

# Decision Making Analysis on Career Technical Education

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- **Consequence Table (EXAMPLE)**



# Problem Statement

Which Associate Degree Programs Should NTID's  
Department of Engineering Studies Offer?

A Decision-Analysis Proposal



# Rationale<sup>★</sup>

- Foundation issues associated with NTID's strategic planning
  - Update career-focused programs and employment readiness
  - Expand articulation agreements and transferability with RIT
  - Investigate development of D/HoH-related STEM programs with RIT
- Current issues regarding program offerings since 2002
  - ACT scores
  - Academic readiness (or lack thereof) of prospective students
  - Limitation of program choices, specifically in AOS
- Primary issues regarding students via program offerings: ★
  - Not all D/HoH students qualify for 2+3 programs
  - Only two choices in AOS programs (CADT, CIMT)
  - If a D/HoH AOS student is not interested in CADT or CIMT, attrition becomes an issue.



# Decision Analysis Framework

## 1. Eight Models

- A. Classical  
(Savage, 1954)
- B. Muddling Through  
(Lindblom, 1959)
- C. **Mixed Scanning**  
**(Etzioni, 1967)**
- D. Garbage Can  
(Cohen, March, & Olsen, 1972)
- E. Political  
(Lindholm, 1955)
- F. Recognize Primed  
(Klien, 1998)
- G. Satisficing  
(Simon, 1956)

### Mixed Scanning Defined

Elements of both [the rationalistic and incrementalist] approach by employing two cameras: a broad-angle camera that would cover all parts of the sky but not in great detail, the second one which would zero in on those areas revealed by the first camera to require a more in-depth examination. (Etzioni, 1967, p. 389)

Similar metaphor is T-shaped theory.



# Stakeholders

1. Prospective D/HoH Students
2. Existing D/HoH Students
3. Department of Engineering Studies (DES) Faculty
4. DES Chairperson
5. **NTID President / NTID Dean \***
6. Curriculum Committees
7. Administrative Council
8. United States Department of Education (US DoE)
9. Other RIT Colleges  
(College of Engineering, College of Applied Science Technology)
10. NTID Access Service
11. Employers
12. Alumni
13. Academic Senate
14. New York State Department of Education (NYS ED)
15. Academic Advisors  
(Counselors, professional staff, faculty)
16. NTID Admissions
17. NTID Development Office



# Review of the Literature

- Current Issues within Postsecondary Education
  - Accessibility, accountability, and affordability
  - Career Technical Education / Carl D. Perkins IV
  - Labor force
  
- Program Offerings Development
  - Program expansion strategies
    - Clusters and pathways
    - Articulation Agreements in Postsecondary education
    - Collaboration efforts
  - Engineering education and reform
    - Engineering restructures for non-engineering students
    - STEM to STE(A)M
    - Workforce education
      - Underrepresented Students
      - Diversity the workforce



# Review of the Literature .. Cont.

- Deaf epistemologies in education and workforce
  - Deaf epistemologies
  - Challenges in post-secondary education for the Deaf
  - Occupational transition status for the D/HH.

Important indicators, despite hearing-deaf employment / unemployment / earning differences (Walter, 2010):

- College educated D/HoH employees earn 2.3 times more than non-college D/HoH employees
- College educated D/HoH employees earn 31% more than non-STEM D/HoH employees





# Objectives

1. Increase DES student enrollment (Extremely Important)
2. Improve employability of DES graduates (Extremely Important)
3. Increase DES student graduation rate (Extremely Important)
4. Increase cooperative work experience opportunities (Extremely Important)
5. Faculty support the alternative (Very Important)
6. Aligns with RIT's strategic plans (Very Important)
7. Increase DES student retention in STEM (Very Important)
8. Improve DES graduates' access to emerging fields (Important)
9. Increase articulation agreements with RIT colleges (Important)
10. Minimize time to degree (Important)



