

Describing to Predicting:

Improving Course Design with Predictive Analytics

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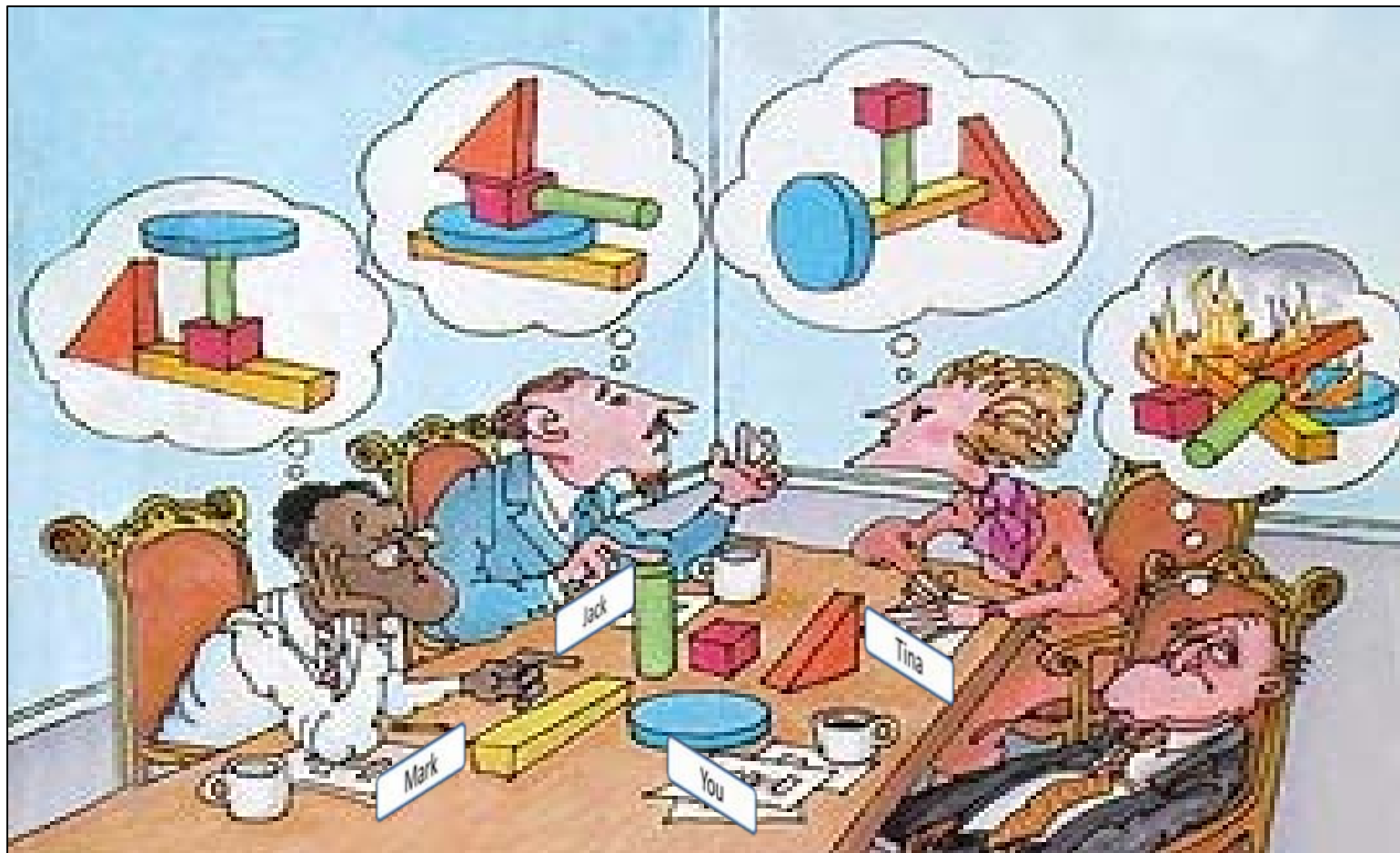
NGA College

