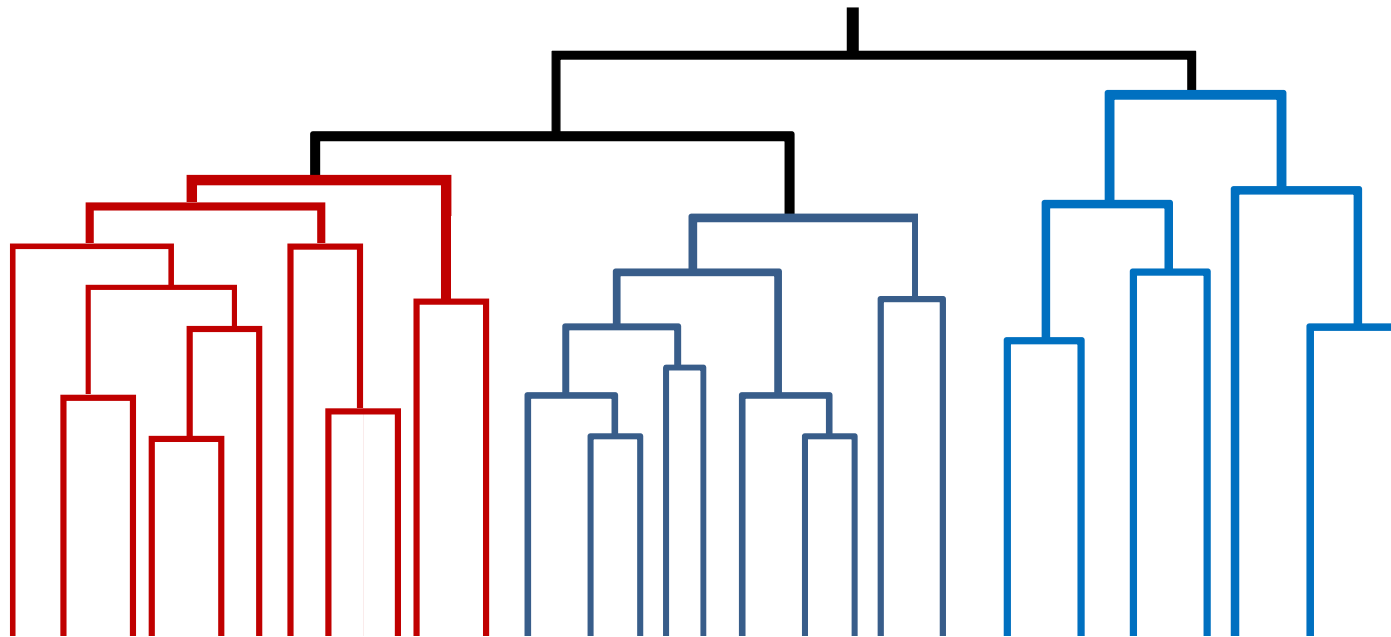


A Comparison of Two Institutions' Approaches to Peer Selection



UNIVERSITY
of HAWAII®
WEST O'AHU

John Stanley, Associate Director
Jacqueline Honda, Director
Office of Institutional Effectiveness
University of Hawaii – West Oahu
uhwoie@hawaii.edu

Presentation Outline

- What are peers and why examine them?
- Relevant previous research
- 2 examples: UH Manoa & UH West Oahu
 - Research Question
 - Methodologies Used
 - Results
- Lessons Learned

UH Manoa



UH West Oahu



What are Peer Institutions?

- Peer – similar role, scope, mission
- Other types of comparison groups
 - Competitor – students, faculty, finances
 - Aspirational – At UH, we call these “benchmark” institutions; those to emulate
 - Predetermined
 - Natural – athletic conference, region (WAC)
 - Traditional – historical (Ivy)
 - Jurisdictional – political or legal jurisdiction (state lines)
 - Classification – national reporting (Carnegie)

- Teeter and Brinkman (2003)



Why Have Peer Institutions?

- Strategic Planning
 - Inform policy
 - Accreditation
- Performance Benchmarking
 - Faculty compensation
 - Teaching loads
 - Tuition schedules
 - Budget alignment
 - Used by other institutions for performance comparison
 - Surveys supply peer lists to prospective students and parents to compare cost and graduation rates



Relevant Previous Research

- Brinkman, P. T., & Teeter, D. J. (1987). Methods for selecting comparison groups. *New Directions for Institutional Research*, 1987(53), 5-23.
- Hurley, R. G. (2002). Identification and assessment of community college peer institution selection systems. *Community College Review*, 29(4).
- Teeter, D. & Brinkman, P. (2003). Peer institutions. In William Knight (Eds.), *The primer for institutional research* (pp. 111). Tallahassee: Association for Institutional Research.
- Xu, J. (2008). Using the IPEDS peer analysis system in peer group selection. *AIR Professional File*, 2008(110).
- Trainer, J. F. (2008). The role of institutional research in conducting comparative analysis of peers. *New Directions for Higher Education*, 2008(141), 21-30.
- Soldner, M. (2009). Peer comparison data: Meeting the needs of campus decision-makers. An AIR/NCES Data Policy Fellowship Report.
- Nzeukou, M., & Muntal, D. (2010). Peerless: A Knowledge-Based Selection Methodology of Peer Institutions. Presented at the Annual Forum of the Association for Institutional Research, Chicago, IL.
- McLaughlin, G., Howard, R., & McLaughlin J. (2011). Forming and Using Peer Groups Based on Nearest Neighbors with IPEDS Data. Presented at the Annual Forum of the Association for Institutional Research, Toronto, Ontario, Canada.
- Carrigan, S. (2012) Selecting Peer Institutions with IPEDS and Other Nationally Available Data. *New Directions for Institutional Research*, 2012 (156), 61-68.
- Stanley, J. & Kilgore, W. (2014). A Mixed Methods Approach to Institutional Peer and Aspirant Identification. *Strategic Enrollment Management Quarterly* pp 164-174.



Who are our peers now?

- Reminder: Peer = similar role, scope, & mission.
 - Teeter and Brinkman (2003)

UH West Oahu current peers:

- California State University – Monterey Bay
- Eastern Oregon University
- Great Basin College
- Texas A&M University - Texarkana
- The Evergreen State College
- University of Washington – Bothell Campus
- University of Washington - Tacoma



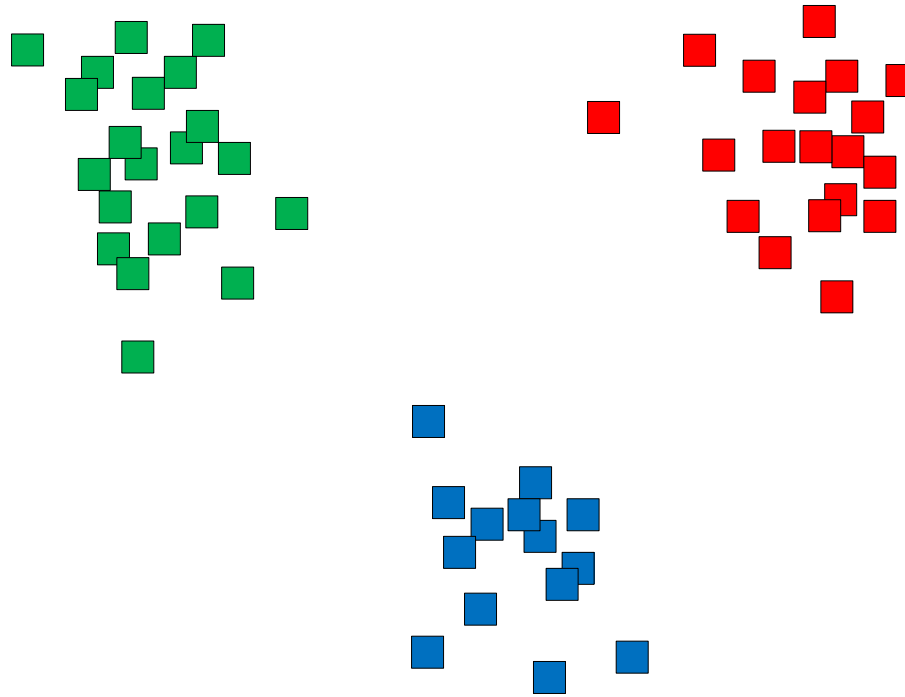
Problems with Current Peer List

~ 13 years old (circa 2002); UHWO still upper 2 yr at that time

	Total Enrollment	% Total Enrollment Men	% Total Enrollment White
UHWO	2361	58	11
Current Peer AVG*	3821 (1842, 5732)	42.6 (35, 53)	24.2 (8, 56)
	12-Month Semester Credits Taken	Number of Students Receiving Bachelors	Graduation Rate 100%
UHWO	77,086	349	3
Current Peer AVG*	185,065 (77,086, 604,956)	726 (42, 1215)	11.5 (4, 35)
	% FTFT Freshman Receiving Any Financial Aid	Total Core Revenues	Postsecondary Teacher's Instructional FTE
UHWO	51	41.5M	74
Current Peer AVG*	78.3 (61, 95)	66.2M (28.4M, 121.3M)	257 (90, 569)
* includes UHWO			7

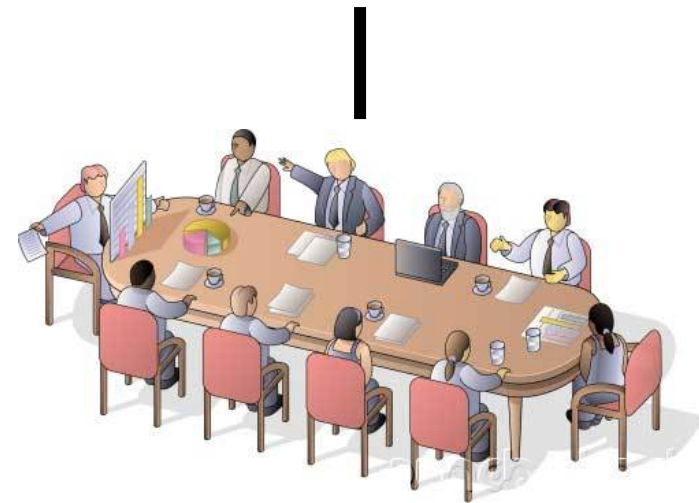
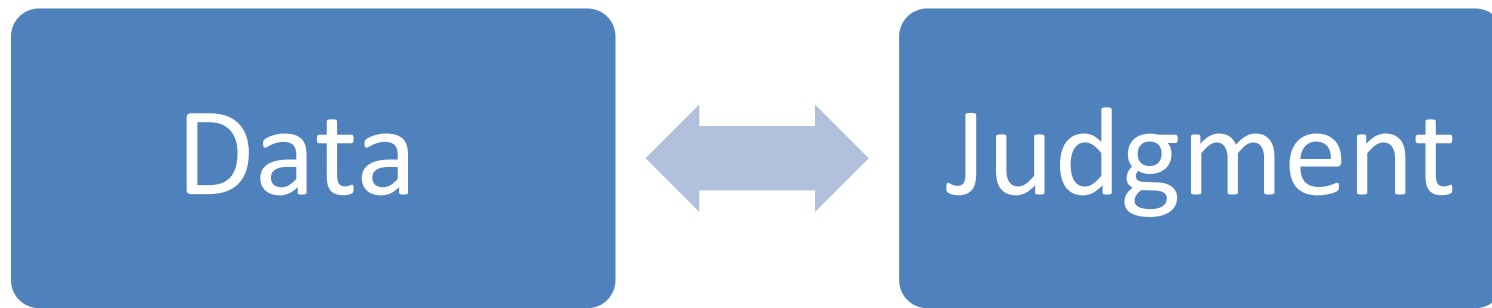
Research Question

What are the 10 (or n) most similar institutions to UH Manoa/ UH West Oahu?