# Alternatives

- **Alternative 1: Maintain the status quo**  
NTID and DES will continue to marketing, recruiting, and preparing students for employment.
- **Alternative 2: Add Biomedical Equipment Repair Technician (BERT)**  
Training D/HoH students in how to maintain, adjust, calibrate, and repair medical equipment such as defibrillators, heart monitors, X-rays, and ultrasound equipment.
- **Alternative 3: Add Renewable Energy/Sustainability Technician (RE/ST)**  
Training D/HoH students in how to explore various renewable and sustainable energy options and evaluate their properties with respect to sun, wind, and water via green economy (i.e. solar energy, wind power, and hydroelectric), and can stretch to LEED via construction.
- **Alternative 4: Eliminate existing program, and add BERT**
- **Alternative 5: Eliminate existing program, and add RE/ST**



# Methods of Predicting Effects

- Methodology: Mixed Methods Paradigm
- Methods: Collection
  - 1 Focus Group
  - 2 Individual Interviews
  - Many Surveys (Qualitative Survey, Quantitative Survey)
  - Literature Review
  - Documents Analysis
- Methods: Analysis
  - Coding (In Vivo, Magnitude/Emotional)
  - Transcription Analysis
  - SPSS



# Marginal Cost

(status quo = \$0)

Fig. 1. BERT Expenditures Marginal Cost Summary

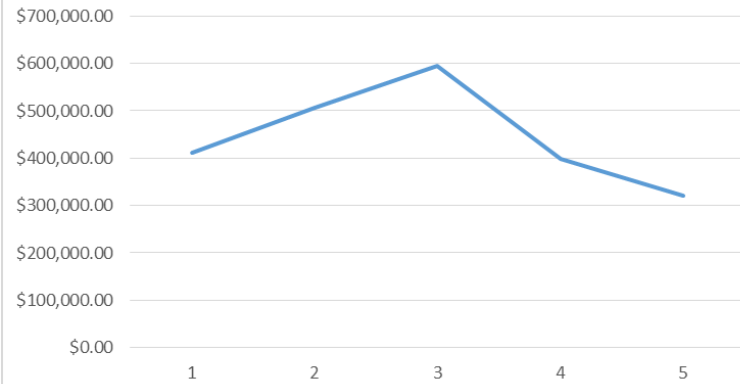


Fig. 2. RE/ST Expenditure Cost Analysis Summary

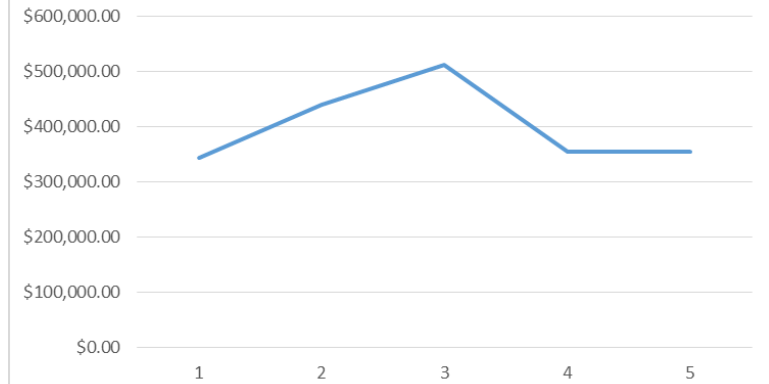


Fig. 3. BERT - CADT Expenditures Cost Analysis Summary

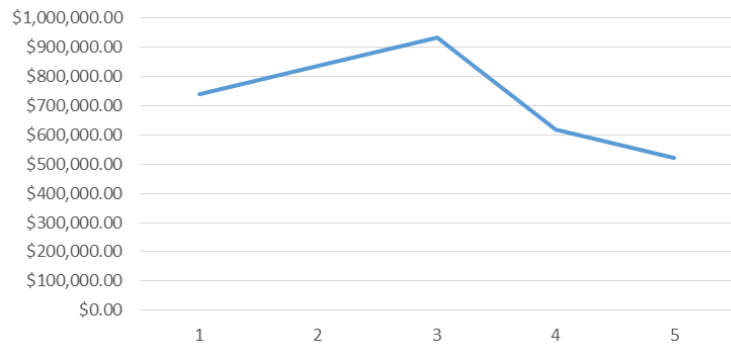
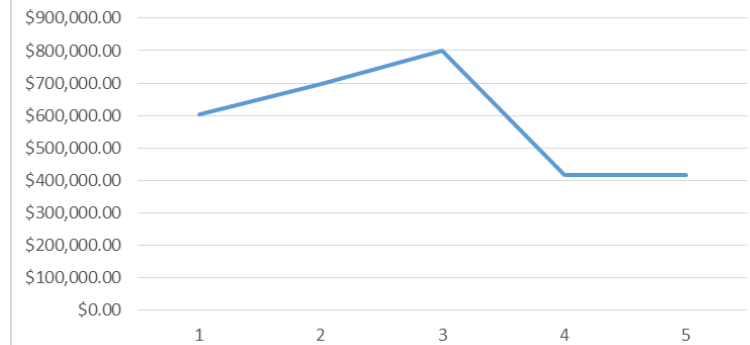


Fig. 4. REST - CADT Expenditures Cost Analysis Summary



# Based on trade offs, uncertainty, and risk tolerance of decision making; ranking alternatives' elimination chart is necessary.

Table 5: Ranking Alternatives Elimination Chart

Objective Number	Objective	Performance	Performance attributes	Objective Importance and Type	Data/Source Evidence	Scale	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	
							Tenured (Full, Associate)	Pre-Tenure (Assistant)	NTTF (Lecturer)	Adjunct	Combo Addition (Uncertainty)	
