Analytical Education in 2020
Foresight Skills and Insights for Intelligence Leaders

Five Eyes Workshop
Center for Intelligence & Security Studies
University of Mississippi
March 2015 ❖ Oxnard, MS

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Outline

- Technological Change
- Adaptive Foresight Skills
- Analytical Education Futures
Technological Change
Ten Areas, Two that Drive Acceleration
Good Futurists try to Tell Weeble Stories

“Weebles wobble, but they don’t fall down.”

“Criticism is your best antidote to error.” - David Brin

Hasbro 1972
(Author’s Collection)
Four Key Images/Stories/Expectations With Respect to Change
First two are Evolutionary (“Innovation” oriented).
Second two are Developmental (“Sustainability” oriented).

Kuznets Curves - Developmental Cycles

Phase 1 - Tech Disrupts & Dehumanizes Us
Phase 2 - Things Stay Bad
Phase 3 - Things Get Better

- Income Inequality
- Environmental Degradation
- Social Stability
- Technological Impact
  - Cities
  - Industries
  - Calculators
  - Video Games
  - Cellphones
  - Social Networks
  - Security Systems...

Leaders, Policymakers, Designers, Scholars Need to Get Us to Phase 3 As Fast as Possible.
The Acceleration of Complexification

Energy Flow Density ($\Phi$)

Dissipative substrate (ergs/sec/gm)

Global AI of the 21st C  $10^{12}$
Pentium II of the 1990's  $10^{11}$
Intel 8080 of the 1970's  $10^{10}$
Modern Engines  $10^5 - 10^8$
Culture (human)  $500,000 (10^5)$
Brains (human)  $150,000 (10^5)$
Animals (hum. body)  $20,000 (10^4)$
Ecosystems  $900$
Planets (Early)  $75$
Stars  $2$
Galaxies  $0.5$

Free energy flow density values in temporally emergent CAS.
The Acceleration of History

- **Homo Habilis** 2,600,000 yrs ago
- **Homo Sapiens** 150,000 yrs
- Neolithic Age 12,000 yrs
- Agricultural Age 7,000 yrs
- Empires Age 2,500 yrs
- **Scientific Age** 380 yrs (1500-1770)
- **Industrial Age** 180 yrs (1770-1950)
- **Information Age** 70 yrs (1950-2020)
- Symbiotic Age 30 yrs (2020-2050)
- **Autonomy Age** 10 yrs (2050-2060)
- **Tech Singularity** ≈ 2070
Economic Acceleration

GDP per capita in West Europe, from 1000-1999 A.D.
- This curve is **smooth** and **superexponential** on a very long timescale.
- Note the “**knee of the curve**” (state switch) occurs in 1850, at the **Industrial Revolution**.

*Contours of the World Economy 1-2030 AD*, Angus Maddison, 2007
Agility, Disruption and Accelerating Change

Annual Growth Rates of Familiar Systems

- **2-3%** US Economy, Most Markets
- **9%** China’s Economy, Some Emerging Markets
- **14%** Global Online eCommerce, Top Chinese Cities
- **20%** Global eCommerce Technology Market
- **25%** Health Care Analytics, India’s Organic Food Market
- **35%** Computing & Communication Ability, Per $ (“Moore’s law”)
- **55%** Creation and Sharing of Digital Info (“Tagging the World”)

The Digital Universe and Big Data, EMC/IDC, 2014-2020

Doz & Kosonen 2008

Toffler 2007
Ten Areas of Technological Change

1. Information Tech
2. Nanoscience and Nanotech
3. Resource Tech
4. Engineering Tech
5. Cognitive Tech
6. Social Tech
7. Health Tech
8. Economic Tech
9. Political Tech
10. Security Tech

LE Drones (Phantom Eye, Scan Eagle)
Disruptive Naval ISR Platforms

Unmanned Surface Vehicle (Piranha)
Naval ISR, Escort, Antipiracy Platform

Smart, Strategic Lookahead in Technological Change (and Books For Further Reading), 2014
Leaders Must Use the Strongest Levers, Nanotech and Infotech, and mind the Hype

"Give me a lever long enough, a fulcrum, and place to stand and I will move the world."
- Archimedes, 250 BCE

Battery Energy Densities:
- Lead Acid: 30 Wh/kg (8X worse)
- NiMH: 80 Wh/kg (3X worse)
- Li-Ion: 250 Wh/kg
- Zn-Air: 1084 Wh/kg (4X better)
- Li-Air: 5200 Wh/kg (20X better)
- Li-Air Theor.: 12000 Wh/kg (50X better)

Gartner Hype Cycle

Fenn 2008
Adaptive Foresight
Eight Skills for Better Futures
The Three P’s of Foresight
Funnels, Trees, and Landscapes

Is your team excelling in all three domains?

