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Inducing Adaptation in Organizations: Concept and Experiment Design

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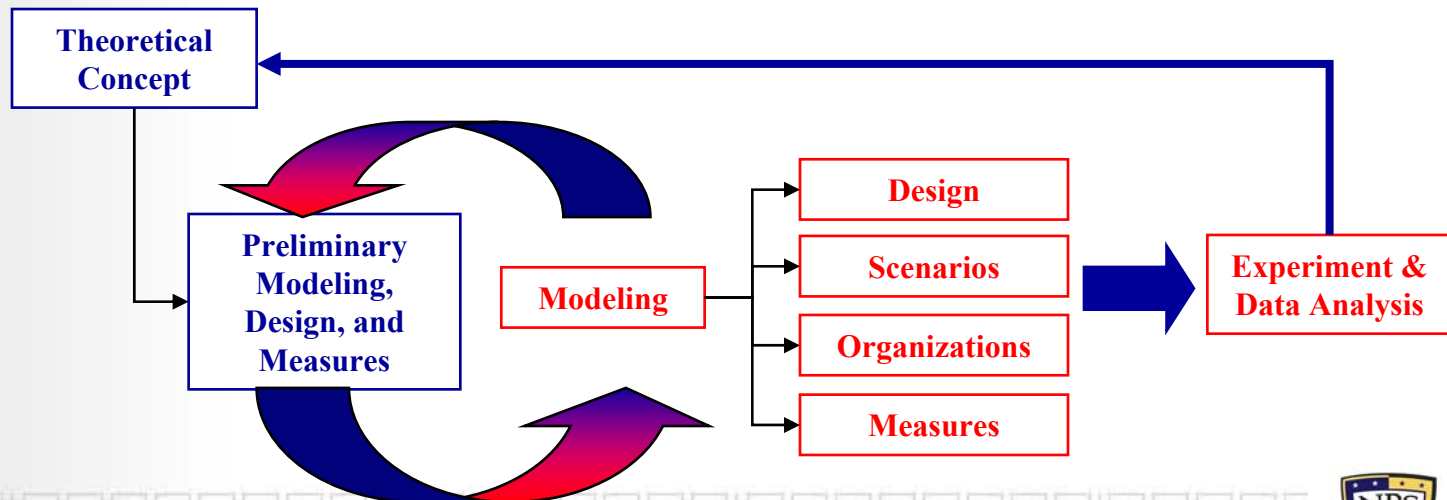
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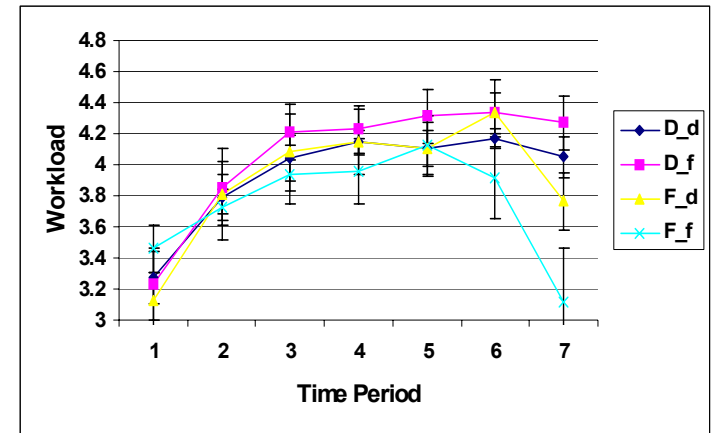
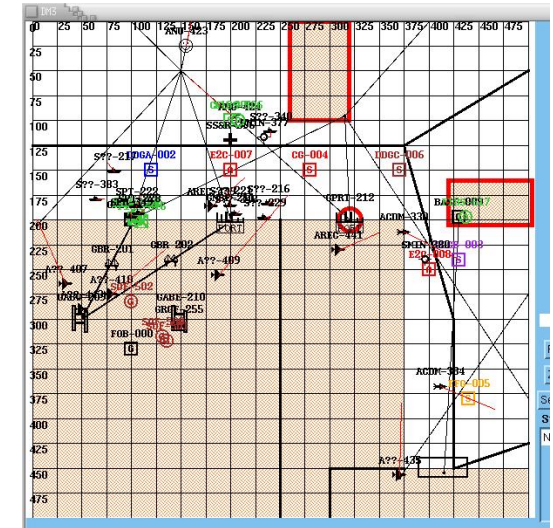
■ Research Objectives

