Impact of Next Generation Learners:
Changes that can drive impact in Technical Education
Cushing Anderson
April 2013
The IT Organization is changing

- IT Priorities are evolving toward the “Third Platform”
  - Business intelligence
  - Smart technologies
  - Virtualization/Data Center Consolidation

- Success Requires Skills
  - Skill of team members/IT org/enterprise must align with requirements and strategic objectives

- Skills Need to be Described and Transferred
What is impacting technical education?

- What is the most effective way to learn a complex new technology?
- What will be different about future training consumption patterns?
- What is the future of instructor led training?
- Is hands-on learning still a key value proposition? Or "flipping the classroom" the best approach for technical education?
- What should the role of social learning be in technical education?
- As next generation learners become managers, do they change their perspective on "what works" to ensure their team has the skills needed to be successful?

- What approach can training organizations use to assure they are providing their clients with the right training content?
- What does "success" in a training context look like? Are smile sheets, ROI or something else the key measure?
CIO and IT Organization is changing: Third Platform

- The “Third Platform” for IT industry growth is emerging, will drive the bulk of IT growth in 2012-2025+
- Millions of new apps and services will be built on this emerging platform
- These apps and services will be built on innovative mash-ups of cloud, mobile devices, mobile apps, social technologies, big data/analytics, and more

Source: Mobility, Clouds and Intelligent Industries: Positioning for the 3rd Wave of IT Industry Growth (Doc # DR2011_GS2_FG March 2011)
CIO and IT Organization is changing: Third Platform

- Leveraging the New Scale of Sales
- “Enterprise” Offerings Built on a Consumer Base
- The “Death” of Dedicated IT?
- Vendors will Leverage Silos to Mash-Ups
- “Industry PaaS” will become more prevalent
- LOB Executives will drive more IT decisions
- Mobility Beyond Smartphones & Tablets
Intelligent Systems Devices Shipped - 2016

- Consumer (1.2Bu)
- Communications (573Mu)
- Energy (262Mu)
- Transportation (216Mu)
- Computing (184Mu)
- Industrial (85MU)
- Retail (28Mu)
- Healthcare (1.2Mu)

Source: IDC May 2012

Intelligent systems do not include PCs or mobile phones
CIO and IT Organization is changing: Strategic Objective of IT…

### Key Objectives of IT

#### Large Enterprise

<table>
<thead>
<tr>
<th>Objective</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing productivity</td>
<td>35%</td>
</tr>
<tr>
<td>IT reliability and efficiency</td>
<td>33%</td>
</tr>
<tr>
<td>Increasing revenue</td>
<td>26%</td>
</tr>
<tr>
<td>Executing business strategy</td>
<td>19%</td>
</tr>
<tr>
<td>Aligning business and IT</td>
<td>18%</td>
</tr>
</tbody>
</table>

N = 2,420

#### SMB

<table>
<thead>
<tr>
<th>Objective</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing revenue</td>
<td>42%</td>
</tr>
<tr>
<td>Increasing productivity</td>
<td>35%</td>
</tr>
<tr>
<td>IT reliability and efficiency</td>
<td>25%</td>
</tr>
<tr>
<td>Retaining existing customers</td>
<td>22%</td>
</tr>
<tr>
<td>Improving customer engagement</td>
<td>20%</td>
</tr>
</tbody>
</table>

N = 1,816

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*IDC Analyze the Future*
CIO and IT Organization is changing: … Driving the following IT investments

Q14. Which of the following are currently significant drivers of increased IT spending in your organization?

- Need to replace old equipment and/or software
- Using technology to improve productivity
- Using technology to cut costs
- No drivers - we are decreasing spending
- Using technology to drive revenue
- Improved economic outlook for 2011
- New technology innovation or solutions in the marketplace
- Budget increases to improve business performance over 2010
- Other

% of Enterprises
CIO and IT Organization is changing: … in the following Business Areas

Q. During the next 6 to 12 months, which business areas will your organization be addressing with major IT initiatives?

- Marketing
- Supply chain mgt.
- Sales & sales tools
- Security
- Finance, accounting, payroll
- Regulatory compliance
- Customer service/CRM
- Employee training

[Bar chart showing the percentage of respondents in different business areas, categorized by company size: 1,000-4,999, 5,000-9,999, 10,000+ employees.]
Q116. What are major challenges currently facing your IT department?