“Trees”
Innovation, Ideation, KM
Design, Entrepreneurship

“Funnels”
Forecasting, Financial,
Risk Mgmt, Law & Security

“Landscapes”
Strategy, Analysis, Planning
Kirton’s Three Personality Traits

Bridgers
(Strategists & Planners)
Preferable Futures

Innovators-Creators
(Innovation & Creativity)
Possible Futures

Protectors-Predictors
(Forecasting & Security)
Probable Futures

Be Diverse:
Use All the Strengths

Gallup’s 34 Workplace Strengths and Four Strength Clusters

<table>
<thead>
<tr>
<th>Foresight</th>
<th>Doing</th>
</tr>
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<tbody>
<tr>
<td>1. Strategic Thinking</td>
<td>2. Executing</td>
</tr>
<tr>
<td>“Knowing Where to Go”</td>
<td>“Getting Somewhere”</td>
</tr>
<tr>
<td>● Analytical</td>
<td>● Achiever</td>
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<tr>
<td>● Context</td>
<td>● Arranger</td>
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<td>● Futuristic</td>
<td>● Belief</td>
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<td>● Ideation</td>
<td>● Consistency</td>
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<td>● Input</td>
<td>● Deliberative</td>
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<tr>
<td>● Intellection</td>
<td>● Discipline</td>
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<tr>
<td>● Learner</td>
<td>● Focus</td>
</tr>
<tr>
<td>● Strategic</td>
<td>● Responsibility</td>
</tr>
<tr>
<td></td>
<td>● Restorative</td>
</tr>
</tbody>
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StrengthsFinder is $14 per employee. Start with this tool!
Perception-Decision-Action Cycles

PDA cycles are at the heart of foresight and leadership. They are grounded in cognitive science. Our perceptions, models, biases determine what we see.

You’ve seen the variations:
The Deming Quality cycle (Plan-Do-Check-Adjust).
The Strategic Planning cycle (Think-Plan-Act-Learn).
The Boyd Dominance loop (Observe-Orient-Decide-Act).
The Agile Development loop (Design-Develop-Test-Discover).
The Lean Startup loop (Envision-Build-Measure-Learn).

We call it the “Do loop”. Master it to win.
The Do Loop

1. Know Your History and Current Condition

2. Use Possible Probable, & Preferable Foresight (3 Ps)

3. Get Somewhere, with Others, and Keep Them Happy

4. Stay On Target, or Get Back On Target
The Eight Skills of Adaptive Foresight

**Learn**
1. **Learning**
   Scanning, L&D, Metrics, Intelligence, Research (*Investigative Thinking*)

**See (Foresight)**
2. **Anticipation & Security** – Probable (*Convergent Thinking*)
   Forecasting, Predictive & People Analytics, Risk Mgmt, Security
3. **Innovation & Creativity** – Possible (*Divergent Thinking*)
   Initiative, Ideation, Alt Futures, Innovation
4. **Strategy & Planning** – Preferable (*Shared Vision / Re-Convergent Thinking*)
   Visioning, Goals, Strategy, Analysis, Planning

**Do**
5. **Execution** - *Product* (*Be Effective*)
   Operations, Sourcing, ICT, Knowledge Mgmt
6. **Influence** - *Market* (*Be Credible*)
   Sales, Marketing, CRM, Community
7. **Relating** - *Team* (*Encourage the Heart*)
   Management, HR, Performance, Ethics, Culture

**Review (Aftsight)**
8. **Reviewing** (*Challenge the Process*)
   Critiquing, Auditing, Quality, Adjusting, Unlearning
Eight Skills of Adaptive Foresight: The Learn-See-Do-Review Cycle ("Do loop")