- Develop & test theory of adaptive architectures
- Investigate fit between organizational structures & mission scenarios
 - Incongruence as a motivation to alter organizational structure
- Create conditions of incongruence & observe the adaptation process
 - Facilitators & inhibitors



Background – Experiment 8

- Realization of Model-based Experimentation
 - Model-based Organizations (F, D)
 - Scenarios (f,d)
 - Successful Manipulation of Congruence
 - Congruent out-performed Incongruent
 - Differences in communications & workload – leading indicators of incongruence
 - New Model-Based Measures
 - Several Papers



		1	2	3	4	5	6
	Platform	STRIKE	BMD	ISR	AWC	SUMC/MINES	SOF/SAR
1	CVN	2F18S	xxx	1UAV	2F18A, E2C	1FAB, 1M-H53	1H-H60
2	DDGA	8TLAM	3ABM, 4TTOM	1UAV	6SM2	1FAB, 2HARP	1H-H60, 1SOF
3	DDGB	8TLAM	3ABM, 4TTOM	1UAV	6SM2	1FAB, 2HARP	1H-H60, 1SOF
4	CG	8TLAM	3ABM	1UAV	6SM2	1FAB, 2HARP, 1M-H53	1H-H60
5	FFG*	2F18S	xxx	1UAV	2F18A, E2C, 4SM2	1FAB, 2HARP, 1M-H53	1H-H60
6	DDGC	8TLAM	3ABM, 4TTOM	1UAV	6SM2	1FAB, 2HARP	1H-H60, 1SOF

Current Study – Goals

- Follow directly from previous results
 - Observe and assess adaptation in response to *incongruence*
 - Will an organization that is in an incongruent situation **recognize** this fact, and adapt its structure (e.g., who owns what, who does what) in order to become more “congruent” with its environment?
- Evaluate our ability to induce, guide, support and measure strategy and *structural adaptation* via:
 - Training, procedures, triggers, feedback, decision aids, ...
- Effect adaptation during *facilitated off-line planning* sessions, **not** during on-line dynamic play



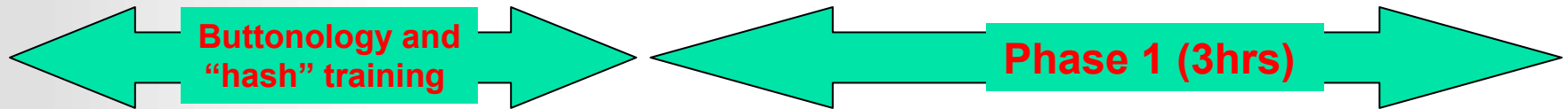
Overcoming Resistance to Change

From previous work, we anticipated a reluctance of players to alter their organizational structure

- Players must be *educated* to know that under certain circumstances it is not only permissible to alter organizational structure, but necessary to enhance mission effectiveness
- Teams should be *trained* to be comfortable in making changes
 - Cross-training in the various assets available is essential
 - Provide exposure to “alternate” orgs (F—D) in training runs
- Players will need *feedback and aids* to help them recognize the signs of incongruence and the need for change
 - Aids could be ppt slides, model outputs, data from run, etc.
 - Decision aids will be needed to help “negotiate” the changes
 - Test potential effectiveness of ideas prior to full implementation



Experimental Design (1)



