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BOOTSTRAP SEMINAR Nov 30 - Dec 2, 1992

Foil Set B:

PARADIGMS -

STRETCHING OUR PERCEPTIONS OF CHANGE

Douglas C. Engelbart, Bootstrap Institute

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B1

BASIC BOOTSTRAP CONCEPTS

Objective: Pursue high-performance org

Hypothesis #1: Whole-system Augmentation

Hypothesis #2: ABC's of Org Improvement

Hypothesis #3: Bootstrap Strategy

Hypothesis #4: Collab. Knowledge Work (CODIAK)

Hypothesis #5: Open Hyperdoc System (OHS)

Hypothesis #6: Joining forces in a C Community

(assumes major paradigm shifts throughout)

PARADIGMS

Envision sweeping change resulting from increasing complexity and urgency, and the many barriers to progress.

Envision "high-performance" organizations that maneuver through complexity and urgency with remarkable speed, agility, precision, and vision.

Paradigms as Barriers to Change

- The Bootstrap Paradigm(s)
- Prevailing Paradigms Affect Strategy
- Shifting and Stretching our Paradigms
- Conclusion

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Notes	DEFINITIONS
	Paradigm: a pattern, example, or model
	Welt-an-schau-ung: ("world view") a comprehensive philosophy or conception of the universe and of human life.
	Frame-work: 1. a structure serving to hold the parts of something together or to support something constructed or stretched over or aroune it (the ~ of a house). 2. the basic structure, arrangement, or system. 3. same as "frame of reference".
	Frame of Reference: the set of ideas, facts, or circumstances within which something exists.
	B4
Notes	PARADIGMS: EXAMPLES FROM HISTORY
	Restrictive paradigms are easy to spot retroactively: Christopher Colombus on the "edge of the earth"
	Quoted reactions to innovation
	Doug's personal accounts
	What are we doing <i>today</i> to amuse future historians?
Notes	B5
	PARADIGMS & LANGUAGE
	Language reflects world view Example: Eskimos have 24 words for "snow"
	Language shapes world view Example: Words and concepts that can't be readily translated because there's no word for it
	

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PARADIGMS: CROSS-CULTURAL DIFFERENCES

Across cultures

Example: Shakespeare in the Bush -- a brief rendition was bombarded with comments about our "strange" customs

Across disciplines

Example: Analytics vs. Synthesizers Example: Strategists vs. tacticians

Across organizational units

Example: R&D vs. Legal vs. Manufacturing

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PARADIGMS & IMPROVEMENT PROGRAMS

• Between improvOR and improvEE in the 3rd world

Example: Lack of appreciation for target culture resulted in complete rejection of new modern medical facility.

• Between improvOR and improvEE within our organizations

ImprovORs: "Oh, those people will *never* be able to do that!"

ImprovEEs: "Oh, corporate would never let us do that!"

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PARADIGMS & PLANNING

Planning tomorrow from today's paradigm?

If our paradigm consists of grass huts, we wouldn't get a 10-story building with an elevator, even though that technology were available.

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Since that time, the term "paradigm" has emerged to convey much the same meaning as the term "framework" used by Kennedy and Putt (1956) and Engelbart (1962, Bib-2, Bib-3). (You will find that we are using the terms "framework" and "paradigm" interchangeably.)

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PAPER BY KENNEDY & PUTT SPURRED THE 1960 "AUGMENTATION FRAMEWORK" SEARCH

They brought out the importance of a conceptual framework to the process of research.

They pointed out that new, multi-disciplinary research generally finds no appropriate framework to fit within; that a framework of sorts would grow eventually, but that an explicit framework-search phase preceding the research is much to be preferred.

Kennedy, J. L. and Putt, G. H., "Administration of Research in a Research Corporation," RAND Corporation Report P-847, April 20, 1956.

The rapidly increasing "complexity and urgency" will require correspondingly more rapid shifts in the paradigms within which we can effectively perceive and resolve our problems.