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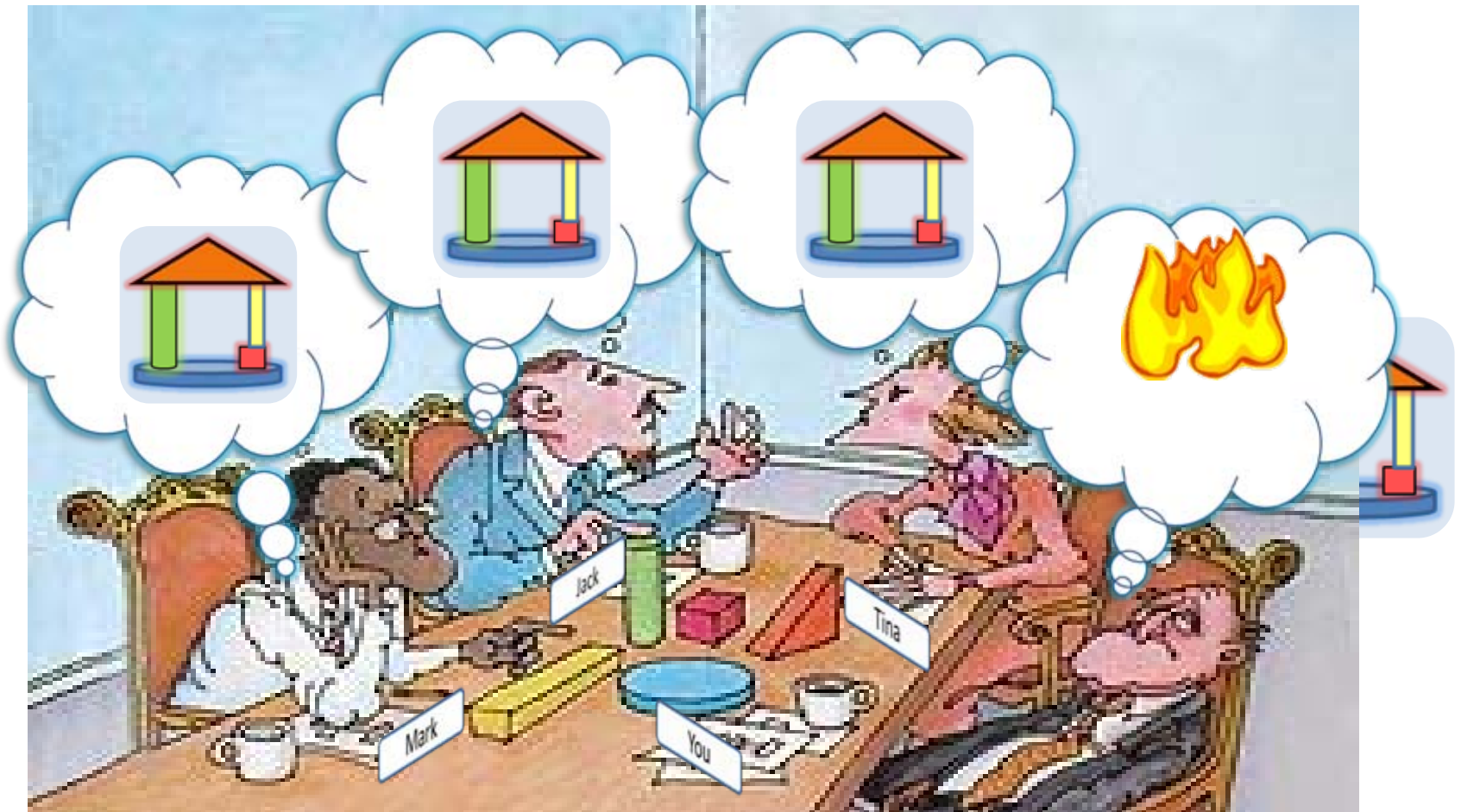
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Concept map for Training Evaluation Program (Present)