Start Org	# of teams	Training (Hashx2)	Play#0 Congruent 1 (no SCUD)	Adapt for SCUD (PS #1)	Play#1 Congruent
F	2 (B,D)	(OrgH)h1 (OrgF)h2	Ff(no SCUD)	F ₁	F ₁ f
D	3 (A,C,E)	(OrgH)h1 (OrgD)h2	Dd(no SCUD)	D ₁	D ₁ d

- H is a hybrid organization, “midway” between D and F
 - Exposes players to elements of Functional & Divisional structures
- First “adaptation” (F ⇒ F₁, etc.) to external SCUD threat
 - Requires players to allocate new assets (TTOM, ABM) and new roles

Experimental Design (2)



Org	Pre-brief & Adapt for Incongruence (PS #2)	Play#2 Incongruent	Post-play Adapt to Incongruence (PS #3)	
... F ₁	F ₂	F _{2d}	F ₃	
... D ₁	D ₂	D _{2f}	D ₃	

"Homework" given to prepare

- Observational and self-reporting instruments were designed to collect data during planning sessions
- Feedback and aids utilized during planning sessions

Planning Session Protocol

- Planning/adaptation occurs prior to the next play
 - Questions posed to team by facilitator:
 - How are we doing?
 - Should we adapt in some way? If yes, how?
 - Discussions were recorded for analysis
 - Asset changes recorded for immediate implementation
 - Strategic changes and rationale recorded



- Provided feedback before each planning session based on team performance to encourage adaptation
 - Model-Based Performance data was available within minutes.
- Measures displayed were suggested by previous study as leading indicators and/or model based
 - Performance (Percent Tasks Completed)
 - Perceived Workload
 - Communications Distribution
 - Gain (UCONN)
 - Cognitive Demand (CMU)

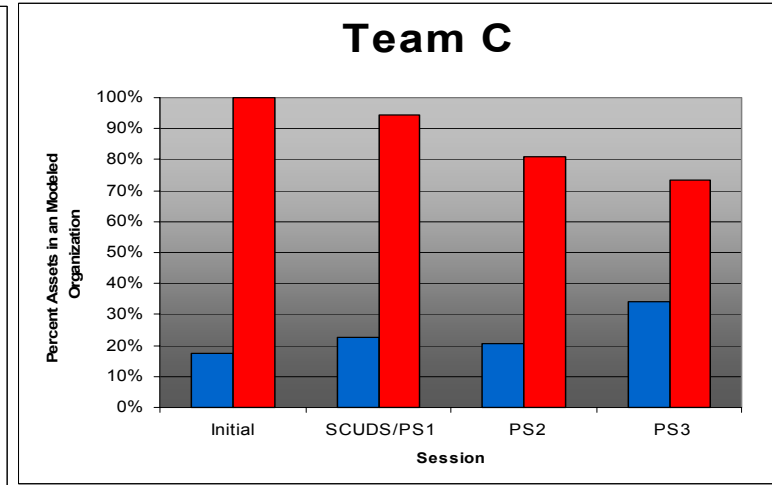
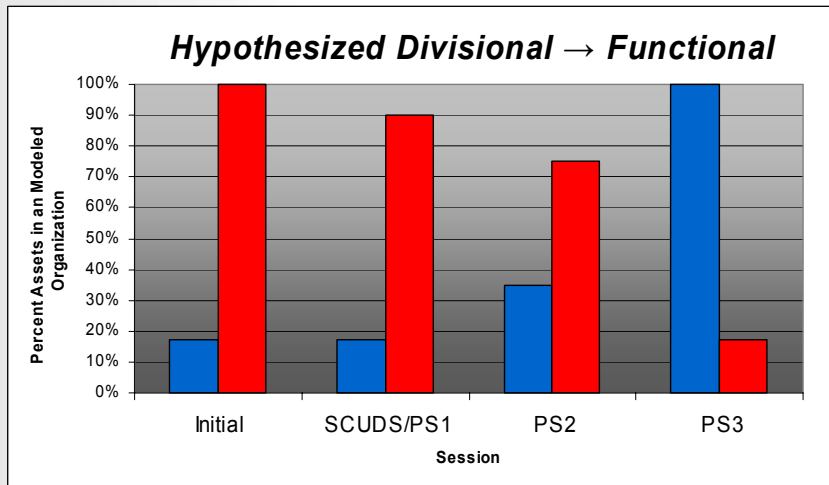


