74
7	0	$ -	$ -	$ -	$ 10,000.00	$ 25,000.00	$ 5,131.58
8	0	$ -	$ -	$ -	$ 10,000.00	$ 15,000.00	$ 4,665.07
9	0	$ -	$ -	$ -	$ 10,000.00	$ 5,000.00	$ 4,240.98
10	0	$ -	$ -	$ -		$ 5,000.00	$ -
11	0	$ -	$ -	$ -		$ 5,000.00	$ -
			MACRS PW	$ 73,456.41		SL PW	$ 57,590.24



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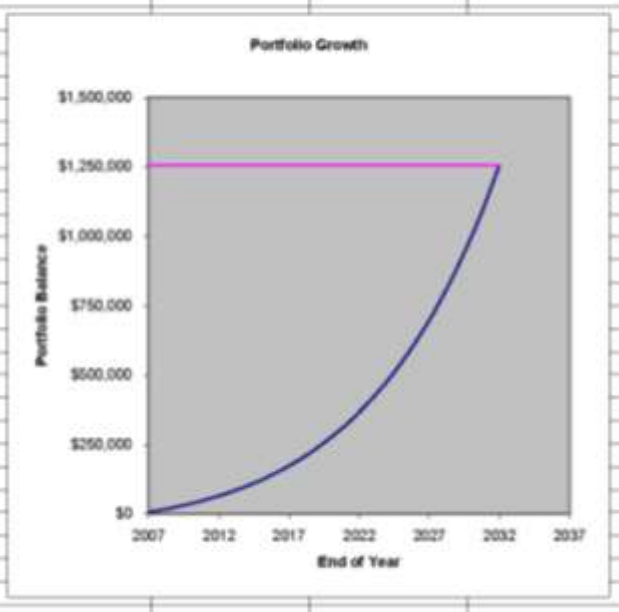
Inflation

Entry Salary	Raises	Inflation	Earnings	Goal (R$)	Goal (A$)	Percentage
$60,000	8.00%	3.75%	7.50%	$500,000	$1,255,084	12.44%

Year	Salary	Savings	Balance	Goal
2007	$ 60,000	$ 7,465	$ 7,465	$ 1,255,084
2008	$ 64,800	$ 8,062	$ 16,087	$ 1,255,084
2009	$ 69,984	$ 8,707	$ 26,001	$ 1,255,084
2010	$ 75,583	$ 9,404	$ 37,355	$ 1,255,084
2011	$ 81,629	$ 10,156	$ 50,313	$ 1,255,084
2012	$ 88,160	$ 10,969	$ 65,055	$ 1,255,084
2013	$ 95,212	$ 11,846	$ 81,780	$ 1,255,084
2014	$ 102,829	$ 12,794	$ 100,707	$ 1,255,084
2015	$ 111,056	$ 13,817	$ 122,078	$ 1,255,084
2016	$ 119,940	$ 14,923	$ 146,156	$ 1,255,084
2017	$ 129,535	$ 16,117	$ 173,234	$ 1,255,084
2018	$ 139,898	$ 17,406	$ 203,633	$ 1,255,084
2019	$ 151,090	$ 18,798	$ 237,704	$ 1,255,084
2020	$ 163,177	$ 20,302	$ 275,833	$ 1,255,084
2021	$ 176,232	$ 21,926	$ 318,447	$ 1,255,084
2022	$ 190,330	$ 23,680	$ 366,011	$ 1,255,084
2023	$ 205,557	$ 25,575	$ 419,037	$ 1,255,084
2024	$ 222,001	$ 27,621	$ 478,086	$ 1,255,084
2025	$ 239,761	$ 29,831	$ 543,773	$ 1,255,084
2026	$ 258,942	$ 32,217	$ 616,773	$ 1,255,084
2027	$ 279,657	$ 34,794	$ 697,825	$ 1,255,084
2028	$ 302,030	$ 37,578	$ 787,740	$ 1,255,084
2029	$ 326,192	$ 40,584	$ 887,404	$ 1,255,084
2030	$ 352,288	$ 43,831	$ 997,790	$ 1,255,084
2031	$ 380,471	$ 47,337	$ 1,119,962	$ 1,255,084
2032	$ 410,909	$ 51,124	$ 1,255,084	$ 1,255,084