Concept map for Training Evaluation Program (Future)



Describing to Predicting:

Improving course design with Predictive Analytics

- Overview of Training Evaluation Models
- Data import and descriptive statistics
- Inferential and Predictive statistics
- Future goals

Describing to Predicting:

Improving course design with Predictive Analytics

- Overview of Training Evaluation Models
 - Rummler and Brache 9-Boxes Model for Performance Improvement
 - Kirkpatrick's Training Evaluation Model
 - Training Evaluation Program's Concept Map
- Data import and descriptive statistics
- Inferential and Predictive statistics
- Future goals

Rummler and Brache 9-Boxes Model

	Goals	Design	Management
Organization	Strategy, operating plans, and metrics.	Organization structure and overall business model.	Performance review practices and management culture.
Process	Customer and business requirements.	Process design, systems design, and workspace design.	Process ownership, process management, and continuous improvement.
Performer	Job specifications, performance metrics, and individual development plans.	Job roles and responsibilities, skill requirements, procedures, tools, and training.	Performance feedback, consequences, coaching, and support.

Rummler, G. and Brache, A., (1997), 9-Box Model, <http://www.rummler-brache.com/the-nine-boxes-model>, Retrieved on 22 December, 2010.

Dr. Donald Kirkpatrick Training Evaluation Steps

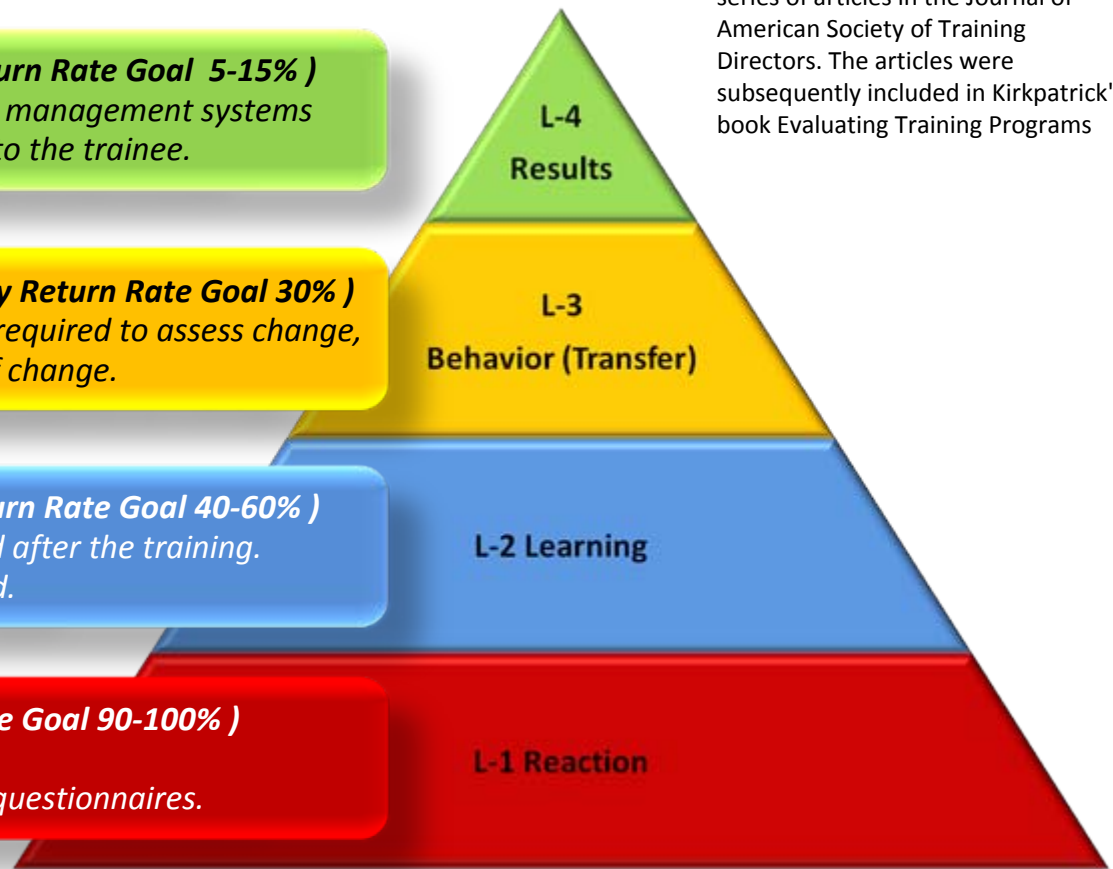
Donald L. Kirkpatrick, Professor Emeritus, University Of Wisconsin first published his ideas in 1959, in a series of articles in the Journal of American Society of Training Directors. The articles were subsequently included in Kirkpatrick's book Evaluating Training Programs

