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### ABSTRACT

*The high school core course grade point average of a first time college undergraduate student admitted to a Midwestern research university might be used to predict that student's academic success. The performance of this predictor is compared to that of other possible predictors.*



ThompsonRD: HS Core Course GPA as a Predictor of Undergraduate Academic Success  
Mid America Association for Institutional Research (MidAIR)  
30<sup>th</sup> Annual Conference  
November 10-12, 2010  
MidAIRTalk\_20101111\_Splash



## UM FTC Undergraduate Automatic Admission Policy

Dr. Joe Saupe's solution to the problem



UM **Enhanced** Admission Policy (Fall 2006 FTC and later)

1. MO high school,
2. UM Required HS Core,
3. ACT, and
4. *either* HSPRNK  $\geq 90$  *if HS ranks its graduates*  
*or* HSCCGPA  $\geq 3.5$  *if HS does not rank its graduates*





“120 Rule” re stated:                    ACTCOM%ile + HSPRNK >= 120

<u>ACTCOM</u>	<u>ACTCOM%ile</u>	<u>HSPRNK &gt;=</u>
>= 34	100	20
33	99	21
32	98	22
31	97	23
	96	24
30	95	25
	94	26
29	93	27
...	...	...
17	28	92
	27	93
	26	94
	25	95
	24	96
	23	97
16	22	98
	21	99
	20	100



## UMFTC Undergrad Automatic Admission — Restated

### UM **Standard** Admission Policy

1. UM Required HS Core,
2. ACT, and

3. <u>ACTCOM</u>	<u>ACTCOM</u> %ile	<u>HSPRNK</u> >=
>= 24	Auto. Admissible	
23	68	52
22	62	58
21	55	65
20	48	72
19	41	79
18	35	85
17	28	92
16	22	



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Fall Semester	Class Size	HSPRNK Missing	
		N	%
2004	6,087	560	9.2
2005	6,455	728	11.3
2006	6,478	809	12.5
2007	6,546	936	14.3
2008	7,694	1,333	17.3
2009	7,675	1,499	19.5
2010	8,418	1,886	22.4



Full time, degree seeking, FTC UM undergraduates who recently completed secondary education. Excludes GED, home schooled, non resident alien, and transfer students. All four UM campuses.



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1. Observed strong linear correlation between **HSPRNK** and **HSCCGPA**.



Pearson

Spearman

		r	OSL	r	OSL
2006	4,636	0.86	< 0.0001	0.87	< 0.0001
2007	4,574	0.87	< 0.0001	0.88	< 0.0001
2008	5,215	0.88	< 0.0001	0.88	< 0.0001
2009	5,085	0.87	< 0.0001	0.88	< 0.0001
2010	5,395	0.87	< 0.0001	0.87	< 0.0001
ALL ██████████	24,905	0.87	< 0.0001 ██████████ ██████████	0.87	< 0.0001

Full time, degree seeking, FTC UM undergraduates who recently completed secondary education and have ACT Composite Score, HS Class Percentile Rank, and HS Core Course GPA. Excludes GED, home schooled, non resident alien, and transfer students. Excludes students who took *only* the SAT. All four UM campuses.







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1. Observed strong linear correlation between HSPRNK and HSCCGPA.

2. Proposed:

a. Use HSCCGPA (and ACTCOM) when no HSPRNK, and

b. Using recent FTC populations, derive HSCCGPA cut off value (for a given ACTCOM) to yield same percentage of Auto Admits as yielded by HSPRNK cut off value.



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UM Admissions Matrix with "legacy" HS Core Course GPA sliding scale.

		HSPRNK	HSCCGPA
ACT Score	No. Students	Critical Value	



## Dr. Joe Saupe Solution to Missing HSPRNK (c. 2002) Update (Dr. R.D. Thompson, Aug 13, 2009)

UM Admissions Matrix with updated HS

ACT Score	No. Students	Critical Value	Percent Admissible		Critical Value (preliminary)	Percent Admissible
22	1,216	54	80.9%	19.1%	2.92	80.9%
21	852	62	68.9%	31.1%	3.05	69.3%
20	587	69	62.7%	37.3%	3.18	63.4%
19	335	78	44.2%			
<= 16	72		0.0%			0.0%
<b>TOTAL</b>	<b>15,137</b>		<b>90.7%</b>			<b>90.7%</b>

Fall 2006 (N = 4,826), 2007 (N = 4,891), and 2008 (N = 5,420) full time, degree seeking, FTC UM undergraduates who (1) satisfy the UM admission requirements for HS core courses, and (2) have ACT Composite Score (or SAT equiv.), HS Class Percentile Rank, and HS Core Course GPA. Excludes GED, home schooled, non resident alien, and transfer students.

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**RDT's Concerns & Considerations:**

- 1. (ACTCOM & HSPRNK) and (ACTCOM & HSCCGPA) can disagree!

**Admissibility Agreement/Disagreement between (ACTCOM & HSPRNK) and (ACTCOM & HSCCGPA)**

Fall Semester	N	Agree		Disagree	
		N	%	N	%
2006	4,636	4,354	93.9	282	6.1



## RDT's Approach: Overview

1. Propose new UM Std Auto Admission Policy based on **HSCCGPA** (and **ACTCOM**) .
2. Base this new Policy on student success.
3. Use Logistic Regression applied to recent FTC populations to derive **HSCCGPA** critical values.