Deficit	$0



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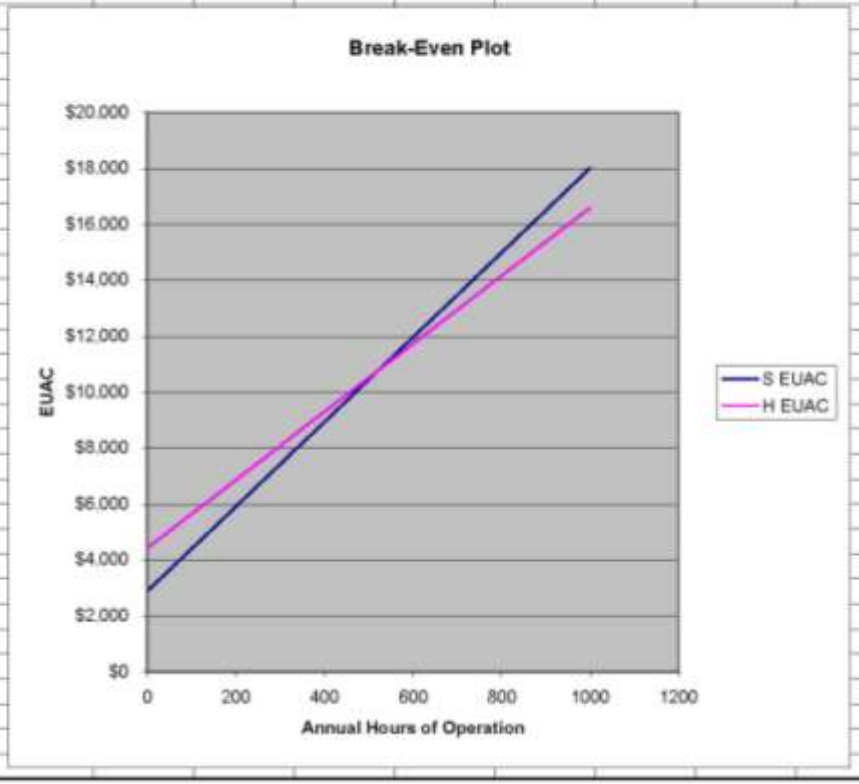
75%

Break-Even Analysis

Standard 100 HP Electric Motor (S)					High-Efficiency 100 HP Electric Motor (H)						Common factors		
S Cost	S Eff	S Life Yr	S AM	S Slvg	H Cost	H Eff	H Life Yr	H AM	H Slvg	HP	T&I	MARR	kWh
$12,500	74%	10	$250	$750	$17,000	92%	8	$500	$1,500	100	1.50%	15%	$0.15

Hours	S EUAC	H EUAC
0	$ 2,891	$ 4,434
50	$ 3,647	$ 5,042
100	$ 4,403	$ 5,650
150	$ 5,159	$ 6,259
200	$ 5,916	$ 6,867
250	$ 6,672	$ 7,475
300	$ 7,428	$ 8,083
350	$ 8,184	$ 8,691
400	$ 8,940	$ 9,299
450	$ 9,696	$ 9,908
500	$ 10,452	$ 10,516
550	$ 11,208	$ 11,124
600	$ 11,964	$ 11,732
650	$ 12,720	$ 12,340
700	$ 13,476	$ 12,948
750	$ 14,232	$ 13,556
800	$ 14,989	$ 14,165
850	$ 15,745	$ 14,773
900	$ 16,501	$ 15,381
950	$ 17,257	$ 15,989
1000	$ 18,013	$ 16,597
	BEP	Diff
	522	$0



Economics Conclusion

Diagnostic Examination

TOPIC XV: ENGINEERING ECONOMICS

TIME LIMIT: 45 MINUTES

1. Approximately how many years will it take to double an investment at a 6% effective annual rate?

(A) 10 years
(B) 12 years
(C) 15 years
(D) 17 years

#3605 1293

2. An individual contributes \$200 per month to a 401(k) retirement account. The account earns interest at a nominal annual interest rate of 8% with interest being credited monthly. What is the value of the account after 35 years?

5. \$5000 is put into an empty savings account with a nominal interest rate of 5%. No other contributions are made to the account. With monthly compounding, how much interest will have been earned after five years?