- Not enough staff
- Budgets not increasing quickly enough to keep pace with internal demand for new IT solutions
- Security risks or problems
- Managing the growth of data
- Complexity of infrastructure management
- Conflicting demands from different business units
- LOB not understanding technology
- Users bringing their own technology devices and applications onto the network
- Other

% of Enterprises
IT Investments:
… a focus on enabling technologies …

Q4. Please indicate spending priorities for your organization over the next 12 months

- Software applications
- PCs
- Storage
- Servers
- Network equipment
- Infrastructure software
- Smartphones / mobile devices
- Printers
- Other

% of Enterprises

IDC - Analyze the Future
IT Investments: … to drive key improvements

Q. Please indicate the initiative that will most improve IT’s relevance to business strategy

**Large Enterprise**

- Security: 31%
- Business Intelligence / Analytics: 19%
- Smart Technologies: 17%
- Data Center Consolidation: 17%
- Virtualization: 15%

N = 2,420

**SMB**

- Security: 29%
- Social Media: 25%
- Mobility: 23%
- Smart Technologies: 21%
- Content Management: 19%

N = 1,816
IT Investments: Innovation is only part of CIO’s world

2013
- Infrastructure: 43%
- Essential Software: 33%
- New Initiatives: 24%

2010
- Infrastructure: 45%
- Essential Software: 36%
- New Initiatives: 19%
IT Investments: Investment Strategies Differ by Industry

- Banking
- Insurance
- Securities and Investment Services
- Discrete Manufacturing
- Process Manufacturing
- Retail
- Wholesale
- Professional Services
- Consumer & Recreational Services
- Healthcare
- Transportation
- Communications and Media
- Utilities
- Construction
- Resource Industries
- Discrete Manufacturing

Percentage of IT Budgets Spent on New Initiatives vs IT as a Percentage of Revenue

- Innovation Intensive
- Infrastructure Intensive

Average: 23.9%

IT Investments: Investment Strategies Differ by Industry

IT as a Percentage of Revenue
Who Are They?

In 2001 Mark Prensky coined “digital native” as the “average college grad” who spends...

- <5,000 hours of their lives reading
- >10,000 playing video games,
- >20,000 watching television,
- !!! Time with IMs, cellphones conversations, etc.

Their developmental experiences are different…

So?

“We … know that brains that undergo different … experiences develop differently, and .. [with] different inputs … think differently.”

But, “brains do not reorganize casually, easily, or arbitrarily.”

Biofeedback requires 50 sessions to produce results.

Scientific Learning’s Fast ForWard program requires students to spend 100 minutes a day, 5 days a week, for 5 to 10 weeks to create desired changes

To Prensky this sounds like what Natives are doing…
Next Generation Learners –

= This Generation Learners

However…

The fact is that the average “digital native”

▪ is not technologically sophisticated;
▪ is not a power user.
▪ Most usage appears to be read-only:
  • checking facebook or
  • looking things up on Wikipedia

IOW “passive interaction”

Not the conditions necessary to rewire the brain…

Source: Selwyn,(2010); Margaryan & Littlejohn (2008) in Digital Natives: Ten Years After, Koutropoulos, (2011)
Other research suggests:

- Proactively use technology
- “Nintendo over logic” – trial and error
- Peer groups, allowing students to pursue their passions
- Multitasking
- Preferred learning approach is different

Really?

- Do they possess the critical literacy and information literacy
- Experiential learning has been described since Socrates (or Piaget in the early 1900s)
- Piaget or Vygotsky in the early 1900s or Summerhill School started in the 1920s
- Mostly anecdotal… and the difference between “multi-tasking” and short, serial segments is unclear.
- “Students expected lecturers to use largely conventional approaches to teaching.”

Source: Are digital natives a myth or reality? University students’ use of digital technologies Margaryan, Littlejohn, Vojt (2010)
Objectives and Approaches of IT Education

Objectives:
Roughly in order of magnitude of impact and importance
1. Get people better at installing/using the gear they own
2. Make implementers/consultants (yours or theirs) better at installing and selling your gear
3. Increase ecosystem availability of folks skilled on your gear - “Reduce the skill gap”
4. Create advocates for your brand/gear by… (several ways)

Approaches:
Roughly in order of magnitude of impact on objectives
A. **Consumption**: Maximize consumption of training by “the right people”
   - Delivery models which reduce barriers and/or increase knowledge transfer/retention
   - Cost models which reduce barriers
B. **Content**: Offer content on the stuff that matters for “better use”
   - Demonstrate “better” impact
   - Attest to competence
C. **Cost**: Charge more than it costs
   - Reduce the cost to create/deliver
   - Increase the charge

Somewhere on the list is “earn more than it costs” depending on the particular business model

Relative Impact (1) and (2) are difficult to determine
I think “B” is more important than “A”
Objectives and Approaches: An Assessment

Start with a POV
Which Approaches matter to which objectives?
Which Approaches matter most?

Evaluate “Innovations”
Which “approach” does it help?
Which “help” in a new way?