Adaptation Analysis

- To assess how adaptive changes made by the teams were, we:
 - Broke asset allocation into the smallest meaningful elements
 - Measure percent overlap between team asset allocation for each mission with the modeled organization
- The result is: overall similarity between the team-generated allocations and the modeled class of organizations



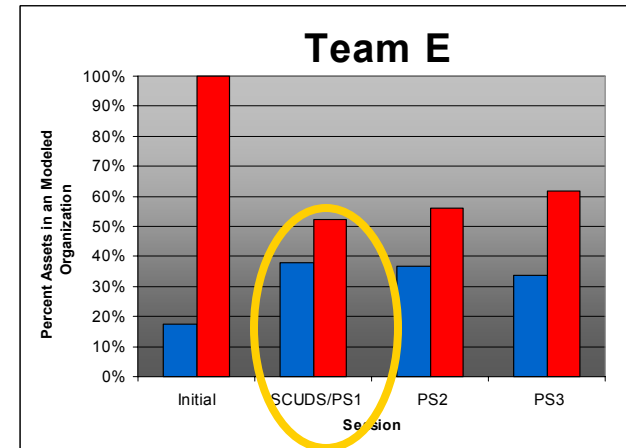
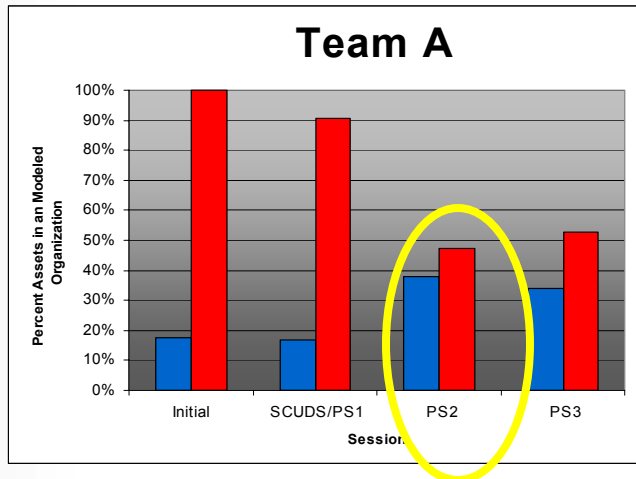
Divisional Results



Team A adapted in anticipation of incongruence

Team C made few, minor changes.

Team E changed in a maladaptive fashion.