(A) \$1250
(B) \$1380
(C) \$1410
(D) \$1420

#4303 1295

6. An engineer deposits \$10,000 in a savings account on the day her child is born. She deposits an additional

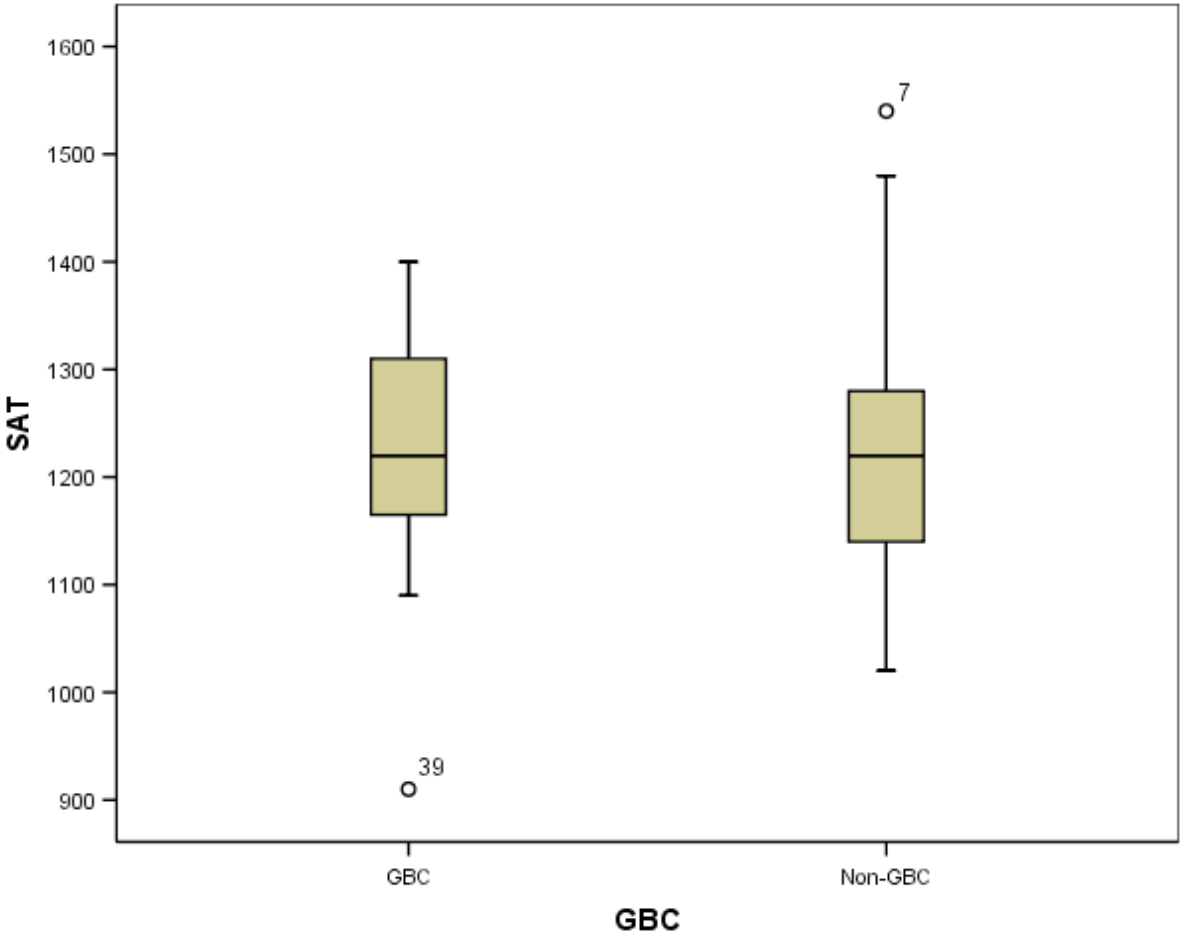
Global Business Communications

Evaluation Process
Bill Booth

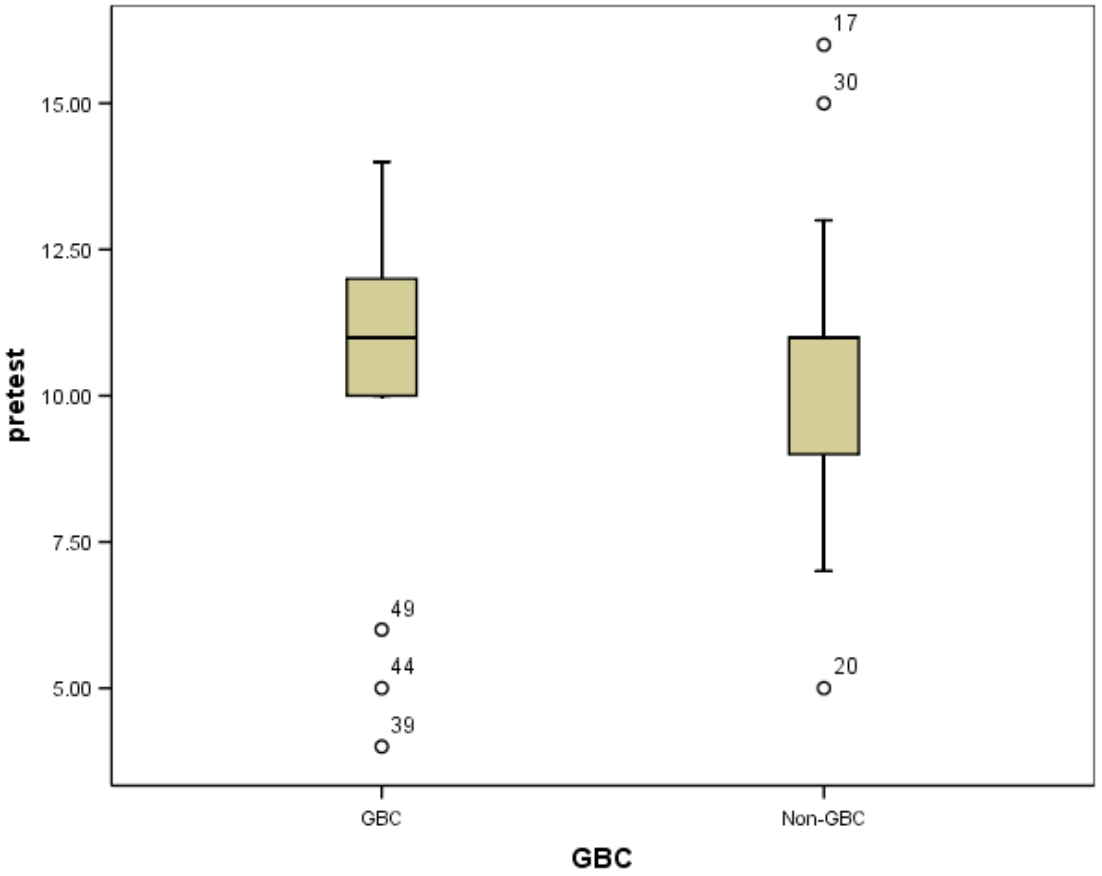
Evaluation Process

- Rationale
- Areas
  - Economics
    - Prof. Karen Johnson
  - Technical Writing
    - Dr. Glenn Blalock
  - Technical Speaking
    - Prof. Kia'Iah James