- **Organizational Leadership (Industry Return Rate Goal 5-15%)**
- *Measures are already in place via normal management systems and reporting - the challenge is to relate to the trainee.*

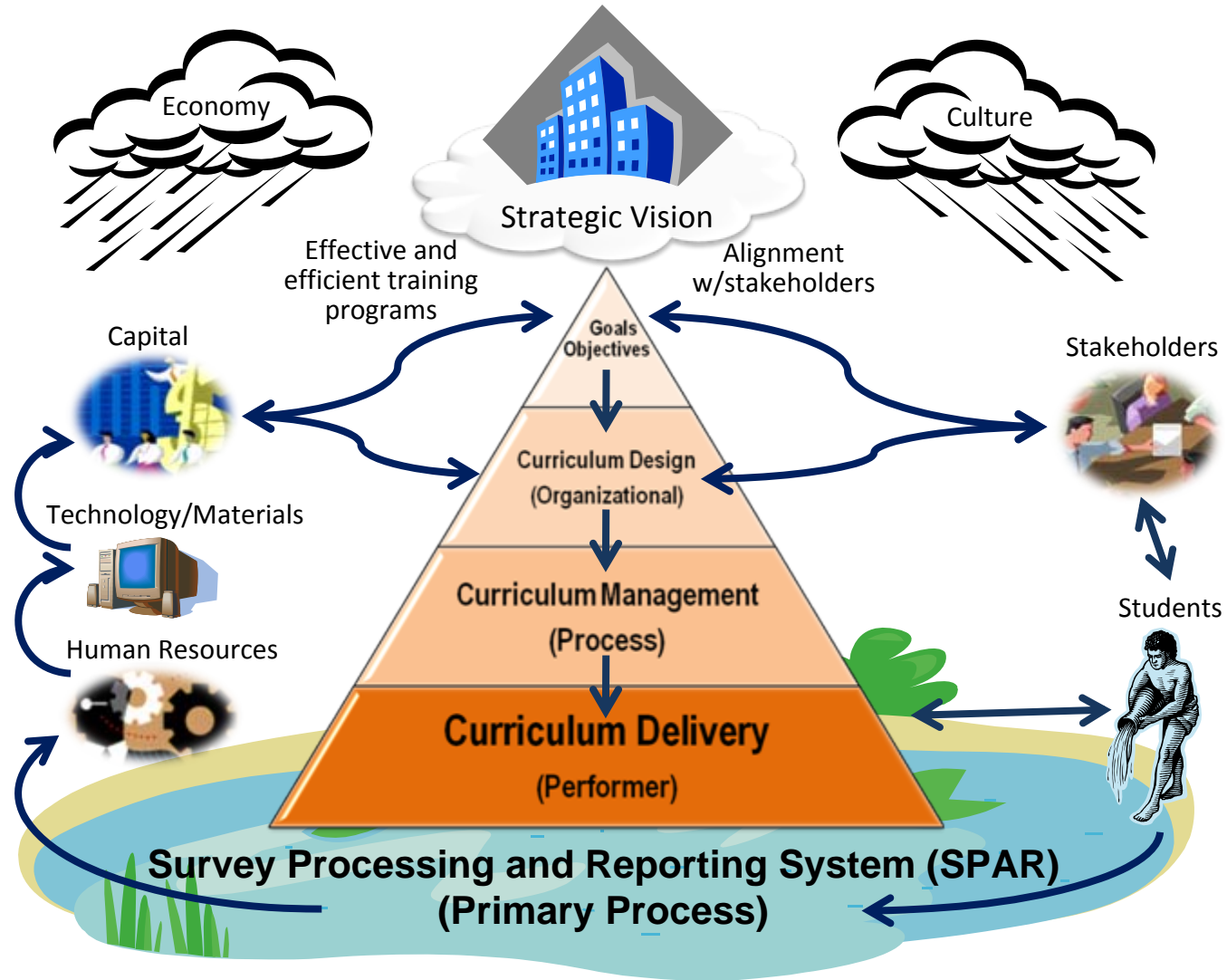
- **Program Manager/Stakeholder (Industry Return Rate Goal 30%)**
- *Observation and interview over time are required to assess change, relevance of change, and sustainability of change.*