1. Learning – "Knowing Your History and Status" (Investigative thinking)
   Intelligence (Research), Learning & Development (Training), Metrics (Triple Bottom Line Accounting)

2. Innovation – "Possibility Foresight" (Divergent thinking)
   Idea Generation (Alternatives, Stories, Scenarios), Design, Innovation Mgmt, Entrepreneurship

3. Anticipation – "Probability Foresight" (Convergent thinking)
   Forecasting (Models, Predictive Analytics), Investing, Risk Management, Law & Security

   Strategy (Framing, Priorities, Goals, Strat. Visions), Analysis (Decision Support), Planning (Quick, Strategic, Roadmaps)

5. Execution – "Getting Somewhere" (Production thinking)
   Product/Service/Project Management (Operations, Engrg, Sourcing, ICT, KM)

6. Influence – "Recruiting Others" (Market thinking)
   Marketing Management (Sales, Biz Dev, Market Research, Cust Svc, CRM)

7. Relating – "Keeping Others On Your Team" (Team thinking)
   Performance Management (HR, Compensation, Ethics, Culture, Advisors, CSR, Communications, Public Relations)

8. Reviewing – "Staying On Target" (Adjustment thinking)
   Scorecards (Feedback), Quality, Change Management (Critiquing, Unlearning, Correcting)

Leadership Culture - Running the Loop, Keeping Your Edge

“Great Inputs”
- Staff Learning and Development (L&D)
- Tech Literacy (Yourself and Your Peer Group)
- Foresight (Eight Skills, Twenty Domains).

“Great Outputs”
- What are the Critical Issues, Challenges, Opportunities? Dominant Models, Trends?
- Ideation, Innovation, Collective Intelligence Building (Platforms, Wikis, Retreats)
- Strategy, Analysis, Planning
- Execution, Influence, Integrity, Empathy, Metrics, Critical Review

Example: Modeling the Learning Skill “How to Read a Book Like a Movie”
- Fifty Books a Year
- Speed Reading and Annotating
- Assign 5 min Briefs For Each Book
- Reward Performance with Freedom
- Book Goes on Shelf, Revisit As Appropriate

Jensen et al 2012
Relating - The Speed of Trust

Your organization, and the eight skills, move at the “speed of trust.” We’re a cooperative species, until exploited or “amydala hijacked.” Then we must acknowledge the injustice or fear & reestablish trust.

Five Waves of Trust

Simon 2010

Rieger 2011

Covey 2008
Analytical Education
Trends, Issues, Challenges, Disruptions, Opportunities and Threats
Education Quality and Granularity

- Professional Development Assns
  - Intelligence Studies, Security Studies,
    - Intnat’l Studies, Analysis, Stats, CS
- Academic Program Intern Partnerships
  - Residency & Online
- Program & Course Benchmarking
  - Qualifying & Rating By Assn Members
- Continuing (Just-in-Time) Education
  - MOOCs, Certifications
  - Helpouts, Webinars
Knowledge Networks - Professional

- Find All The Useful Networks
- Connectors Need Special Support
- KM Platforms (Intellipedia) Erode Silos
  - Be Sure to Incentivize Participation

Know Your Types:
Connectors, Mavens, and Salespeople

16 of the United States Intelligence Agencies

Gladwell 2002

‘FIVE EYES’ COUNTRIES
Australia
Canada
New Zealand
United Kingdom
United States

Breaking Down Silos
Empowerment - Creating Leaders

95% of Leadership is Bottom-Up, not Top-Down
Give Away Control; Keep Responsibility;
Create Self-Leaders (“Leader-Leader” Mgmt)

Kelly 1995

USS Santa Fe Innovations (1999-2001):

• From Fleet Worst to First in:
  - Operational Performance
  - Sailor and Officer Retention

• Pushed decisionmaking (leaves, schedules, performance) down to Chiefs (“Chiefs in Charge”)

• Eliminated top-down monitoring. Sought 20:1 ratio of bottom-up to top-down monitoring.

• Early, informal conversations (“Think out loud”).

• Proactive conversations: “I Intend to…”

• Goal to minimize leader response to: “Very Well.”