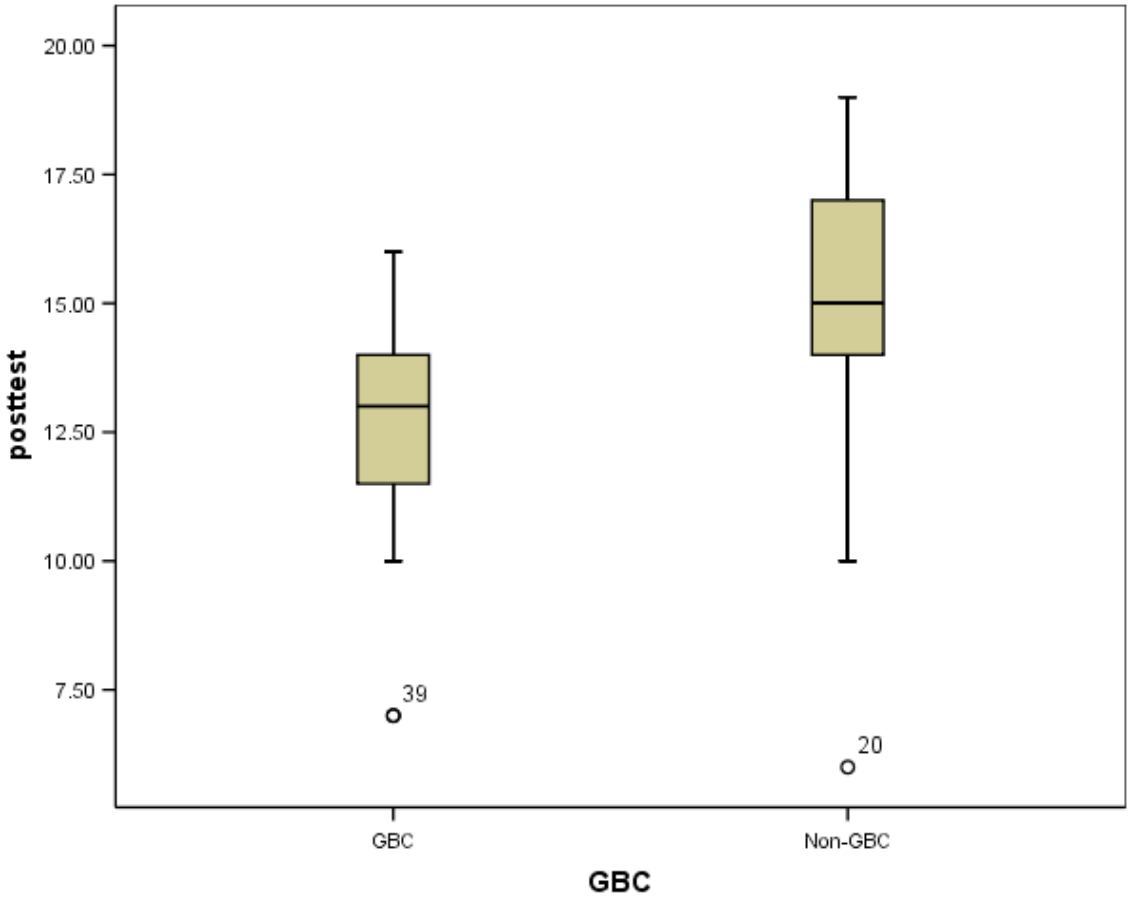
Participants