This is the challenge to humankind that triggered all of this Augmentation and Bootstrap pursuit.

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BOOTSTRAP'S BASIC PREMISE



"While population and gross product increase at a significant rate,

The <u>complexity</u> of man's problems grows still faster, and

The <u>urgency</u> with which solutions must be found becomes steadily greater ...

The <u>product</u> of <u>complexity</u> times <u>urgency</u> has surpassed man's ability to deal with it."

Paraphrased from '62 Augmentation Framework Paper

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EXAMPLE: COMPLEXITY & URGENCY FOR ORGANIZATIONS

Rapid and drastic changes in:

- Market forces
- Economic conditions
- Global competition
- Technologies
- Speed of change
- Social issues
- Environmental issues
- Legislative issues
- Etc

How effectively is your organization responding?

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EXAMPLE: COMPLEXITY AND URGENCY COMPOUNDED BY NEW DIRECTIONS IN TECHNOLOGY

Creating nicer paper → Working in online environment

Personal computing → Groupware

Application islands → Integration

Departmental islands → Interoperability

- New directions in each area compound the complexity of assessment, experimentation, and assimilation in all areas.
- Rate and scale of technology "explosion" compounds the urgency.

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OUR EMERGENT TECHNOLOGY WILL PRODUCE VERY LARGE CHANGES IN OUR ORGANIZATIONS!

Compare a human organization to a crude biological organism: slow responses; poor sight; lousy perception; ponderously clumsy; doesn't understand its own workings; ...

A sudden mutation produces a new technology to support its nervous-system functions. Hugely better in all dimensions -- sensing, remembering, associating, perceiving, reasoning, coordinating, ...

Does the organism replace its old nervous system (i.e., automate), and there rest its future?

Or, does it set about evolving the rest of its structure and function to become a new, different, and much more capable organism?

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Paradigms

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The "quantitative scale" of these critical factors, when increased past a certain point, produce significant, qualitative systemic changes within our organizations and their environments.

Some domains of science and engineering long ago learned this about "dimensional scaling" within functional systems.

The qualitative changes are often a surprise to those who live with these systems every day.

It is thus predictable that surprising, large-impact changes will occur in our every-day environments.

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QUESTION OF SCALE AND PERVASIVENESS

What do different people believe will be the scale and pervasiveness of societal change stemming from computer-comunications technology? I.e., changes in the way:

- · we live and work?
- our organizations are structured?
- · our marketplaces are structured?
- our business transactions are negotiated and implemented?
- · our legislative processes are carried out?
- our judicial systems work?
- · our educational systems work?

B16



LARGE-SCALE TRANSFORMATIONS VILL BE COSTLY IN:



- Dollars
- Human energy
- Stress
- Distraction from direct business functions
- Backing out from a wrong turn

Expect decades of investment in change

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DESPERATELY NEED A GENERAL STRATEGY FOR SURVIVAL AND SUCCESS: Faster & Smarter

Faster: Increased Responsiveness

- Quick to identify the need for change
- Quick to integrate new knowledge
- · Quick to make informed decisions
- Quick to respond to new market opportunities --
- Faster design, creation, delivery of quality products
- Quick to capitalize on new technologies & techniques
- Able to change course mid-stream

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otstrap Seminar Nov/92	Paradigms
DESPERATELY NEED A GENERAL STRATEGY FOR Note	s
SURVIVAL AND SUCCESS: Faster & Smarter Smarter: Ability to gather and analyze intelligence Data → meaningful information Creative, innovative Organizational memory and access Comprehend complexity Ability to see Higher Quality: Improved coordination within and across work groups, and with suppliers and customers	
PARADIGMS Note	s
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Where will your strategy come from?