- **Course Manager/Student (Industry Return Rate Goal 40-60%)**
- *Typically assessments or tests before and after the training.*
- *Interview or observation can also be used.*

- **Instructor/Student (Industry Return Rate Goal 90-100%)**
- *'Happy sheets', feedback forms.*
- *Verbal reaction, post-training surveys or questionnaires.*



Concept Map of Evaluations



Describing to Predicting:

Improving course design with Predictive Analytics

- Overview of Training Evaluation Models
- Data import and descriptive statistics
 - History of NGC survey program
 - Using IBM SPSS data import, pre-process and store data
 - Presenting data using reports, charts, and tables
- Inferential and Predictive statistics
- Future goals

History of NGC Survey Program

- **Focus metrics** (*Satisfaction, Quality of Instruction, Course Quality, Relevance, Learning, Transfer and Academic Support*)
- **NGC has been collecting data since FY98** (Scantron)
 - FY05 version was informed by extensive research
 - Nuhfer, E. (2003). *Of What Value are Student Evaluations?* Center for Teaching and Learning, Idaho State University
 - Sacks, Peter. (1996). *Generation X Goes to College*. Chicago, IL: Open Court Publishers.
 - Validated with Factor Analysis
 - FY07 version refined scales and added business metric
 - Changed scale to Strongly Agree/Disagree on Likert Scale
 - Added Net Promoter Score
- **Validated FY10 Barco Survey as high quality instrument** (SPAR)
 - Confirmed Construct Validity with Factor Analysis
 - Confirmed Reliability with Cronbach's Alpha
 - Net Promoter Score as leading indicator of "change"



Survey Import, Data Prep and Storage

- **IBM SPSS Data Collections** to Import
 - Provided survey logic and rules for scanning
- **IBM SPSS Statistics** for Data Preparation
 - Writing *SYNTAX* for standardized processes
 - Verify data using *REPORTS* and *DESCRIPTIVES*
 - Created dashboards using *TABLES* and Charts
- Export to Access database



Six composite scores (scales)

Composite Metrics (Scales)	Purpose
Satisfaction	Classic L-1 metric for reaction
Relevance	Indicator of target audience
Quality of Instructor	Quality metric for faculty
Course Quality	Quality metric for staff
Learning	Respondent self-assessment of L-2 indicator
Transfer	Respondent self-assessment of L-3 indicator
Academic Support	Quality metric for facility & support
Net Promoter Score ©	Biased metric and leading indicator of performance