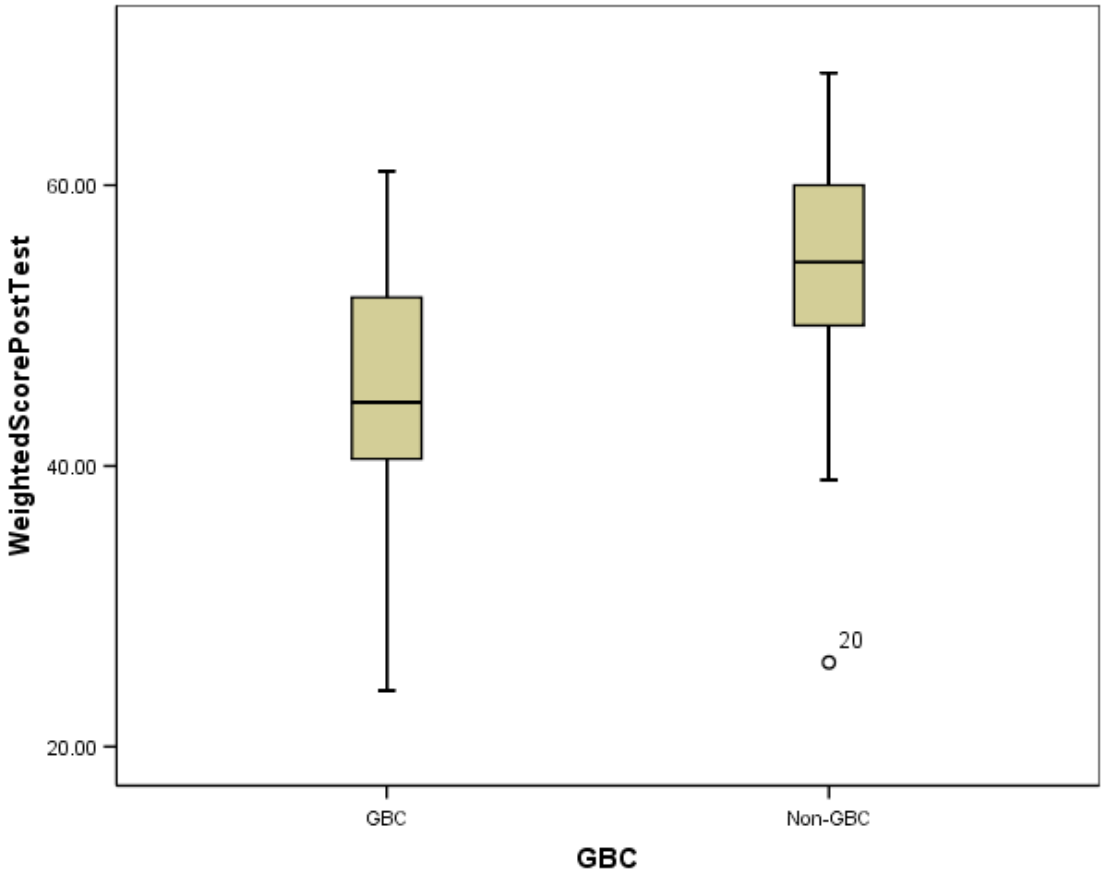
Pre-Test



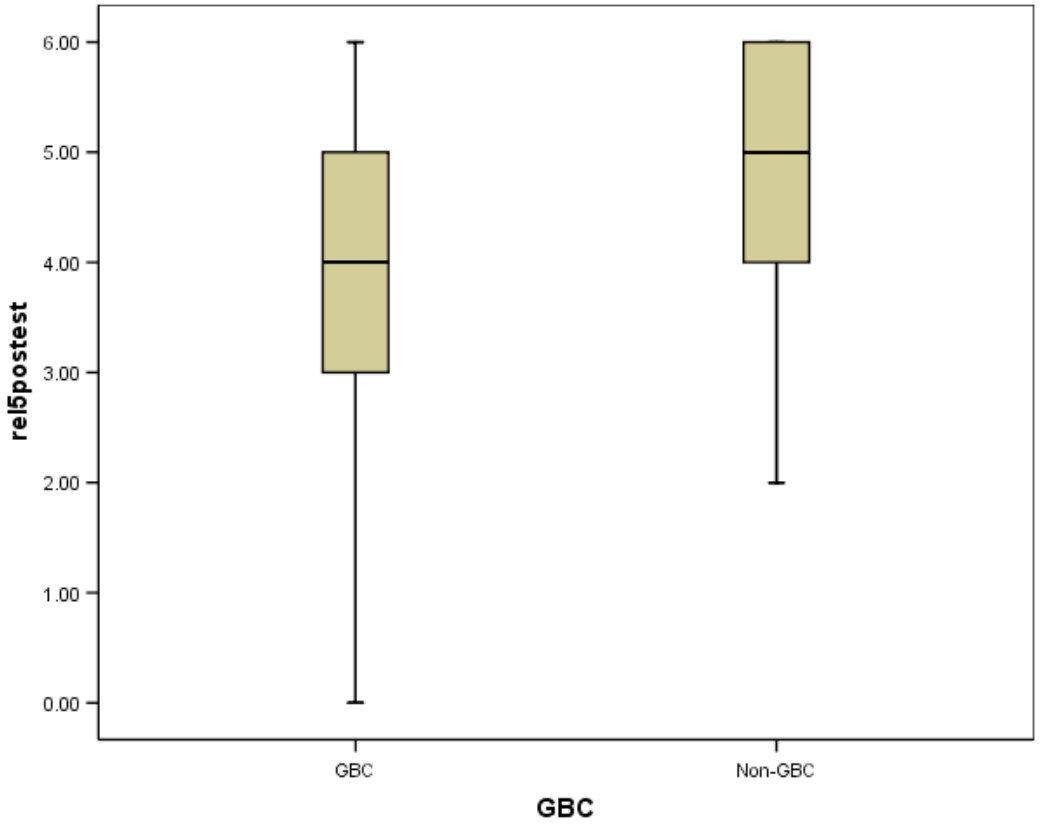