1	Teaching	To maximize teaching at a given capacity pertaining professoriate rank.	# of courses / semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	3	1	4	2	
			# of contact hours/week per semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	3	1	4	2	
			# of office hours / week per course section	Fund-Imp	Workload Policy	(HL, L, U, HU)	2	2	2	4	2	
			# of students minimum served / semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	3	1	4	2	
			Academic Advising: # of students/caseload	Fund-Imp	Workload Policy	(HL, L, U, HU)	1	2	4	4	2	
			Learning Outcome Assessment	Fund-EI	(HL, L, U, HU)	1	1	3	4	2		
2	Scholarship	To expect scholarly work at a given capacity pertaining professoriate rank.	Appraisal performance for quality	Fund-EI	Self Appraisal	(HL, L, U, HU)	3	4	2	1	2	
			# of publications to scholarly journals	Fund-EI	T/P policy	(HL, L, U, HU)	2	1	4	4	1	
			Grading: writing to standards	Fund-Imp	T/P policy	(HL, L, U, HU)	1	1	2, summer	4	1	
			Research: Contribution to Community	Fund-Imp	T/P policy	(HL, L, U, HU)	1	1	3	4	1	
3	Service	To contribute services at a given capacity pertaining professoriate rank.	Appraisal performance for quality	Fund-VI	Self Appraisal	(HL, L, U, HU)	2	2	2	3	2	
			Contribution to campus services	Fund-Imp	Policy #E.27, SA	(HL, L, U, HU)	2	2	2	3	2	
			Contribution to community services	Fund-LI	Policy #E.27, SA	(HL, L, U, HU)	2	2	2	4	2	
4	Department Constituencies	To support the alternative and faculty ownership.	Appraisal performance for quality	Fund-Imp	Policy #E.27, Self Appraisal	(HL, L, U, HU)	2	2	2	4	2	
			faculty ownership & perspective	Fund-VI	Dept. Budget & Workload policy	(HL, L, U, HU)	2	1	1	2	1	
5	Academic Affairs	To support the alternative	final decision maker	Fund-EI	College budget & Workload policy	(HL, L, U, HU)	4	1	2	2	2	
							Grand Total	\$31,404	\$114,422	\$1,271	\$8,176	
							S+B	\$123,283	\$104,111	\$89,460	\$0	\$112,361 to \$
							S+B @ cap.	\$86,305	\$46,850	\$80,514	\$0	\$320,861 \$
							Sunk cost	\$36,983	\$57,261	\$8,946	\$0	