5-Point Likert Data for composite scores

10-Point scale for Net Promoter Score

Visual Trend Analysis

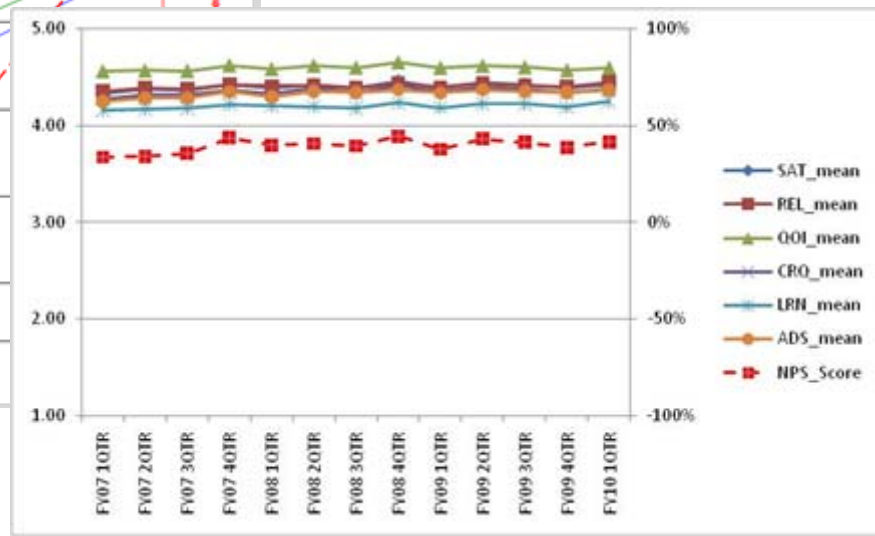
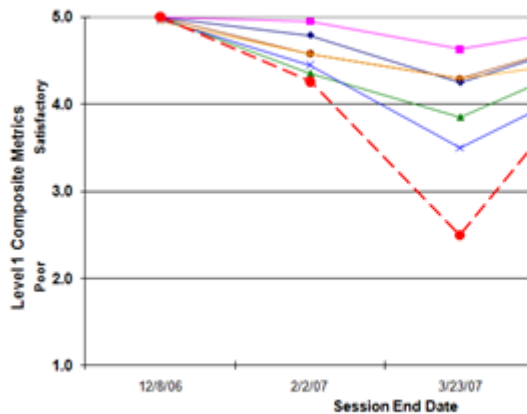