Post-Test



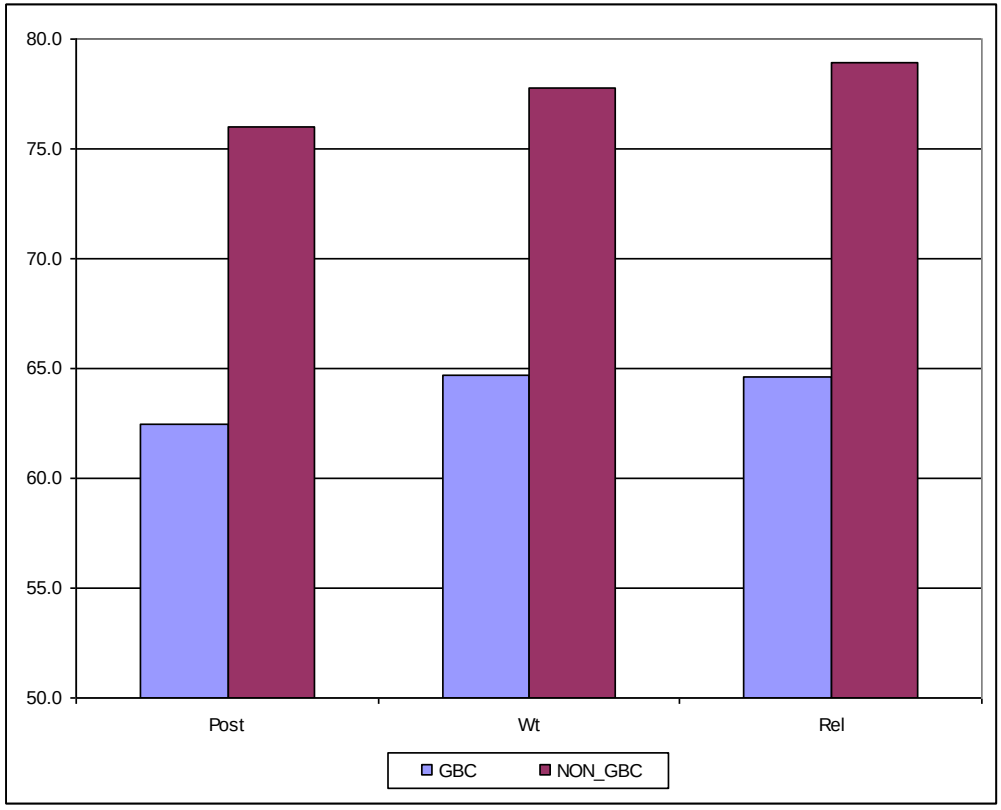
Post-Test (Weighted)