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Notes	ASSUMING HUGE CHANGES IN NEXT- CENTURY ORGANIZATIONS - HOW DO WE PURSUE THEM?
	It is hard enough to cope with today with this quarter. We've never before had to cope with change rates like this. No models to guide us.
Notes	CRITICAL CHOICE: WHICH EVOLUTIONARY PATH?
	Bewildering variety of paths will be perceived
	Expect extended period of rapid and complex change
	Organizations with better paths will emerge with improved capabilities
	Organizations with poorer paths will fall behind or die
	How will you and your competitors fare?
Notes	323
Notes	CRITICAL NECESSITY: AN APPROPRIATE FRAMEWORK
,	Not generally understood as an issue when opening new pursuits
	Inappropriate framework may lead to wasteful mistrials and widely ignored possibilities
	 E.g., why wasn't computer-supported collaboration perceived as an important pursuit much sooner?
	• Conceptual and strategic framework: Inherited from local culture OR consciously cultivated?
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BARRIERS TO THE DEVELOPMENT OF AN APPROPRIATE FRAMEWORK

- Limited perceptions of which changes are appropriate to pursue
- Limited perceptions of the scale of candidate change and of the potential payoffs
- Limited ROI time-frame for funding and careers
- Cultural inertia: "It's always worked this way"

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HOW DOES YOUR ORGANIZATION VIEW THE FUTURE?

Minor, gradual adjustments

• OR •

Enormous, dramatic, sweeping changes

- Your framework seriously affects your investment strategies
- An inadequate framework produces inadequate strategies
- Subtle difference in strategies will put some organizations far ahead of others in capability and effectiveness

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SERIOUS CONCERN

Today's organization seriously underestimates the rate, scale, and pervasiveness of change to come

Expect higher "fatality rate" of orgs the longer this persists

A first-world country, if not evolving effectively, could be in the 21st century's 3rd World

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Notes	HOW WILL YOUR ORGANIZATION DEVELOP ITS FRAMEWORK?
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Notes	HOW WILL YOUR INDUSTRY DEVELOP ITS FRAMEWORK?
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	B29
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BOOTSTRAP FRAMEWORK DEVELOPMENT PRODUCED A STRATEGY

I have a strategy ... years of development and refinement resulted in detailed draft of a "handbook" with all the necessary ingredients for bootstrapping organizations into the 21st century.

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CHALLENGE

Take this strategy, or one like it*, back to your organization and get going on it right away.

... but where would you take it? Who's responsible for it? Is your org positioned or even oriented for rapid, dramatic transformation?

The greatest limiting factor will be paradigms!

Your strategy needs to take this into account.

*If you have a better one, I'd really like to know so I can make mine better!

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BOOTSTRAP'S FRAMEWORK DEVELOPMENT PRODUCED A NUMBER OF PARADIGM SHIFTS

Stretching our perceptions of:

- · Rate, scale and pervasiveness of change;
- Scale and nature of potential improvement in organizational capabilities -- significant concepts introduced that are difficult to discuss in today's vocabulary and paradigms. E.g.:
- Potential candidates for organizational change toward capability improvement;
- Strategic options for investing in improvement.

A critical issue -- if working effectively within tomorrow's organizations will involve a radical paradigm shift -- consider the special problem of trying to plan, design and implement tomorrow's Augmentation System from within today's paradigm.

See also note at C31.

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Notes	BOOTSTRAP PARADIGM BARRIERS
	The Bootstrap Strategy is loaded with new paradigms!
	it is only recently that people are resonating not readily traslatable into today's paradigms broader in scope than most paradigms
	require paradigm shifts in several cross-disciplinary areas had to invent terms for discussing key concepts
	don't be surprised if you don't "get it" all on the first pass don't be surprised if you can't explain it easily to a colleague hope you'll agree Bootstrapping is important pursuit
Notes	B34
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	• Conclusion
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Notes	CONCLUSION
	We need higher-performance organizations asap Prevailing paradigms will not lead to serious pursuit soon enough
	We need a comprehensive strategy asap for bootstrapping organizations into the 21st century!