Selecting Peers

The Peer Selection Process Continuum



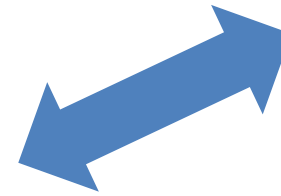
Data Used

Data



Example:

1. Graduation Rates
2. Retention Rates
3. Finance (Expenditures)
4. SSH per I-Faculty
5. # of Degrees
6. # Students in Distance Ed
7. # Students in Business Majors





Data Preprocessing

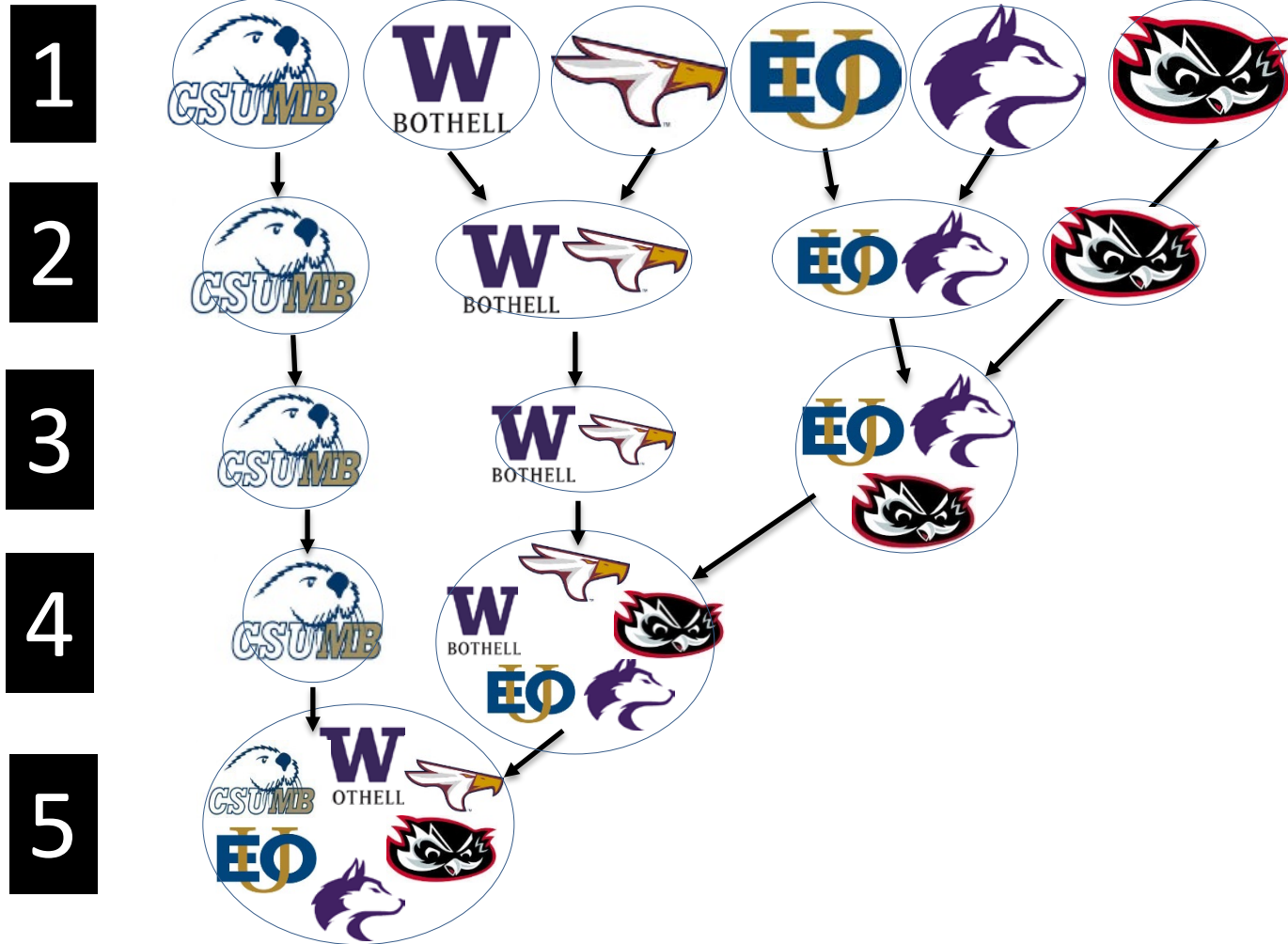
- Considering Reliability & Validity of Data
- Standardization
- Address Outliers & Missing Data
- Descriptive Statistics
- Dimension Reduction?



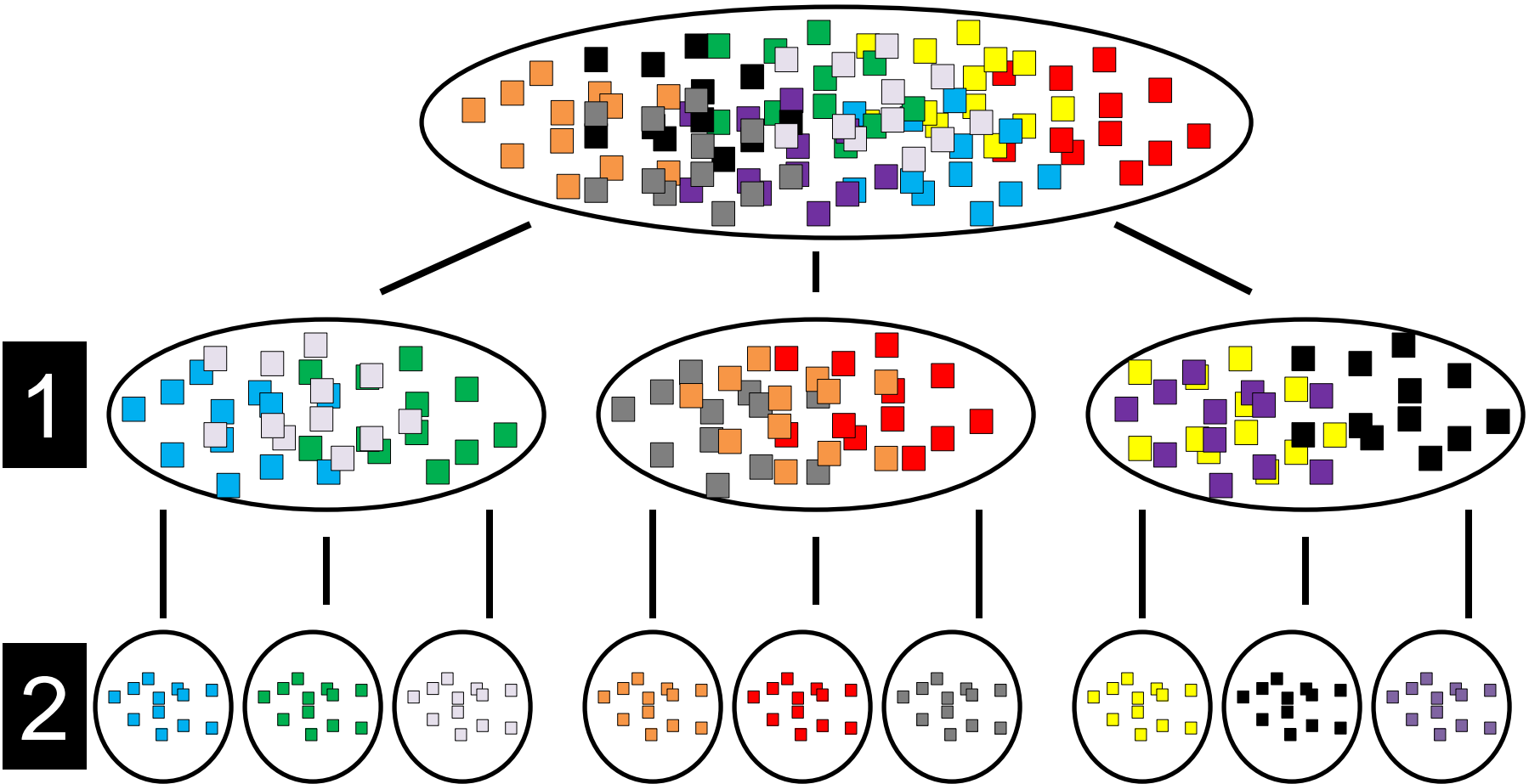
Choosing a Methodology

- Statistical clustering is the most commonly used methodology in peer selection.
 - Teeter (1984), Christal (1987), Brinkman (1987), Nzeukou & Muntal (2010),
- Clustering is a statistical procedure that combines individual cases in to homogeneous groups, called clusters, so that distances between clusters are maximized and distances within clusters are minimized.
- Several different clustering methods (i.e. hierarchical, two-step)
- Supporting methods to clustering include factor analysis and discriminant function analysis

Agglomerative Clustering Example



Two-Step Clustering Example





Clustering Data Management Tasks

- Choose clustering procedure
 - Hierarchical Agglomerative Clustering (UH Manoa)
 - 2-step sequential (UH West Oahu)
- Choose method for forming groups
 - Between-Groups Linkage
 - Within-Groups Linkage
 - Nearest Neighbor
- Choose statistic to measure distance
 - Standard Euclidian Distance
 - Correlation
 - Cosine