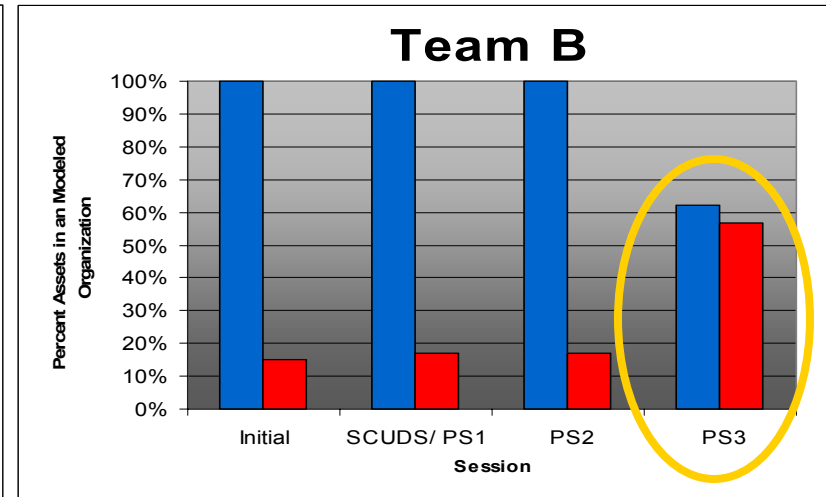
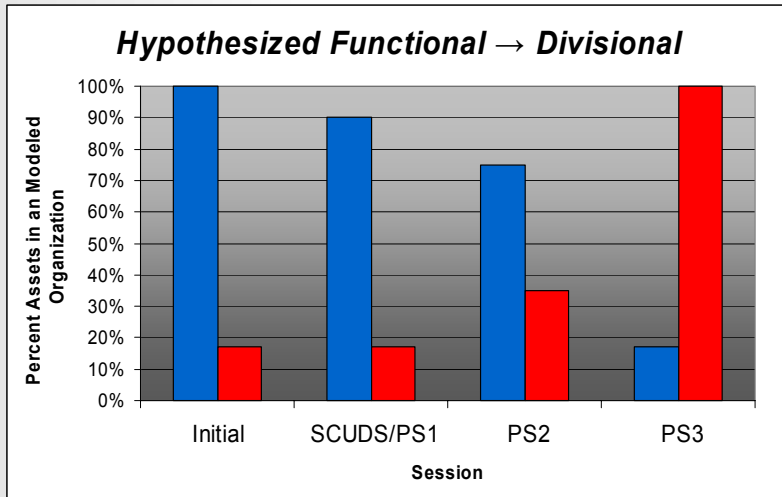


Blue: Percentage of Assets that are *Functional*

Red: Percentage of Assets that are *Divisional*



Functional Results

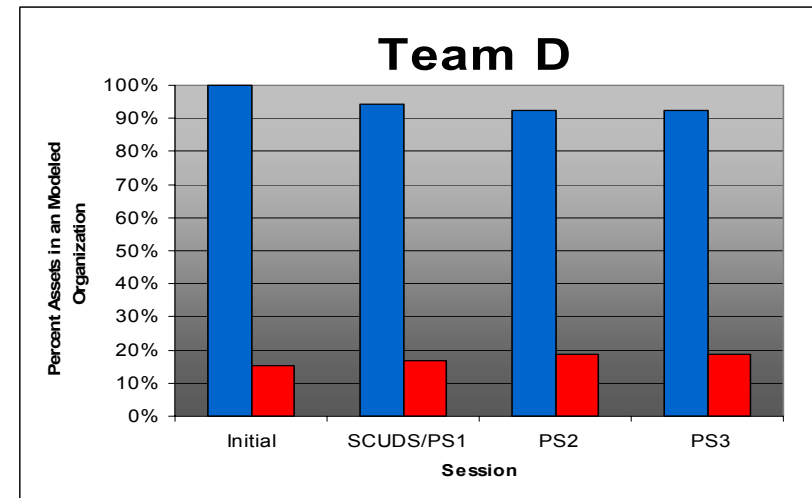


Team B made adaptive changes in reaction to incongruence.

Team D made few, minor changes.

Blue: Percentage of Assets that are *Functional*

Red: Percentage of Assets that are *Divisional*



Conclusions

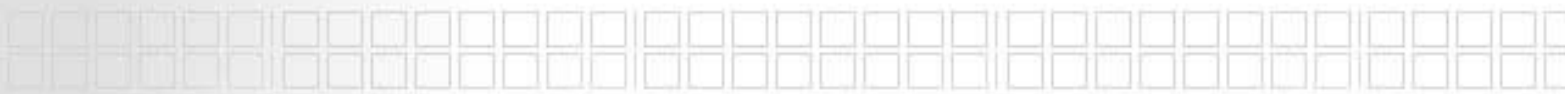
- Demonstration of structural adaptation in some teams based on model-based congruence manipulation
 - Adaptations observed were modest and variable
 - Most changes were small, some not adaptive
 - Participants often recognized the need for organizational change, but were reluctant to do so
- Implementation of initial version of congru-o-meter moderately successful
 - Model-based measures available for planning
 - What once took days now takes minutes!
 - Observations indicated that more detailed performance feedback would be beneficial