Post-Test (Most Relevant)



Post-Test



Observations on Engineering Economics

Professor Karen Johnson

Technical Writing

Global Business Communication

Rishi Sriram

Current problems in student writing

- Students write like they talk
- Frequent mistakes in grammar and punctuation
- Frequent mistakes in style and structure
- Inability to write concisely
- Disregard for prescribed writing formats
- Use of first person in technical writing
- Lack of know-how with writing technical reports
- Mistakes with graphs and charts

Why was this class important?

- It forced students to stop thinking like a college student!
  - The real world does not allow you to separate subjects (writing cannot be separated from economics, engineering, and speaking)
- The ideas of our students mean nothing unless they are communicated well
  - In a manner that makes people want to do something about your ideas!

Technical writing theorems

- Write appropriately for your audience
- Write clearly
- Write concisely
- Engage your audience
- Help the reader

- ***This is difficult!!!!***

Textbook

- Students learn to write by doing
- However, a textbook can help!
- Textbook: used as a reference guide
  - *Spring Into Technical Writing: For engineers and scientists*
  - Barry J. Rosenberg
    - Software engineer
    - Technical writing professor at MIT
    - Aimed at the specific audience (ECS students)

Quote from book

- "The difference between success and failure in the technical world is generally the ability to communicate effectively"
  - p. 7

Technical writing is engineering

- Careful planning is key
- Beta testing is vital to find defects
- Requires iteration
- Simpler is better
- Simpler is more difficult

Technical writing is *not* engineering

- You can't just reduce it to formulas
  - The answer to most questions is:
    - It depends!

- Requires a different kind of thinking
  - **This kind of thinking can be learned!**

Assignments

- Position Paper
  - Students formulate an opinion on an issue and articulate their position to their “boss”
- Income Statement
  - Summary of profits and losses over a fiscal year
- Business Plan (group project)
  - Cover letter, abstract, corporate history, product, marketing, and finances
- Final Paper
  - Position paper on thoughts of GBC
- Final Portfolio
  - Bringing together all corrected writings

Thoughts

- Emphasized fundamentals of writing
- Limited practice
  - Designed with second course in mind
- Improvement in style, clarity, and conciseness of writing
- Learned not only how to write…
  - But how to write about engineering economics

Observations on ECS Technical Writing

Dr. Glenn Blalock

EGR 4396
Communication Overview

- Purpose: To lay a foundation for future classes
- Approach: Both to break ground & to stay grounded
  - Integrated curriculum and instruction, global application
- Topics: Selected from MBA MComm
  - Communication principles (1)
  - Executive and team presentation skills &

Baylor University

EGR 4396

Global Business Communications

Setting the Context

Principles and Barriers

Anne Grinols, PhD

Assistant Dean

Faculty Development & College Initiatives

Hankamer School of Business

Business Communication

Definition:

Efficient formulation, appropriate delivery, & accurate receipt of message, as well as the message itself, in a business environment.

- Communication is a process.
- Communication is perception.
- Communication carries expectations.
- Communication makes demands.

Communication Principles

- Communication is a two-way street.
- You are always communicating…..
- The non-verbal dominates the verbal.
- Identify and overcome barriers.
  - Eg. People want to hear less then you want to tell them.