UH Manoa Example

- Data Source: IPEDS (2010 data used)
- Methodology: Hierarchical Agglomerative Clustering, Discriminant Analysis

Institutional

# Public 4 Year Schools in IPEDS.....	>700
Institutional Size: 10,000 – >20,000.....	274
Research Universities (very high research activity).....	70
Highest Degree Offered: Doctoral (Research, Scholarship, Prof.).....	64

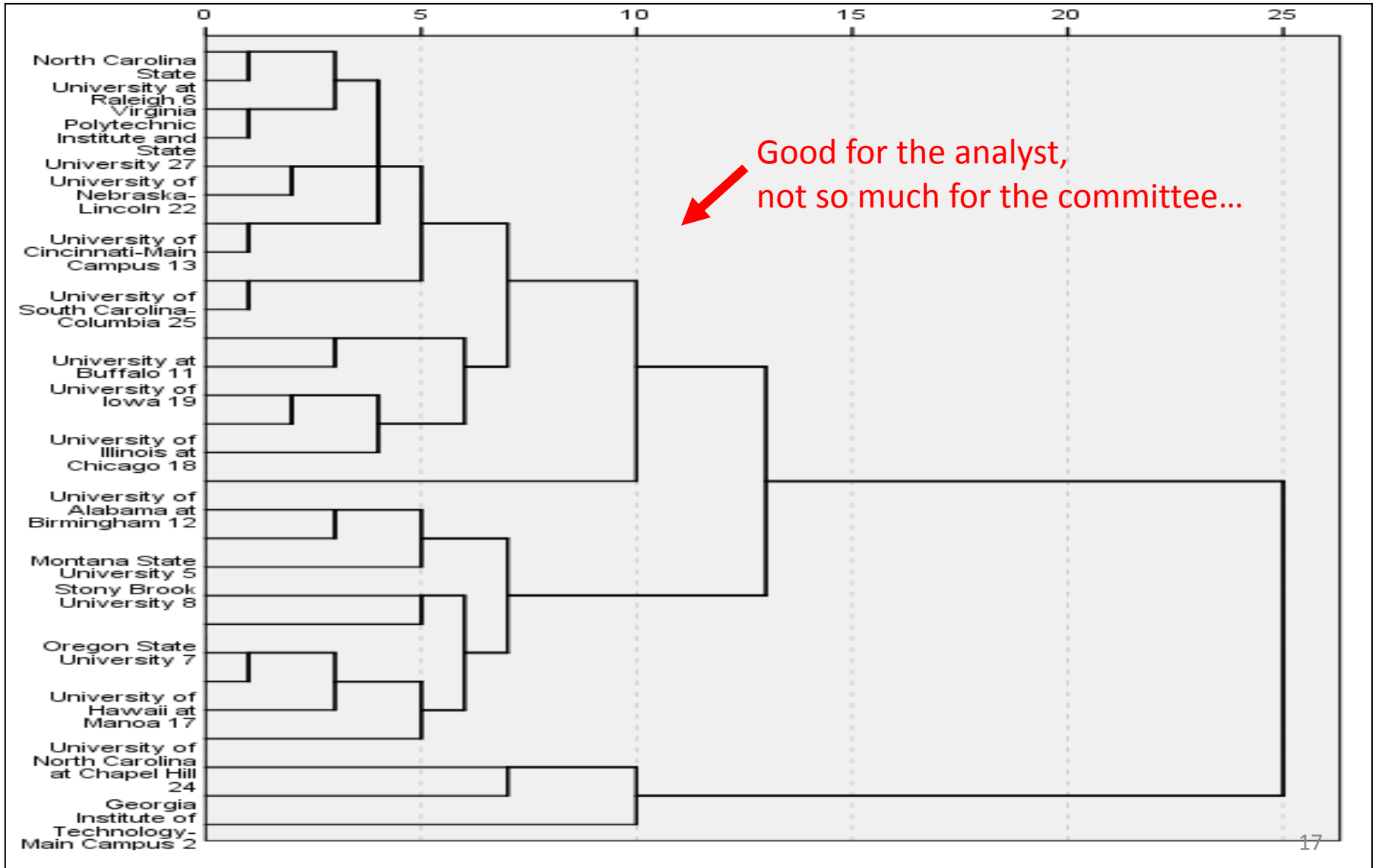


Final = 64 Institutions

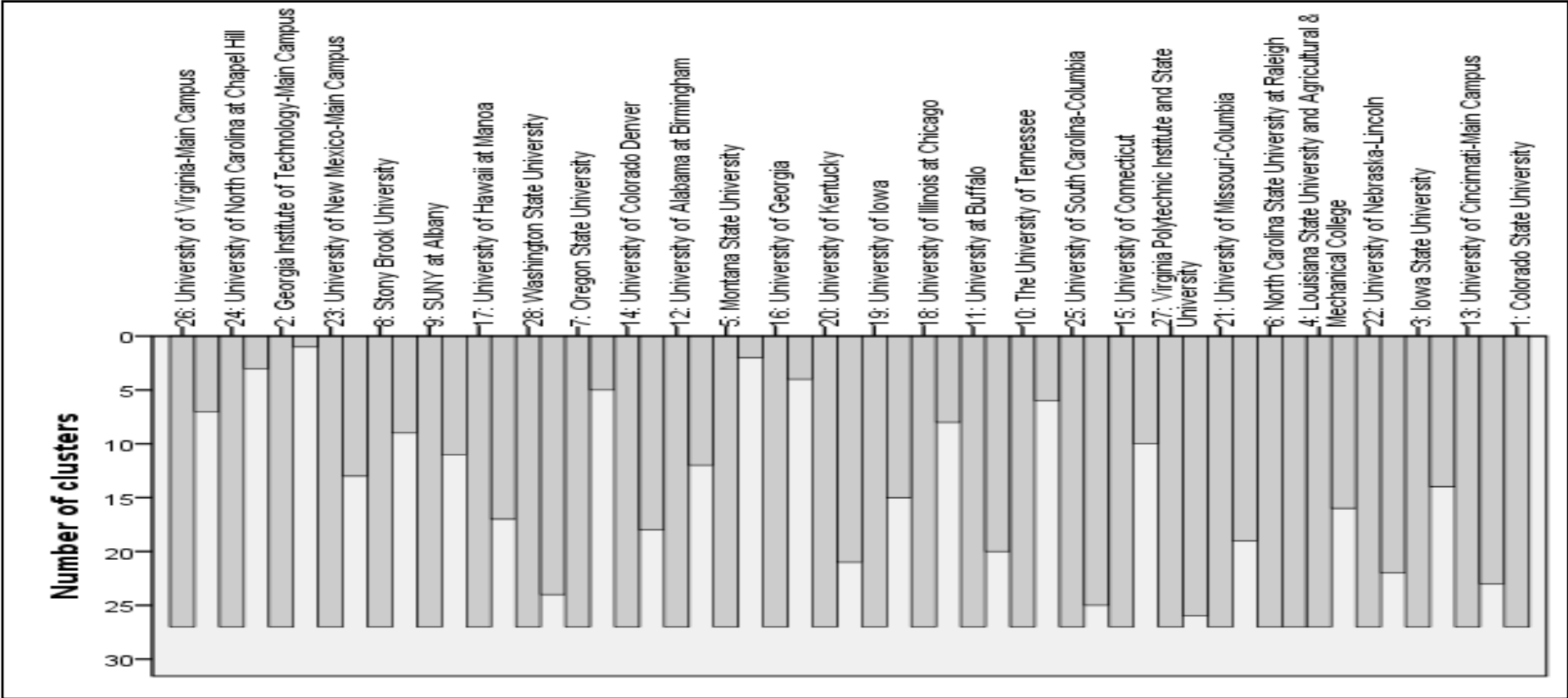
Data Elements

- Graduation rate, overall, first-time full-time undergraduates
- Retention rate, first-time full-time undergraduates
- Transfer-in undergraduate enrollment
- SAT critical reading 25th percentile score of first-time undergraduates
- SAT critical reading 75th percentile score of first-time undergraduates
- SAT Math 75th percentile score of first-time undergraduates
- Number of doctor's degrees awarded
- Revenues from tuition and fees per FTE enrollment

HAC Dendrogram



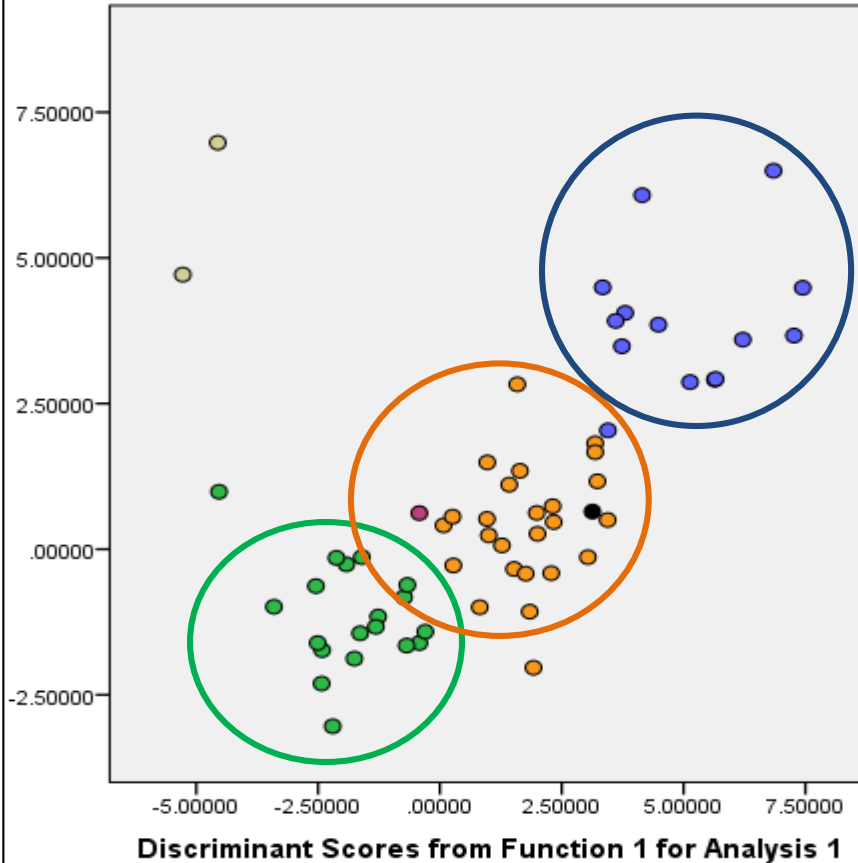
HAC Icicle Plot



Good for the analyst, not so much for the committee...