- Thematic reporting of means

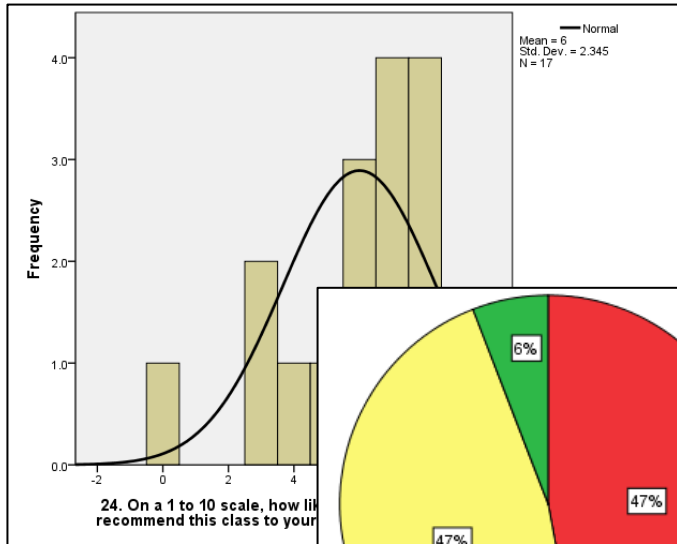
Average Ratings by Question



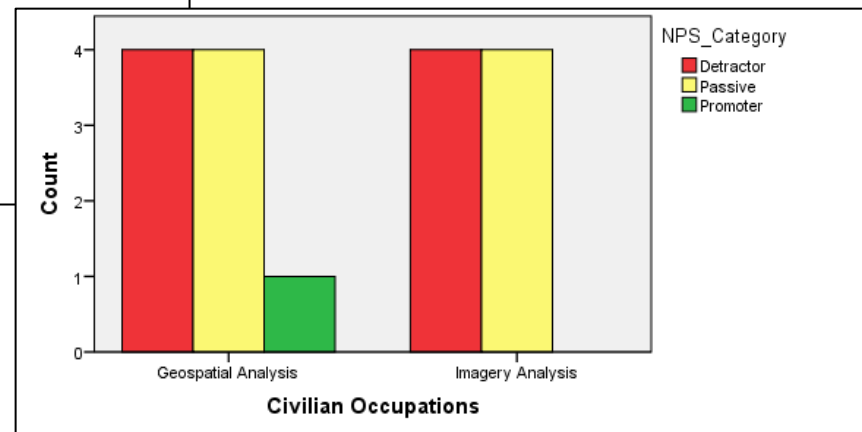
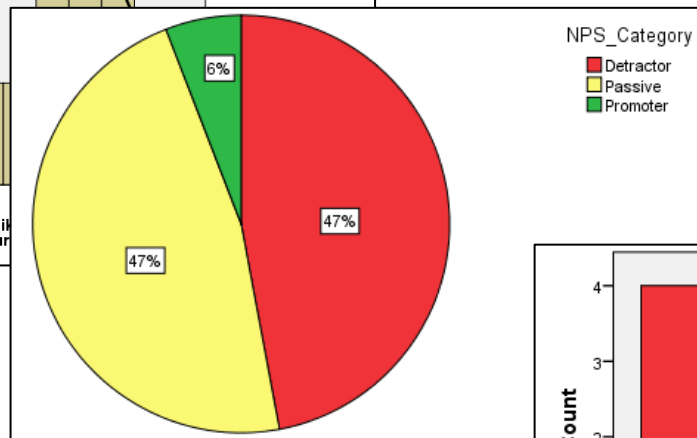
Basic Instructor Training (BIC101) Trend Chart



NPS as leading indicator



- Thematic reporting of means
- Report distribution



Using Z-score as “Heat Chart”



	SessionCount	SAT_mean	Zscore (SAT_mean)	REL_mean	Zscore (REL_mean)	QOI_mean	Zscore (QOI_mean)
4	4.92	1.66750	4.92	1.83139	5.00	1.67644	
4	4.75	1.11062	4.75	1.24544	4.85	1.02099	
2	5.00	1.94593	4.67	.94246	5.00	1.67644	
379	4.79	1.22890	4.66	.90216	4.81	.86304	
7	4.86	1.46861	4.95	1.98124	4.83	.92736	
88	4.77	1.17390	4.78	1.35217	4.90	1.25934	
83	4.74	1.06701	4.60	.69424	4.82	.89728	
8	4.61	.64656	4.53	.43750	4.92	1.31230	
12	4.61	.64656	4.53	.43750	4.92	1.31230	
39	4.63	.71795	4.68	1.00461	4.64	.08544	

- Thematic reporting of means
- Report distribution
- Using Z-scores to norm-reference L-1 results

Describing to Predicting:

Improving course design with Predictive Analytics



- Overview of Training Evaluation Models
- Data import and descriptive statistics
- Inferential and Predictive statistics
 - Chi-Square for target audience analysis (alignment)
 - T-Tests for demographic analysis (alignment)
 - Regression on NPS and Satisfaction (effectiveness)
- Future Goals



Describing to Predicting:

Improving course design with Predictive Analytics

- Overview of Training Evaluation Models
- Data import and descriptive statistics
- Inferential and Predictive statistics
- Future goals
 - Leverage Resources among IBM SPSS users
 - Qualitative analysis
 - Control charts
 - Modeling
 - Forecasting
 - Continued focus on strategic mission, vision, and goals

Conclusion

- Overview of Training Evaluation Models
- Data import and descriptive statistics
- Inferential and Predictive statistics
- Future goals