## RDT's Approach: Details

Defn of Success:

or FS Cum GPA  $\geq 2.0$  *if not enrolled for SP*

2. ample:

## Sample for Logistic Regression

Fall Semester	N	1st Year Success
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[REDACTED]

[REDACTED]



## RDT's Approach: Results

1. 1<sup>st</sup> Order Linear Logistic Regression with 1<sup>st</sup> Year Success regressed on ACTCOM, HSCCGPA, and HSPRNK:

MODEL **iSUCCESSFUL** = [redacted] highly significant  
[redacted] (OSL < 0.0001). [redacted]  
**HSPRNK** adds nothing *additionally* (OSL = 0.0691)

2. 1<sup>st</sup> Order Linear Logistic Regression with 1<sup>st</sup> Year Success regressed on ACTCOM and HSCCGPA:

MODEL **iSUCCESSFUL** = **HSCCGPA** **ACTCOM**

Model is highly significant (OSL < 0.0001).  
Both **HSCCGPA** and **ACTCOM** are  
Estimate of intercept

[redacted]

[redacted]

## RDT's Approach: Results (continued)

[REDACTED]

[REDACTED]

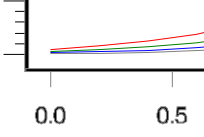
Fall 2007 and Fall 2008 full time, degree seeking, FTC UM undergraduates who recently completed secondary education and have ACT Composite Score, HS Class Percentile Rank, and HS Core Course GPA. Excludes GED, home schooled, non resident alien, and transfer students. Excludes students who took *only* the SAT. **Three UM campuses only.** (UM\_2 is excluded for this preliminary investigation.)

[REDACTED]

[REDACTED]

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Fall 2007 and Fall 2008 full time, d  
Composite Score, HS Class Percent  
Excludes students who took *only* th

## RDT's Approach: Results (continued)



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## Success of Admissible Students

(Using UMSd Admission Policy restated legacy)

ACTCOM	N	No. Admiss.	1st Year Success	
			N	%
>= 24	6,185	6,185	5,618	90.8
23	813	686	599	87.3
22	703	573	508	88.7
21	484	333	292	87.7
20	322	211	178	84.4
19	164	68	57	83.8
18	91	26	21	80.8
17	26	5	3	60.0
<= 16	17	0		
TOTAL	8,805	8,087		



## RDT's Approach: Results

$\geq 24$		N/A
23	0.90	2.81
22	0.90	2.84
21	0.90	2.87
20	0.90	2.90
19	0.90	2.94
18	0.90	2.97
17	0.90	3.00
16	0.90	3.03
15	0.90	3.06
14	0.90	3.09

13	0.90	3.13
12	0.90	3.16
11	0.90	3.19
10	0.90	3.22
9	0.90	3.25
8	0.90	3.28
7	0.90	3.32
6	0.90	3.35
5	0.90	3.38
4	0.90	3.41
3	0.90	3.44
2	0.90	3.47
1	0.90	3.50





## RDT's Approach: Performance

ACT	Prob of Success (est.)	HS CC GPA Critical Value (prelim.)	Class Size Fall 2009 FTC	Admissible by RDT's HSCCGP & ACTCOM Rule		
				N	1st Year Success	
					N	%
$\geq 24$		N/A	3,320	3,320	3,007	90.6
23	0.90	2.81	424	350	313	89.4
22	0.90	2.84	318	276	248	89.9
21	0.90	2.87	238	194	176	90.7
20	0.90					



## Proposed "PÜÜ" Policy

1. UM Required HS Core,
2. ACT, and
3. ACTCOM

\_\_\_\_\_ HSCCGPA >=



UM **Enhanced** Admission Policy (FTC Fall 2006 and later)

1. MO high school,
2. UM Required HS Core,
3. ACT, and
4. *either* HSPRNK >= 90 *if HS ranks its graduates*  
*or* HSCCGPA >= 3.5 *if HS does not rank its graduates*



ThompsonRD: HS HS

Research (MidAIR)



## Next Steps

1. Include 4<sup>th</sup> UM campus.
2. Include additional FTC cohort(s), e.g., Fall 2006 and/or Fall 2009.
3. Reconsider [REDACTED] [REDACTED]
4. Investigate model further:
  - o Fit, goodness, etc.
  - o Look again at [HSPRNK](#).
  - o 1<sup>st</sup> order interaction, or 2<sup>nd</sup> order model.
  - o Longitudinal effect.
  - o Campus effect.
5. Incorporate uncertainty when specifying [HSCCGPA critical values](#).  
Use
  - o *either* confidence limits
  - o *or* highest posterior density interval limits
6. Investigate robustness of results regarding FTC students who:
  - o did not complete HS Core.
  - o did not recently complete secondary education.
  - o did not take ACT (i.e, who took only the SAT).Success

[REDACTED]

7. Discuss implications/practicability of results with UM campus enrollment managers, admissions directors, and registrars.
8. Discuss policy issues with UM System Academic Affairs and campus provosts.







Described UM FTC Undergraduate Automatic Admission Policy.

Described the problem of Missing **HSPRNK**'s regarding Standard Policy.

Described Dr. Joe Saupe's solution to the problem of Missing **HSPRNK**'s in the Standard Policy, and discussed some concerns.

**Discussed**