Discriminant Analysis

Y Axis Factors: Transfer-In Undergraduate Enrollment, Doctoral degrees awarded



Average Linkage (Between Groups)

- 1
- 2
- 3
- 4
- 5
- 6

Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.407 ^a	66.1	66.1	.903
2	2.265 ^a	33.9	100.0	.833

a. First 2 canonical discriminant functions were used in the analysis.

Structure Matrix

	Function	
	1	2
SAT Math, 75th percentile score of first-time, degree/certificate-seeking undergraduate students: Fall 2010	.615*	.374
Graduation rate, overall, full-time, first-time, degree/certificate-seeking undergraduates	.531*	.372
SAT Critical Reading, 75th percentile score of first-time, degree/certificate-seeking undergraduate students: Fall 2010	.433*	.226
Percent of full-time, first-time, degree/certificate-seeking, undergraduate students in fall 2009 returning in fall 2010	.419*	.333
SAT Critical Reading, 25th percentile score of first-time, degree/certificate-seeking undergraduate students: Fall 2010	.312*	.230
Revenues from tuition and fees per FTE enrollment: Fiscal year 2010	.184*	.021
Transfer-in, degree/certificate-seeking undergraduate enrollment: Fall 2010	-.517	.734*
Doctor's - research/scholarship degrees awarded: 2009-10	.272	.322*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

X Axis Factors: SAT Scores, Graduation Rate, Retention Rate, Revenues from Tuition and Fees

Cluster Membership

Based on results, determined 6 clusters was sufficient

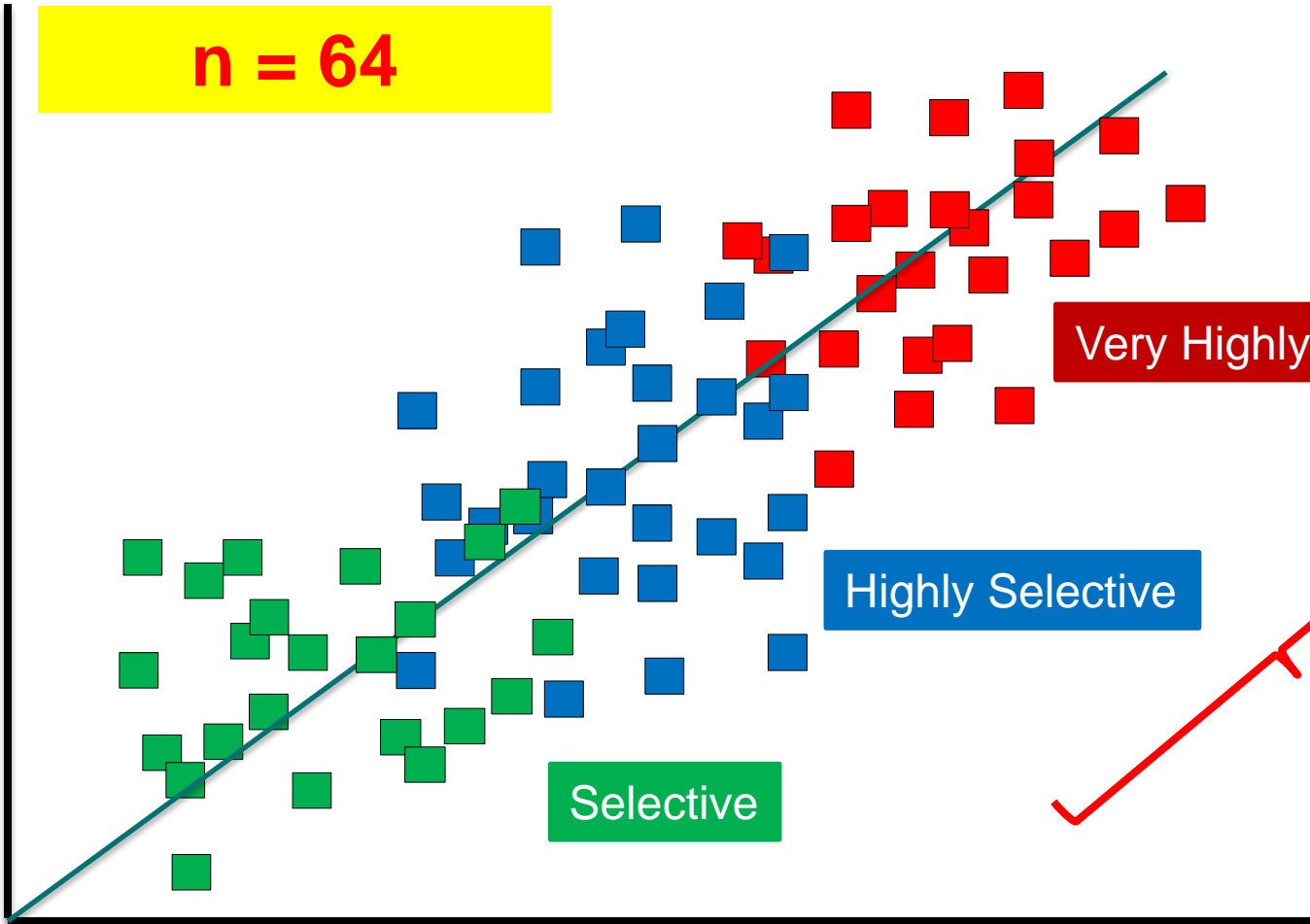
Cluster Group 1	Cluster Group 3	Cluster Group 4
Arizona State University	Florida State University	Ohio State University-Main Campus
University of Central Florida	Indiana University-Bloomington	The University of Texas at Austin
Cluster Group 2	Iowa State University	University of California-Berkeley
Colorado State University-Fort Collins	Louisiana State University	University of California-Los Angeles
Georgia State University	Michigan State University	University of California-San Diego
Mississippi State University	North Carolina State University at Raleigh	University of Florida
North Dakota State University	Purdue University-Main Campus	University of Illinois at Urbana-Champaign
Oregon State University	Rutgers University-New Brunswick	University of Maryland-College Park
University of Arizona	Stony Brook University	University of Michigan-Ann Arbor
University of Arkansas	Texas A & M University-College Station	University of Minnesota-Twin Cities
University of Cincinnati-Main Campus	The University of Tennessee	University of North Carolina at Chapel Hill
<u>University of Hawaii at Manoa</u>	University at Buffalo	University of Virginia-Main Campus
University of Houston	University of California-Davis	University of Washington-Seattle Campus
University of Illinois at Chicago	University of California-Irvine	University of Wisconsin-Madison
University of Kentucky	University of Colorado Boulder	Cluster Group 5
University of Louisville	University of Connecticut	Pennsylvania State University
University of New Mexico	University of Delaware	Cluster Group 6
University of Oregon	University of Georgia	University of Alabama at Birmingham
University of South Florida	University of Iowa	Insufficient Data
University of Utah	University of Missouri-Columbia	University of Kansas
Virginia Commonwealth University	University of Nebraska-Lincoln	Wayne State University
Washington State University	University of Oklahoma Norman Campus	
	University of Pittsburgh-Pittsburgh Campus	
	University of South Carolina-Columbia	
	Virginia Polytechnic Institute and State University	



Public, Research I, 4-Yr Example

F(y) = Doctoral Degree Output

n = 64



Very Highly Selective

Highly Selective

Selective

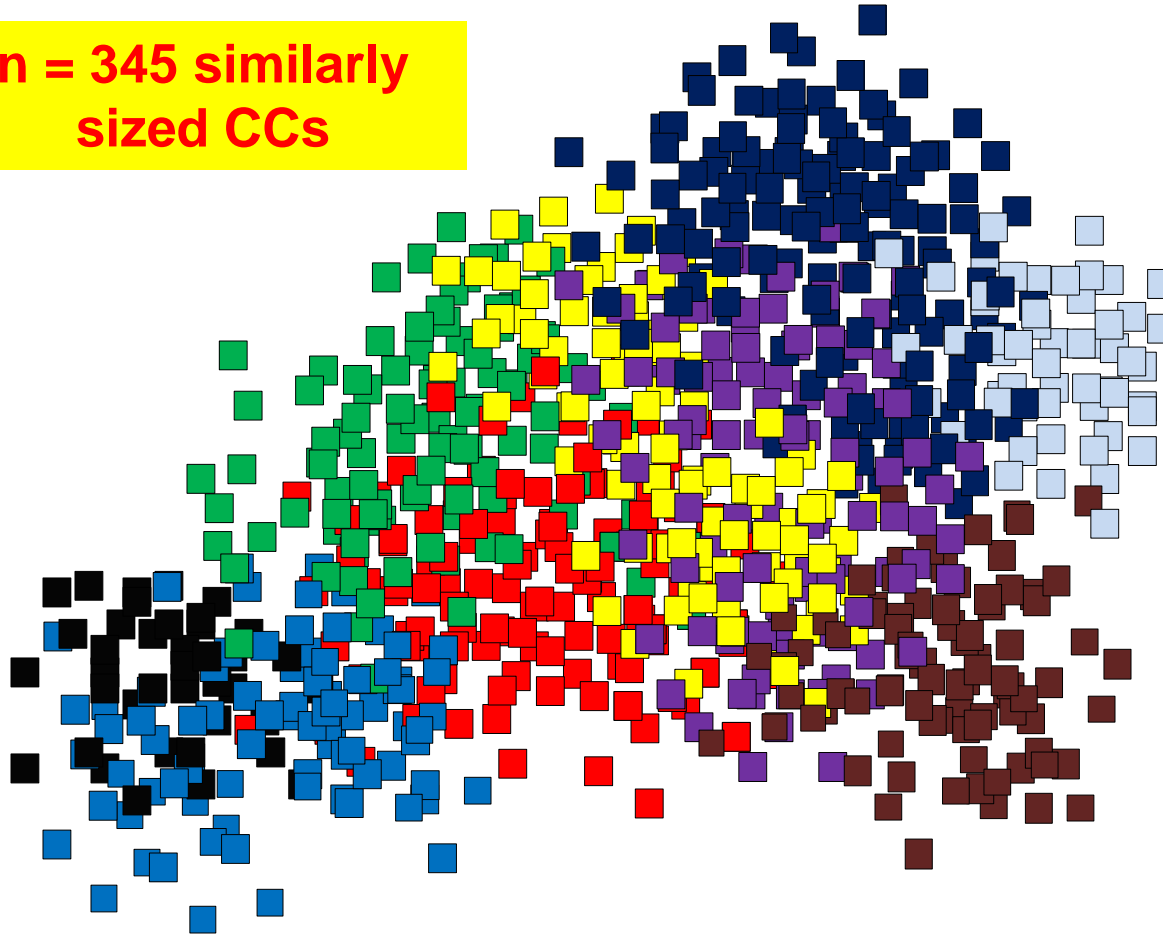
Hierarchical Cluster Analysis good for data like this.