Thank You



Backup Slides



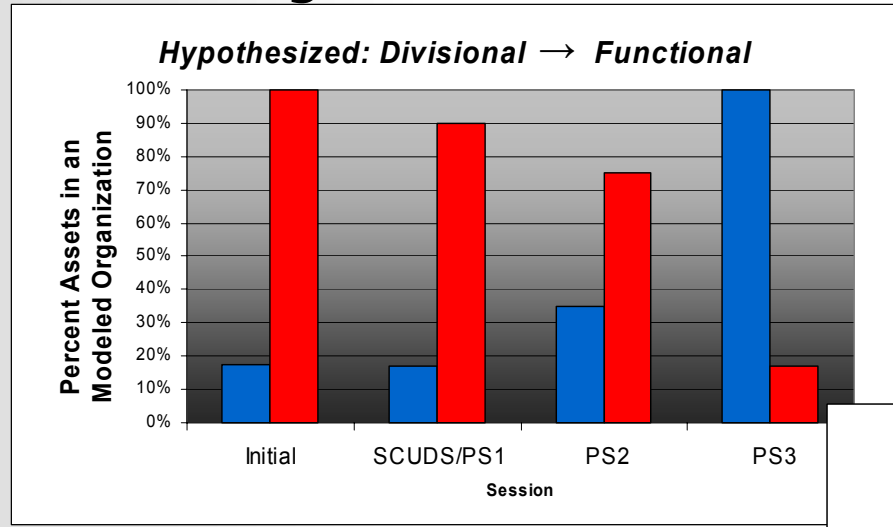
Phasing in of SCUDS (PS #1)

- An operationally meaningful external trigger
 - forced adaptation – teams must do something!
 - simply a stage- wise phase-in of a threat and assets to deal with it
- Provides a bridge between training and data collection in the incongruent runs
 - Gives players familiarity and training with the facilitated adaptation process used in planning sessions

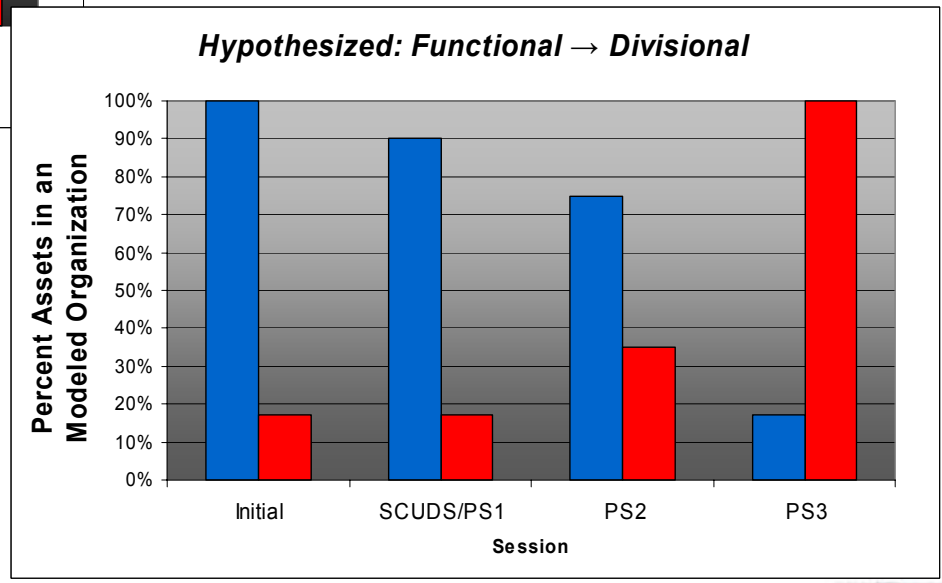


Hypothesized Adaptation Results

Initial Organization: Divisional



Initial Organization: Functional



Blue: Percentage of Assets that are *Functional*

Red: Percentage of Assets that are *Divisional*