Scale: HL- Highly Likely, L-Likely, U-Unlikely, HU-Highly Unlikely  
 Scale: HS- Highly Support, S-Support, U-Unlikely Support, HUS-Highly Unlikely Support  
 Scale Ranking: 1- highly likely, 2-Likely, 3- Unlikely, 4-Highly Unlikely

Alternative 5 Subnet  
 5.1 is 1 Pre-Tenure (HL)  
 5.3 is 1 Pre-Tenure and  
 5.5 is 2 Lecturers and 1  
 5.6 is 2 Pre-tenure and



Table 6: Ranking Alternatives (REDRAWN) Elimination Chart

Objective Number	Objective	Performance	Performance attributes	Objective Importance and Type	Data/Source Evidence	Scale	Alternative 5	Alternative 6
							Combo Addition (Uncertainty)	Combo elimination (Uncertainty)
1	Teaching	To maximize teaching at a given capacity pertaining professoriate rank.	# of courses / semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	2
			# of contact hours/week per semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	2
			# of office hours / week per course section	Fund-imp	Workload Policy	(HL, L, U, HU)	2	2
			# of students minimum served / semester	Fund-EI	Workload Policy	(HL, L, U, HU)	2	2
			Academic Advising: # of students/caseload	Fund-imp	Workload Policy	(HL, L, U, HU)	2	2
			Learning Outcome					
		Curriculum Development: Evaluation		Fund-EI	Assessment	(HL, L, U, HU)	2	2
		Appraisal performance for quality		Fund-EI	Self Appraisal	(HL, L, U, HU)	2	2
2	Scholarship	To expect scholarly work at a given capacity pertaining professoriate rank.	# of publications to scholarly journals	Fund-EI	T/P policy	(HL, L, U, HU)	1	2
			Grant: Bring in \$ to University	Fund-VI	T/P policy	(HL, L, U, HU)	1	2
			Research: Contribute to Community	Fund-VI	T/P policy	(HL, L, U, HU)	1	2
			Appraisal performance for quality	Fund-VI	Self Appraisal	(HL, L, U, HU)	1	2
<del>3</del>	<del>Service</del>	<del>To contribute services at a given capacity pertaining professoriate rank.</del>	<del>Contribution to campus services</del>	<del>Fund-imp</del>	<del>Policy #E.27, SA</del>	<del>(HL, L, U, HU)</del>	<del>2</del>	<del>2</del>
			<del>Contribution to community services</del>	<del>Fund-EI</del>	<del>Policy #E.27, SA</del>	<del>(HL, L, U, HU)</del>	<del>2</del>	<del>2</del>
			<del>Appraisal performance for quality</del>	<del>Fund-imp</del>	<del>Policy #E.27</del>	<del>(HL, L, U, HU)</del>	<del>2</del>	<del>2</del>
		Self Appraisal						
4	Department Constituencies	To support the alternative and faculty ownership.	faculty ownership & perspective	Fund-VI	Dept. Budget & Workload policy	(HL, L, U, HU)	1	3
5	Academic Affairs	To support the alternative	final decision maker	Fund-EI	College budget & Workload policy	(HL, L, U, HU)	2	2
						Grand Total		
						S+B	\$112,361 to	\$112,361 to
						S+B @ cap.	\$320,861	\$320,861
						Sunk cost		

Scale: HL- Highly Likely, L- Likely, U-Unlikely, HU-Highly Unlikely

Scale: HS- Highly Support, S- Support, U-Unlikely Support, HUS-Highly Unlikely Support

Scale Ranking: 1- highly likely, 2- Likely, 3- Unlikely, 4-Highly Unlikely

Alternative 5 Subnets:
5.1 is 1 Pre-Tenure (HL)
5.3 is 1 Pre-tenure and 1 lecturer (HL)
5.5 is 2 Lecturers and 1 Pre-tenure (L)
5.6 is 2 Pre-tenure and 2 Lecturers (U)

# Example

djlnet Fall 2013 DM 1



# Questions Thank You



# References

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