F(x) = Retention/ On-Time Graduation Rates

Community Colleges Example

$F(y)$ = Associates Degree Output

$n = 345$ similarly sized CCs

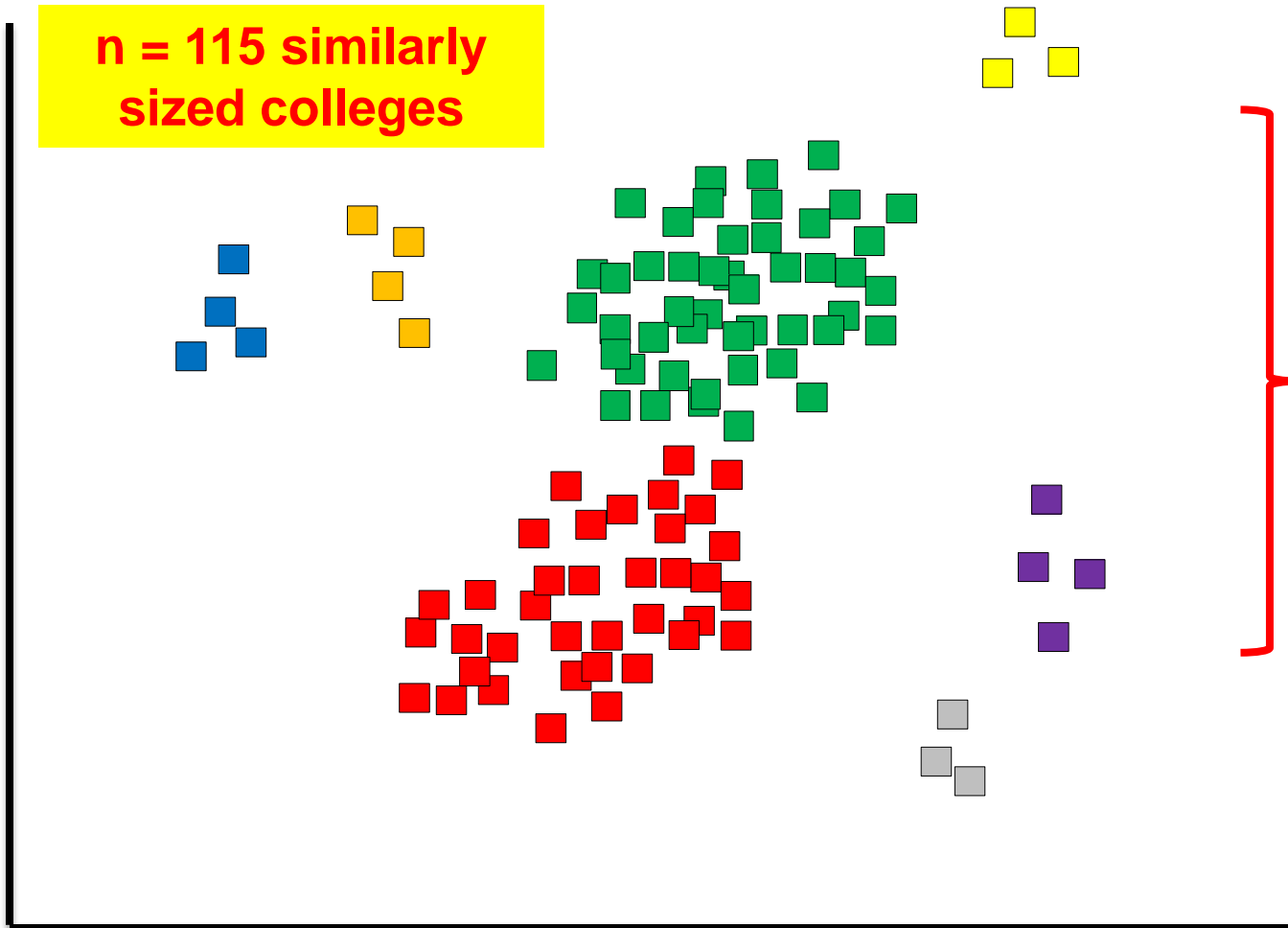


Two-step Cluster Analysis better for data like this.

$F(x)$ = Retention/ On-time Graduation Rates

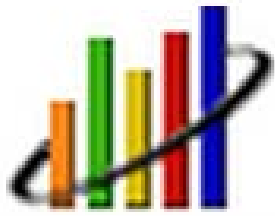
Baccalaureate/Masters Colleges Example

$F(y)$ = Bachelors Degree Output



$F(x)$ = Retention/ On-time Graduation Rates

Two-step Cluster Analysis better for data like this.



Data Selection



IPEDS DATA CENTER

Institutional

Public 4 Year Schools in IPEDS.....>**700**

Bachelors & Master Carnegie Classification.....**139**

Institutional Size: 1,000 – 4,999..... **115**

Final = 115 Institutions

Data Elements

Core Expenses Total per Completion (FY 13)

Graduation Rate Within 4, 5, & 6 Years Total (2013)

First-Time Full-time Freshmen Retention Rate (Fall 13)

12-month Student Semester Hours Taken per Instructional Faculty (AY 13)

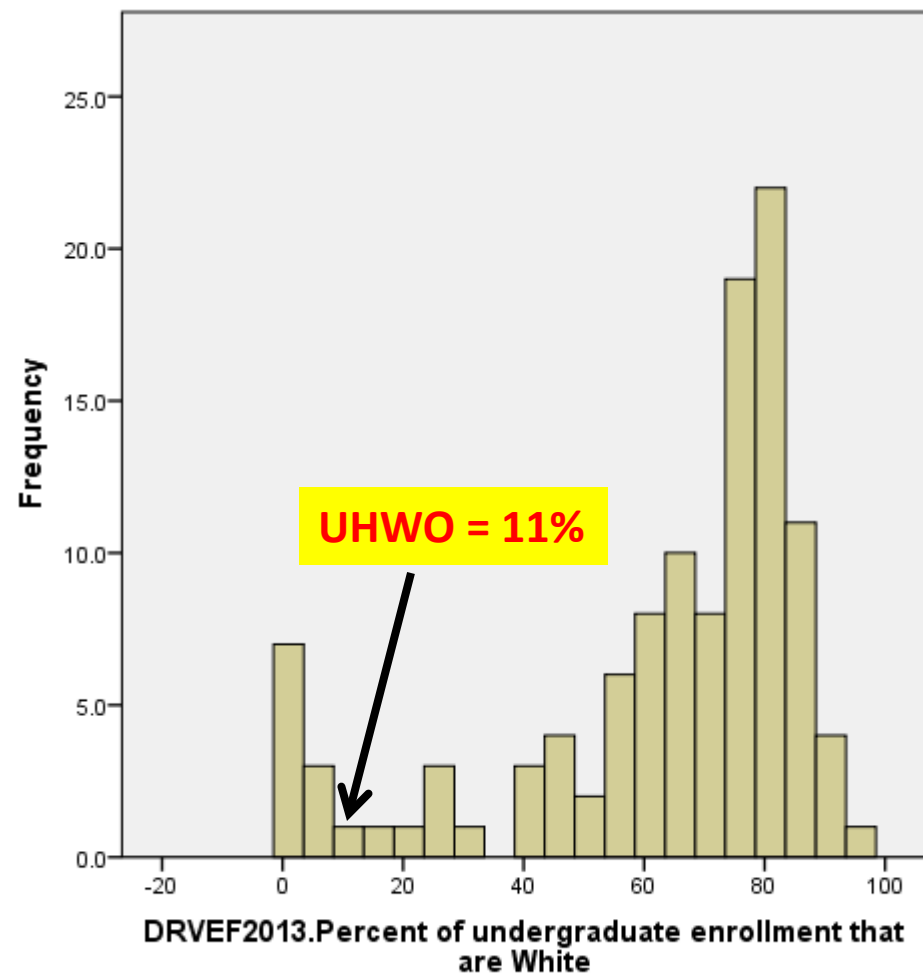
of Bachelor Degrees Awarded (FY 13)

% of Bachelor Degrees Awarded in CIP Code 52 (FY 13)

% of Undergraduates Enrolled in Some But Not All Distance Ed Courses (Fall 13)



Percent of Undergraduate Enrollment that are White



OTHER IPEDS ETHNICITY CODES ARE:

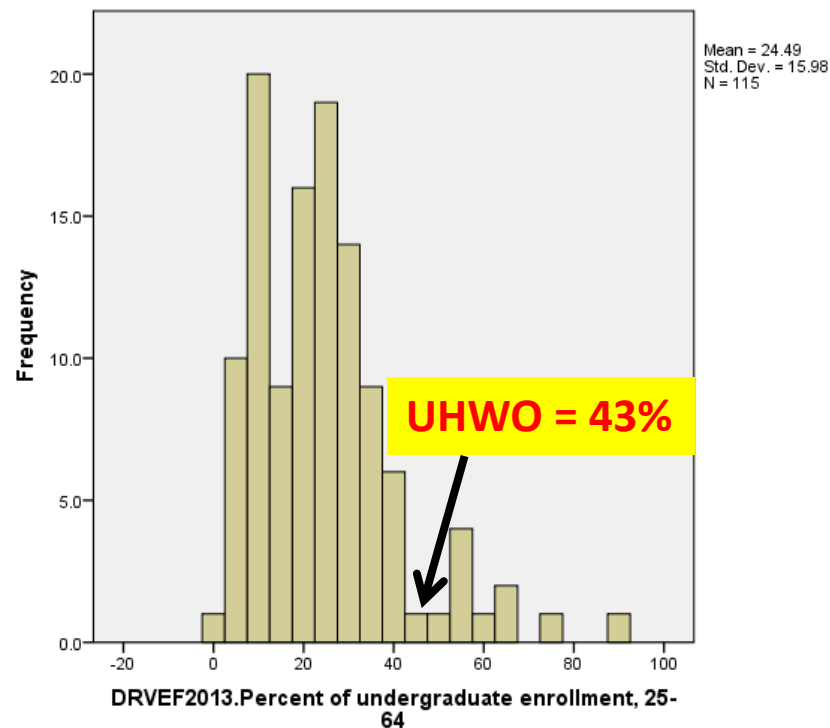
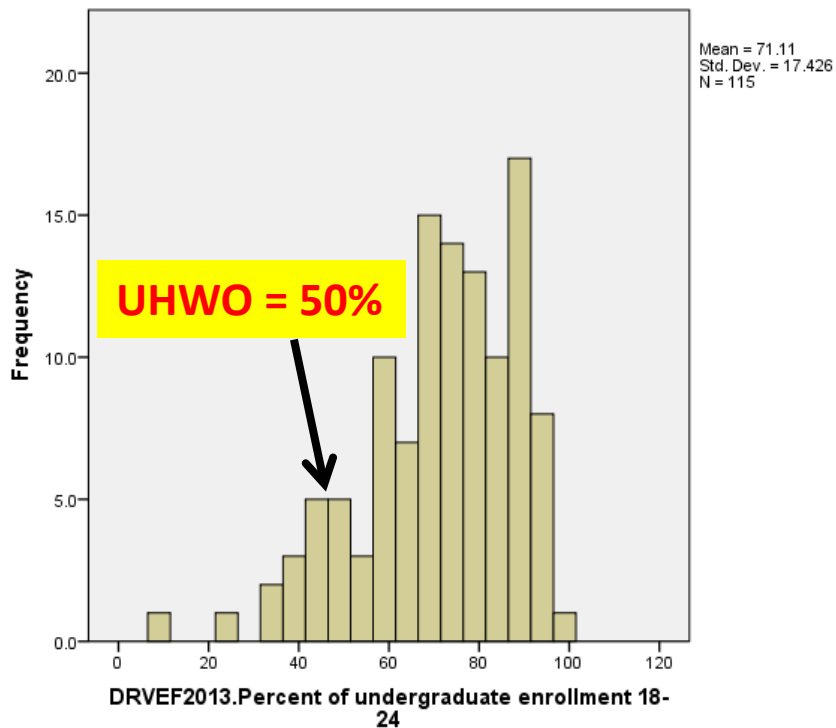
- Alaskan Native or Native American
- Asian
- Black/African American
- Hispanic/Latino
- Native Hawaiian
- Mixed Race 2 or more

Note:

- IPEDS reporting methodology significantly under-reports Native Hawaiian students.
- Asian racial groups are consolidated in IPEDS
- IPEDS inadequate for UH to make institutional comparisons based on race/ethnicity.



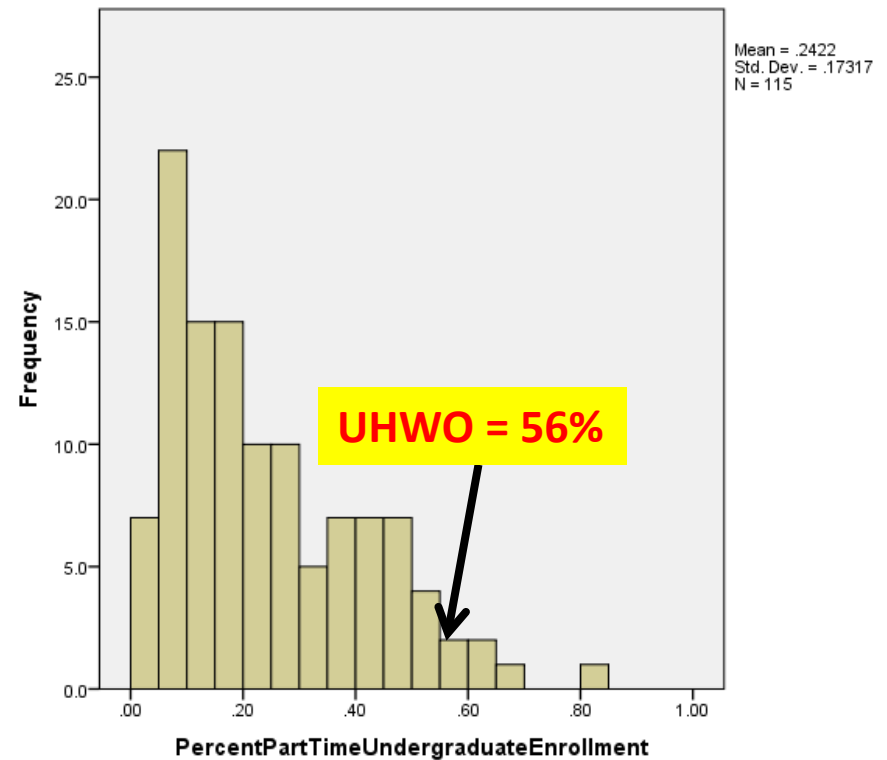
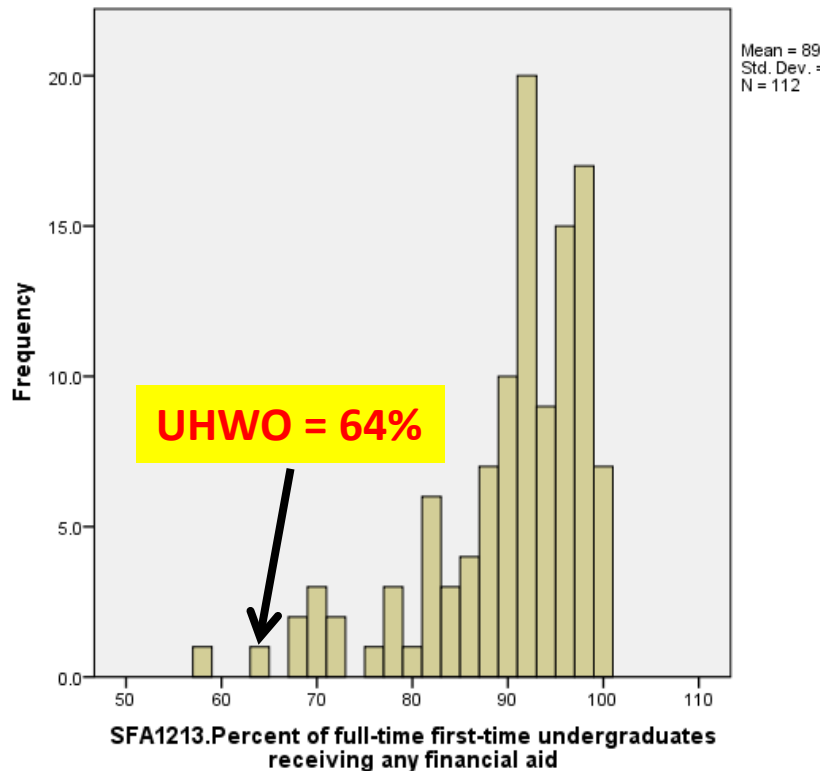
Percent of Undergraduate Enrollment that are ages 18-24, 25-64



UHWO has a greater percentage of non-traditional students compared to most institutions in the comparison sample.



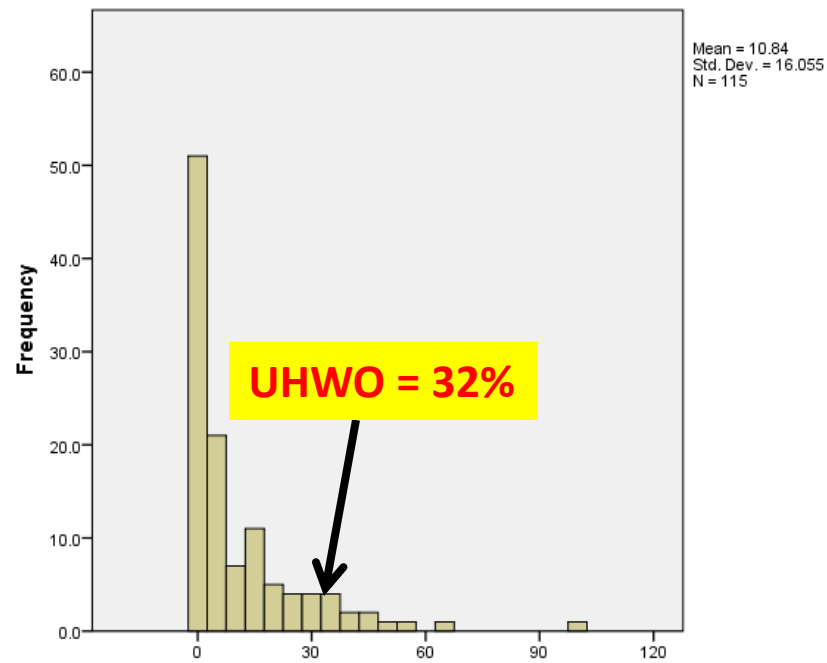
Percent of First-Time Full-Time Undergraduates Receiving Any Financial Aid



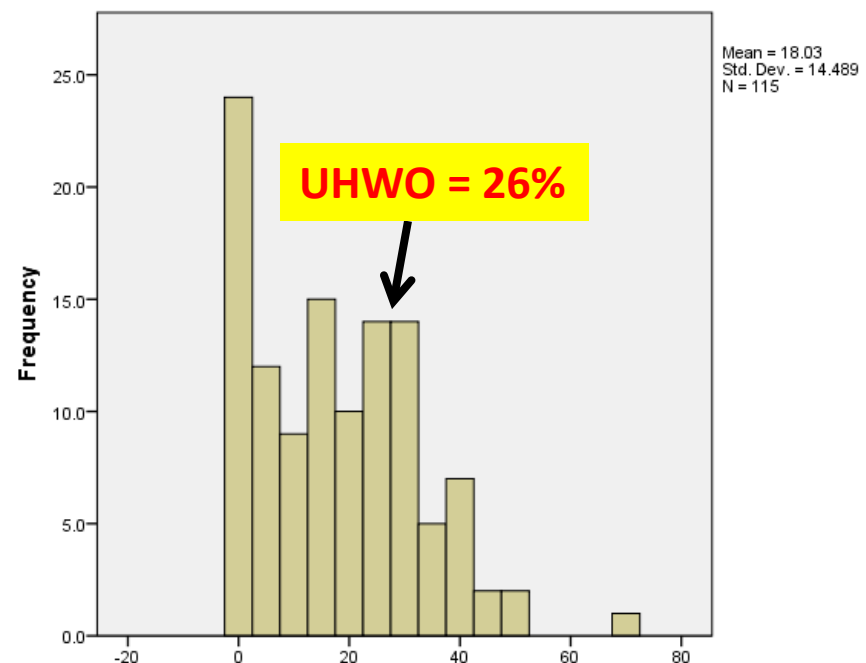
UHWO has a much lower percentage of FTFT UGs receiving any financial aid, and a much larger percentage of part-time UG enrollment, relative to the sample.