• Officers require their team to provide inputs.

• Reward creative solutions, rewrite the rules.

Marquet 2012
Structured Freedom - The Ultimate Incentive

- Finand HS went from #15 to Top 3 in 20 yrs in STEM, Reading & Crit. Thinking (PISA)
  - Throwing Out 50% of Curriculum
  - Montessori style Ed. Approach w/ Free Time for Avg. Performers
  - MS-degree Teachers as Coaches
- How do Intelligence Educators apply this?
  - Take KAI, Identify their Innovators
  - Offer Your Staff Freedom for Performance
  - 2dary Measure Qual & Diversity of Outputs

20% Time Led to:
Gmail, G News, Google X, YouTube Purchase...

Steiber 2014
Evaluations - Evid.-Based, Bottom-Up, Teams

● Across the Disciplines
  - HUMINT, SIGINT, GEOINT
  - MASINT, OSINT, D&D, etc.
● Evidence-Based Analytics
  - Data-Guided Eval. Experiments
  - Find and Reward Top Performers
● Mostly Bottom-Up
  - 360 Degree Evals
● Teams Set their Own Targets (GGoB)
● Human-Computer Team Evals
  Example: Freestyle Chess
  Juniors, Avg PCs, Good Process beat Grandmasters, Top PCs, Poor Process

Started in 2014

Waber 2013

Stack 2013
Brynjolfsson 2014
US Technical Talent Crisis - A Kuznets Issue?

- US Millennials (1980+) scored 23rd of 23 OECD countries on ETS Adult Skills (PIAAC) Test, measuring:
  - Literacy
  - Practical Math
  - Problem-Solving in Tech-Rich Environments

- In 2020, it is est. there will be 123 million high-paying, high-skill jobs in the US, but only 50 mill. Americans qualified to fill them. (Gordon 2009)

Both Futures (Dehumanizing vs. Empowering) are Always Available
Empowering Future Gets Easier as Tech Goes “Third Generation”

Fisher, American Millennials are among the world’s least skilled, Fisher, Fortune 3.10.15.
Realtime Online Talent Pools

- Growing Slowly but Steadily
- Online & Global Pool Must Compensate for US Shortages & Declines

300M Global Users
41% with 500+ “Weak” Connections
Innovation Leadership

- Large Incumbents Are Counterinnovative
  - Innovators have 2-5% of Market Share
  - Procure with Several, Run Competitions

- To Keep Incumbents Honest:
  - Measure Speed & Cost-to-Capability
  - Use Benefit-Cost Analysis

Innovation Management Platforms

Society for Benefit-Cost Analysis

Covering the EdTech Startup Space

Christensen 2011
Hasik 2008
Human-Built Knowledge Bases - Amateurs

- Amateurs Just Need a Little Guidance
- Bottom-Up Beats Top Down, With a Large Enough Crowd
- Creating the Substrate for a Semantic Web
Crowds and Competition - Fueling the Fire

- Crowdbids and Crowdworking
- Crowdfunding and Crowdfounding
- Open Expert Networks (and Reputation)
- Wikinomics (Mass Collaboration)
- OSINT Competitions?

355K Solvers

250K Experts

90K Experts
Trustable Transparency and Immunity

Gmail keeps every email we’ve ever typed. Gmailers are all bloggers who don’t know it.

“In 2020’s some of us will use lifelogs, and store everything we’ve ever said. Then everything we’ve ever seen. All this searchable storage, processing, and bandwidth makes us all networkable in ways we never dreamed. Add NLP, collaborative filtering, and other AI to this, and all this data becomes collective intelligence.

Brin 1999

Eggers 2014

Sci-Fi Dystopia

Taleb 2014

“Bottom Up” vs. “Top Down” Transparency
(Sousveillance vs. Surveillance)
20:1 Ratio in Democratic Societies?
Simulations - Learning Fastspace

- Mirror Worlds, VWs, & AR
- Rapid, interactive, multi-user
- Collaboration environments (user-created content)
- Optimization environments (GIS, automation, AI)
- Still Bandwidth- and CPU-limited (not yet “hyperreal”).
- 2020’s
Edutainment - A Latent Opportunity

- Lean Back vs Intelligent Lean Back vs Lean Forward TV
  - Huge Educ. Opp: Americans still watch 6 hrs/day (ATUS)
- Incumbents and legislators don’t trust open iTV business models
- Even Google still using old industry rules w/ YouTube (vs, Pull-based ads).
- It may take an outsider (OVA) and kid developer (Napster-style) to disrupt.