Audience Analysis

- Identify your audience, primary & secondary
  - What do they know?
  - What do they need to know?
  - What do they care about?
- Munter model
  - Tell-Sell-Consult-Join
- Sell benefits, not features

Baylor University

EGR 4396

Global Business Communications

Executive and Team Presentations

Anne Grinols, PhD

Assistant Dean

Faculty Development & College initiatives

Hankamer School of Business

Presentation Skills and Strategies

- Individual skills
- Individual strategies
- Team skills
- Team strategies
- Practice

Baylor University

EGR 4396

Global Business Communications

Interpersonal Communication & Team Dynamics

Anne Grinols, PhD
Assistant Dean
Faculty Development & College Initiatives
Hankamer School of Business

Interpersonal Communication

- A Affirm
- C Comment
- E Expand

(L) ACE

Baylor University

EGR 4396

Global Business Communications

TOYF

Think On Your Feet Opportunities

Technique and Application

Anne Grinols, PhD

Assistant Dean

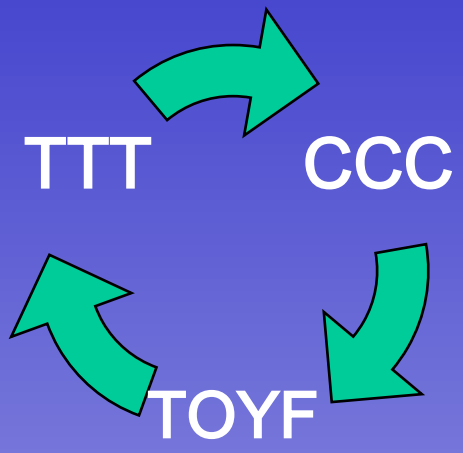
Faculty Development & College Initiatives

Hankamer School of Business

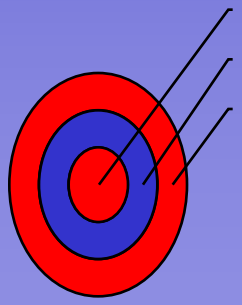
Think **O**n **Y**our **F**eet
Technique

1. **Restate/rephrase question**
2. **Give one-sentence response**
3. **Support your response**
   --provide examples, illustration, story
4. **Restate for closure**

Communication Takeaways



Connect with Respect



Aim with care to hit your target audience.

Observations on ECS Communications

Professor Kia'iah James

"The mission of Baylor University is to educate men and women for worldwide leadership . . ."

"The mission of Baylor's School of Engineering and Computer Science is to provide a superior education through instruction, scholarship and service that prepares graduates for professional practice and responsible leadership . . ."

“Communication
is an
audition for leadership”

Area of Evaluation - Content

- Strengths : Research & Knowledge
- Weaknesses: Introduction, Organizational Structure, Conclusion
- Overall Impression: Great potential considering strengths, yet weaknesses evident from 1st to 2nd evaluated speeches will prevent success

Area of Evaluation - Delivery

- Strengths: Courage & Completion
- Weaknesses: Nonverbal Communication & Lack of Situational Awareness & Response
- Overall Impression: Great Potential. Change comes with practice. Good content only gets the job.

  Leaders = superior content + polished delivery!

Workers or Leaders?

Superior Degree +

Polished Communication Skills =

Leadership in the Global Business Marketplace

Student Perspectives

Blake Buchanan, junior, electrical and computer engineering

Dusty Dodge, senior, electrical and computer engineering

Connecting the Dots

Integrating Early Indications into Final Design for 2-Course Sequence

Greg Leman

What *IS* Technology Entrepreneurship?

- A “safe” experiment in the multi-disciplinary reality off campus
- A for-real test of teamwork, content and communication skills
- A journey from idea to launch at the speed of “live”, covering:
  - Business concept feasibility validation
  - Intellectual property assessment
  - Economic justification
  - Moving into Operations
  - **AND** A consulting assignment from the sponsor

How are the skills demonstrated?

'Til Now:

- Economics -
  - Overview venture's financial soundness
  - Model economics of specific innovation
- Communication -
  - 2-Track detailed written report built on 6 milestones
  - "Stand and Deliver" presentation of recommendations

Adjustments:

- Economics –
  - Review FE exam demands & tweak
  - Add case studies on key issues
- Communication –
  - Add module for presentation design of message flow
  - Add formal mid-term client review

How will the graduates use their skills?

- Repeatedly answering 2 questions:
  - Why should this happen / be done?
  - Why should we be the ones to do it?
- In 3 layers:
  - Overall “Yeah, I get that!”
  - Value proposition with no numbers
  - Proof of tech & biz validity with numbers
- To very mixed audiences
  - CFO’s to Sales guys to Scientists
  - “AmerAsiOpeans” from Mars and Venus

Why expect so much?

- Technology is at the heart of every world-scale problem's solution
- The value equation has to work to make any solution sustainable
- If the "techies" and the "bean counters" don't work together a lot of stuff is going to stay unsolved

We can get there from here *together!*

Faculty, Participant, and Board Discussion