Percent of Undergraduate Students Enrolled in Distance Education



DRVEF2013.Percent of undergraduate students enrolled exclusively in distance education courses

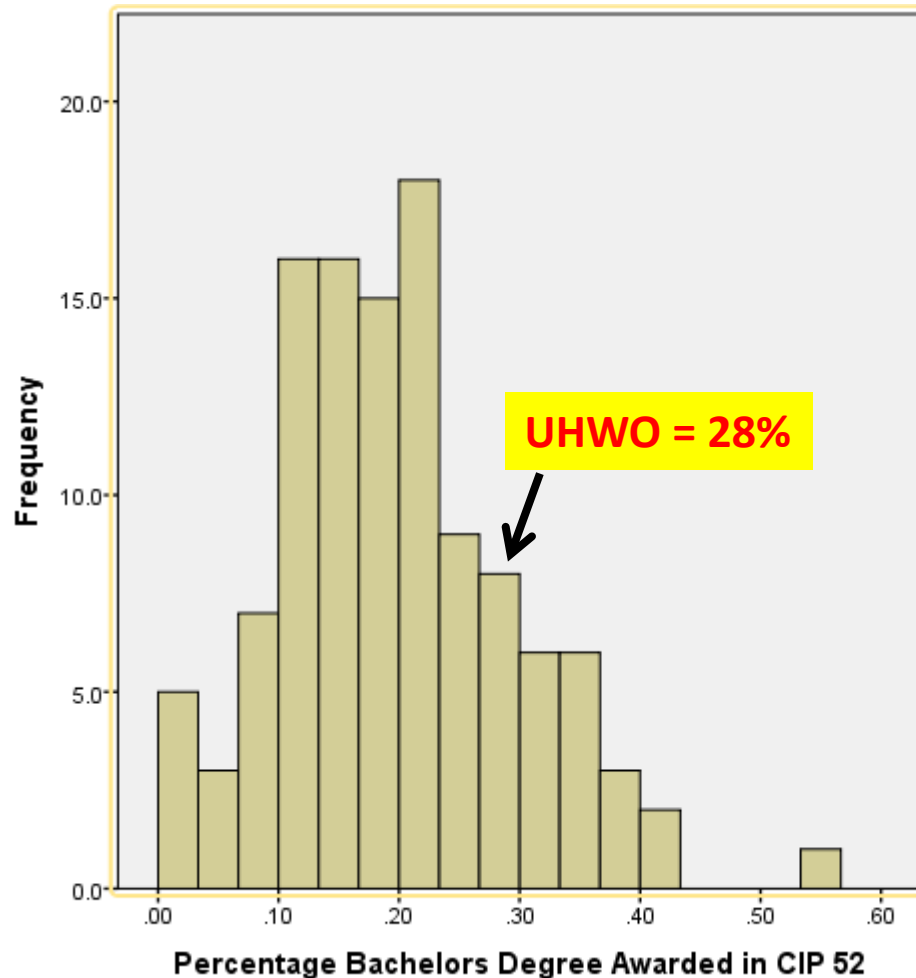


DRVEF2013.Percent of undergraduate students enrolled in some but not all distance education courses

The percentage of UG students enrolled in ALL DE is skewed and UHWO tends to outlie. The percentage of UG students enrolled in AT LEAST ONE DE is more normally distributed and UHWO is one-half standard deviation above the mean.



Percent of Bachelors Awarded in “UHWO-like” Concentrations

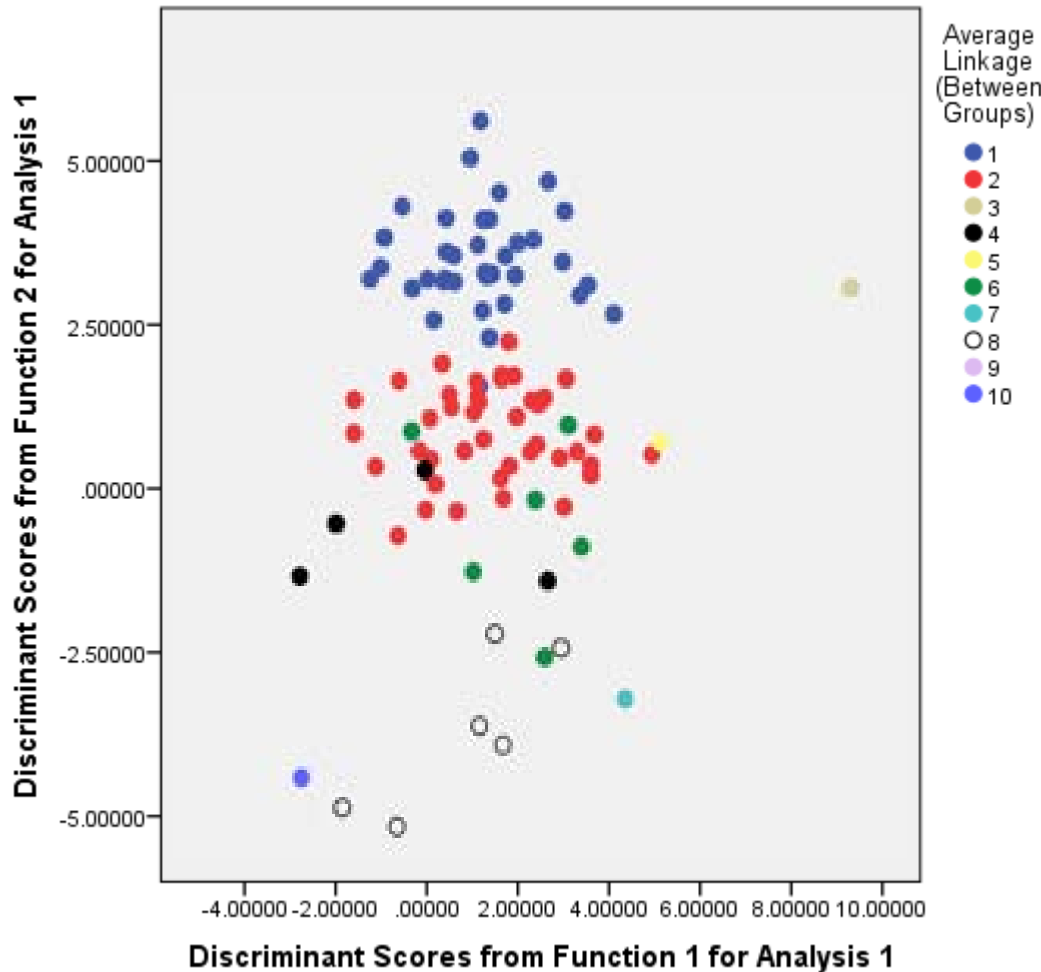


CIP 52 INCLUDES:

- Business Administration
- Accounting
- Marketing
- Management
- Management Information Systems
- Travel Industry Management
- Hospitality & Tourism Management
- Entrepreneurship Studies



Hierarchical Cluster Fit



Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	3.359 ^a	88.7	88.7	.878
2	.426 ^a	11.3	100.0	.547

a. First 2 canonical discriminant functions were used in the analysis.

Structure Matrix

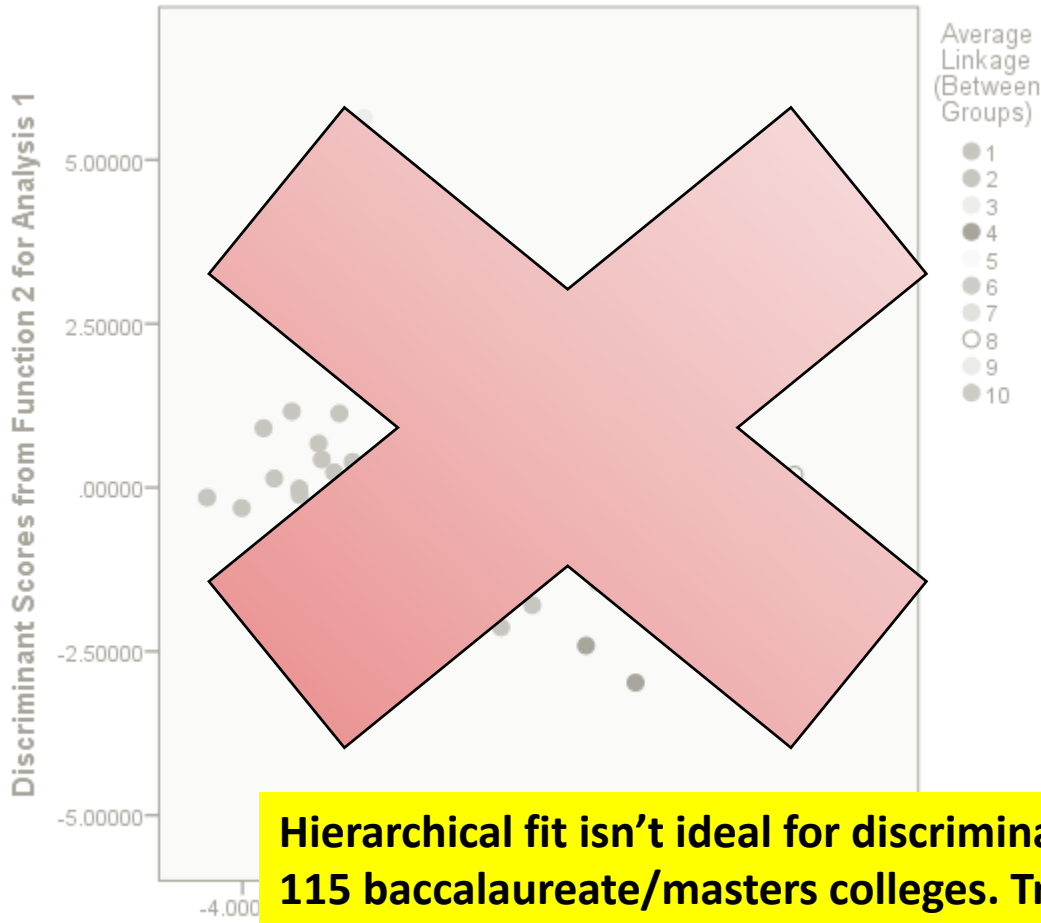
	Function	
	1	2
DRVC2013.Bachelor's degree	.545 [*]	-.265
EFIA2013.12-month instructional activity credit hours: undergraduates	.508 [*]	-.071
DRVHR2013.Instructional FTE	.446 [*]	.127
EF2013D.Full-time retention rate, 2013	.416 [*]	.368
DRVGR2013.Graduation rate - Bachelor degree within 6 years, total	.354 [*]	-.296
DRVF2013.Core expenses, total dollars (GASB)	.309 [*]	.225
DRVGR2013.Graduation rate - Bachelor degree within 4 years, total	.253 [*]	-.203
Percentage Bachelors Degree Awarded in CIP 52	-.074	.309 [*]

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function



Hierarchical Cluster Fit



Hierarchical fit isn't ideal for discriminating between the 115 baccalaureate/masters colleges. Try 2-step cluster procedure.