In 2020’s...

VS

Consumers First & Education First
Machine Learning and Machine-Built Knowledge Bases

- Collaborative Filtering
- Predictive Analytics
- Sentiment Analysis
- Visualization Platforms
- Lead Generation
- Deep Learning
Platforms - People, Methods and Machines

- Creative Fusions of Talent, Tech, and Process
- The Best Of These Need Our Continual Subsidy and Critique

 Recorded Future
 Christopher Ahlberg

 Cynefin
 Dave Snowden

 The Good Judgment Project
 Forecasting Tournament
 Philip Tetlock, U. Penn
Usability - The Conversational Interface

<table>
<thead>
<tr>
<th>Date</th>
<th>Avg. Query</th>
<th>Platform</th>
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<tbody>
<tr>
<td>1998</td>
<td>1.3 words</td>
<td>Altavista</td>
</tr>
<tr>
<td>2005</td>
<td>2.6 words</td>
<td>Google</td>
</tr>
<tr>
<td>2012</td>
<td>5.2 words</td>
<td>GoogleHelp</td>
</tr>
<tr>
<td>2019</td>
<td>10.4 words</td>
<td></td>
</tr>
</tbody>
</table>

Codebreaking follows a logistic curve. Collective NLP as well. Average spoken human-to-human query length is 8-11 words.

Ubiquity

- Google (2.2B) and Facebook (1.35B) are now the largest platforms, 1st & 2nd largest “Countries” in the world (China 1.35B, India 1.24B)
- “One wearable smartphone per child.”
The Wearable Web and Global English

- Conversational Interface
- Crowdlearning and Teacherless Education
- Global English (*500M new English Speakers by 2035?*)
- Realtime Language Translators (“Lean Back”)

Leader’s Challenge

- How do you improve online training processes and performance measurements on your team? Improve use of desktops, laptops, tablets, mobiles, wearables?
- How do you figure out the *50% core*, and *50% freedom* in job and IT training?

Wristphone concept, 2007

$500

FREE

Skype Realtime Lang Translator
Beta Spanish English 2014

Scoble&Israel 2013
Groupnets and the Values-Mapped Web

- Social Freedoms and Privacy
- Evidence-Based Behavior
- Values-Mapped Web
- Groupnets (Learning, Performance, Therapy)
- Wikinomics & Gamification (Collective Intell.)

3-150 per Group, Cognitively Diverse

Inglehart-Welzel Cultural Values Map

Why Groupnets Will Help Criminals and the Mentally Ill:
There are 50X More Normals than Those Who Need Help.

Leader’s Challenge

- How can you facilitate Knowledge Creation, Knowledge Management, Ad-hoc Teams, Ideation, Strategy, Critique, Innovation, and a DIY, Entrepreneurial ethic in your org? How do you make it more freedom oriented and evidence-based?
Digital Twins (Personal Software Agents)

Some Opportunities:
- Intelligent Filtering and Collaboration Management
- Group Performance Enhancement (Groupnets)
- Performance Enhancement (Complete your sentences?)
- Indiv./Group/Culture Rights Representation (‘lobby twins’)
- Transparency and Accountability of Corps, Institutions, Govts.

Some Challenges:
- Data Security and Privacy
- Predictive Marketing and Profiling
- New Forms of Crime and Fraud
- Polarizing and Isolating Eco Chambers (collapse of community)
- Parenting (How early can kids have Twin’s?)
- New Addictions and Dependencies (Twin ‘relationships’?)
The Foresight Company

Our Mission:
- Training foresight professionals.
- Supporting a global community of foresight leaders.
- Providing best-in-class industry foresight speakers, trainers, and consultants.

When You’re Ready To Get Serious About The Future.

Practice ◆ Community ◆ Development

ForesightCompany.com
Discussion
What Do You Think?
Thank You!

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