Summary of Canonical Discriminant Functions

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	3.359 ^a	88.7	88.7	.878
2	.426 ^a	11.3	100.0	.547

a. First 2 canonical discriminant functions were used in the analysis.

	Function	
	1	2
DRVC2013.Bachelor's degree	.545*	-.265
EFIA2013.12-month instructional activity credit hours: undergraduates	.508*	-.071
DRVHR2013.Instructional FTE	.446*	.127
EF2013D.Full-time retention rate, 2013	.416*	.368
DRVGR2013.Graduation rate - Bachelor degree within 6 years, total	.354*	-.296
DRVF2013.Core expenses, total dollars (GASB)	.309*	.225
DRVGR2013.Graduation	.203	.09*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
 Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

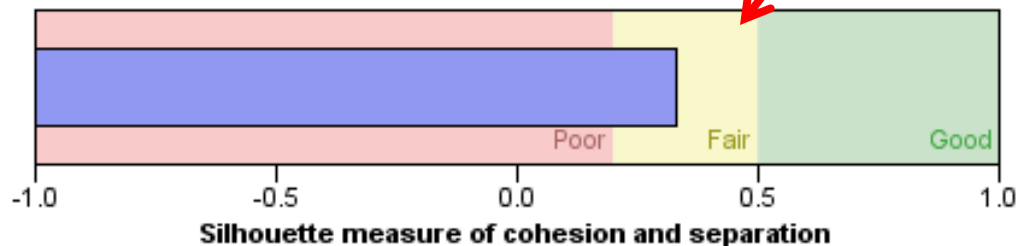
Employ Two-step Cluster Analysis

Model Summary

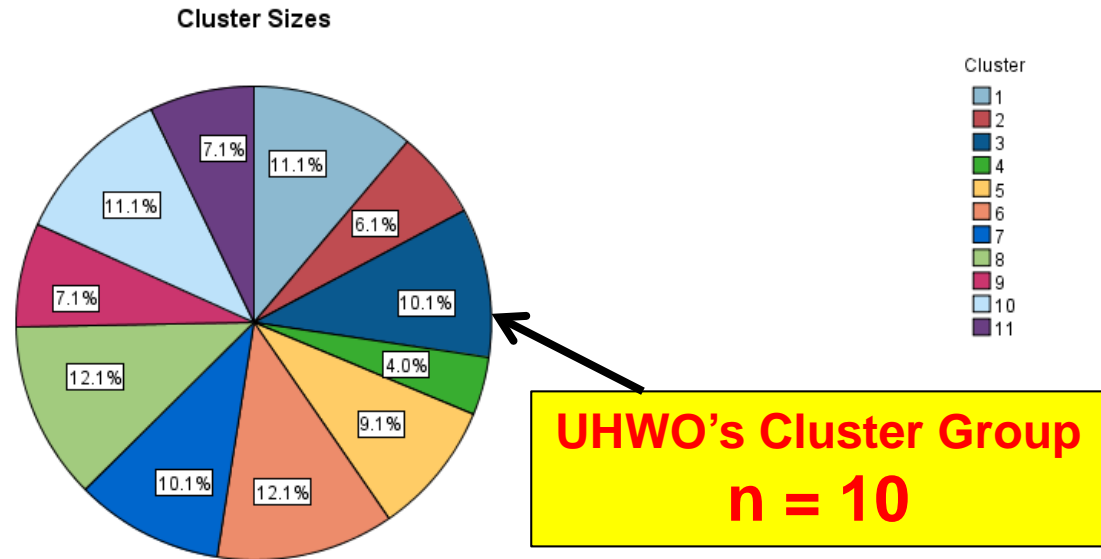
Algorithm	TwoStep
Inputs	9
Clusters	11

Goodness of fit is moderate-to-good

Cluster Quality



Cluster Distribution

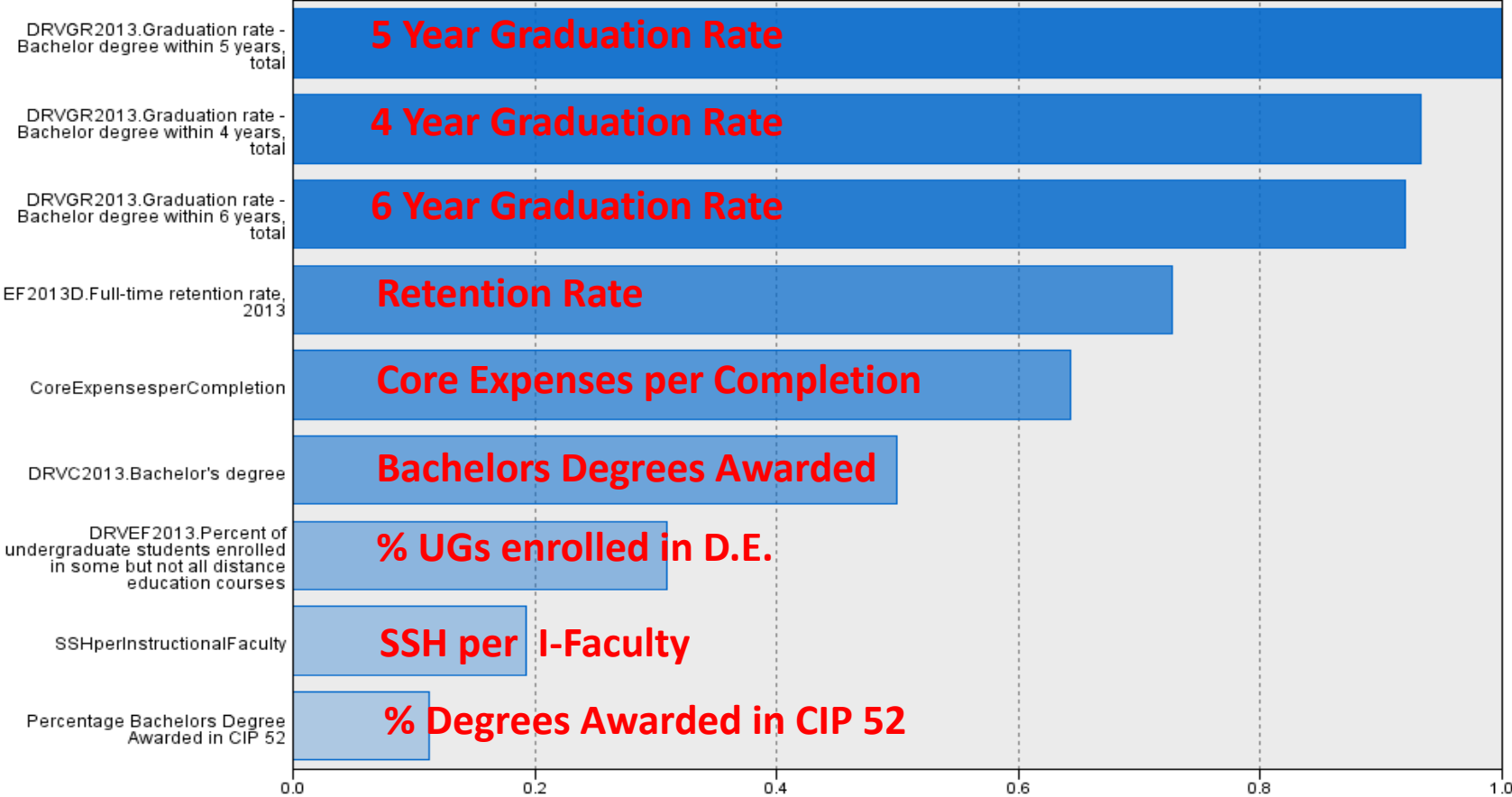


Size of Smallest Cluster	4 (4%)
Size of Largest Cluster	12 (12.1%)
Ratio of Sizes: Largest Cluster to Smallest Cluster	3.00

Predictor Strength



Predictor Importance



Percentage Bachelors Degree Awarded in CIP 52

DRVGR2013.Graduation rate Bachelor degree within 5 year total

Least Important

Most Important 84



UHWO's Cluster

Cluster Comparison

■ 3

DRV	5 Year Graduation Rate	total	
DRV	4 Year Graduation Rate	total	
DRV	6 Year Graduation Rate	total	
EF2	Retention Rate		
Cor	Core Expenses per Completion		
DRV	Bachelors Degrees Awarded		
DRV	% UGs enrolled in D.E.	some but not all distance education courses	
SSH	SSH per I-Faculty		
Per	% Degrees Awarded in CIP 52		



Cluster Group #3 is the proposed peer group and includes:

1. Dickinson State University
2. Georgia Southwestern State University
3. Indiana University - East
4. Lewis-Clark State College
5. Louisiana State University - Shreveport
6. Minot State University
7. Montana State University - Billings
8. Peru State College
9. Southern Arkansas University Main Campus
10. University of Hawaii - West Oahu



New Peer Group Details

	UH WEST OAHU	OLD PEER AVERAGE	NEW PEER AVERAGE
Total Enrollment	2,661	3,821	3,162
12-month UG SSH per I-Faculty FTE	528	688	508
Bachelors Awarded	349	726	465
4 year Grad Rate	10	25	13
5 year Grad Rate	25	40	26
6 year Grad Rate	25	45	31
Retention Rate	68	70	63
Core Expenses (in millions)	\$26	\$55	\$35
Core Expenses per Completion (in thousands)	\$76	\$84	\$74



Takeaways

UH West Oahu's new peer list is...

- Recognizant of UHWO's enrollment growth projections/aspirations.
- Aligned with campus targets for degree awards and graduation rates.
- More closely aligned with campus's financial scope.
- Incorporates UHWO's campus-based and distance-learning missions.



Lessons Learned

The role of institutional research

- Provide analytical support
- Formative collaboration with campus groups
- Exploratory and iterative process
- Clear, simple methodology
- Flexible, easy to update
- Focus on key variables



Questions?

University of Hawai'i – West Oahu
Office of Institutional Effectiveness

uhwoie@hawaii.edu

808-689-2316