For example
MOOC’s

<table>
<thead>
<tr>
<th>Objective</th>
<th>Consumption</th>
<th>Content</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce Delivery Barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce cost barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce “better” content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate “better”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attest (certify)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce Cost to produce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase charges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get people better at installing/using gear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make implementers/consultants better</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Reduce the skill gap”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create advocates</td>
<td></td>
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</tr>
</tbody>
</table>

For example
MOOC’s

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Objectives and Approaches: *Impact on Delivery*

**How do they do it now?**

*Primarily C-ILT*

*But Synch and Asynch are increasing*

*Formal OJT means “we don’t send people to training”*

Note: Other includes "portable" technologies, video and text. Asynch includes simulations
What will it be?
It’s all about “most convenient”

Primarily C-ILT
But Synch and Asynch will increase

Formal OJT - no reason to think many more will train.

Objectives and Approaches:
Impact on Delivery

"Primary Approach"

"Primary" in 2013
- Classroom-based ILT (38.4%)
- Asynchronous e-learning (21.4%)
- Synchronous e-learning (11.6%)
- Formal OJT (16.3%)
- Other (12.3%)

"Primary" in 2020
- Classroom-based ILT (30.0%)
- Asynchronous e-learning (28.0%)
- Synchronous e-learning (20.0%)
- Formal OJT (16.0%)
- Other (6.0%)

Note: Other includes "portable" technologies, video and text. Asynch includes simulations.
**Objectives and Approaches: An Assessment**

**What’s a MOOC?**

“Massive” – scaled for LOTS of students simultaneously
“Open” – meaning v-low cost
“Online” – Self-paced ILT
“Class’”

Short lessons (often recorded)
Lots self-arranged group work
Sometimes monitored by “instructors”
No uniform approach to assessment (“massive” gets in the way)

**My view:**
Not a real alternative to current models

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**Objectives**
- Reduce Delivery Barriers
- Reduce cost Barriers
- Produce “better” content
- Demonstrate “better”
- Attest (certify)
- Reduce Cost to produce
- Increase charges

**Approaches**
- Consumption
- Content
- Cost

**My view:**
“Right people?”

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Objectives and Approaches: An Assessment

“Flipping the Classroom”

Short lessons are “content delivery” (recorded)

Instructor led “practice”/help

Currently used in k-12

Modeled after home-schooling approach

My view:
Excellent for motivated students…
Good for class-rooms of different skill levels (teacher can focus where needed)

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Objectives and Approaches: An Assessment

“Hands - On” Simulations

Simulations driving content delivery (or simulations reinforcing delivered content)

High-fidelity to work tasks

My view: Excellent
Objectives and Approaches: An Assessment

Role of Social in Technical Education

Group projects
“Peer learning” – collaborative projects

Group teaching

Communities of learners

My view:
OK for group dynamics and teaming skills… but…

If an you know the “body of knowledge” (BOK) the group is trying to learn… teach them. Letting them figure it out is “nice” but inefficient.

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Objectives and Approaches: An Assessment

Is learning theory changing?

Notice the application (extension) of Bloom's taxonomy...

These theories make assumptions about the “source of knowledge”

My view:
No – we understand that DIFFERENT learning styles are used in different circumstances

No one theory is “right” and its not about preference.

What is the source of Technical Knowledge?
In technical education… most knowledge is “known” or external but connections are important (think EPSS, CoEs, expert locators)

Source: “A Simple Guide To 4 Complex Learning Theories”, Edudemic.com
Objectives and Approaches: An Assessment

Is learning theory changing?

So consider each a tool to apply to various learners and content.

And remember – the goal is performance

(maybe not knowledge)

Research suggests that although transformations in education may be necessary it would be misleading to ground the arguments for such change in students’ shifting patterns of learning and technology use.

Organizational Capability: Impact of Skill

Q. What element had the greatest impact on project success?

- Skill of the project team: 51%
- Dedication of the team: 47%
- Technology performing as expected: 29%
- Clearly defined business objectives: 26%
- Clear and effective communications: 24%
- Quality of the project plan: 23%
- Executive sponsorship/support: 19%
- Available budget & resources: 18%
- Accuracy of project scope: 17%
- Support provided by the technology vendor/consultant: 16%
- Skill of the consultants/system integrators: 14%
- Effective risk management: 11%

Source: Impact of Training on ERP Project Success, 2012 (IDC#234545)
Organizational Capability: Comparison of capability - IT

<table>
<thead>
<tr>
<th>Backup and recovery</th>
<th>Backup jobs are successfully completed without failure almost 60% more often.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restore requests are completed within 1 hour of request nearly 75% more often.</td>
</tr>
<tr>
<td></td>
<td>Restore requests are completed within 24 hours of request more than twice as often.</td>
</tr>
<tr>
<td></td>
<td>File retrieval events are satisfied by the end user without IT intervention 85% more often.</td>
</tr>
<tr>
<td></td>
<td>Server backups are administrated/monitored/controlled centrally more than twice as often.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Archiving and retrieval</th>
<th>Compliance with legal and regulatory requirements for archiving email and other content is achieved more than twice as often.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Email and document storage volume is covered by archival processes 60% more often.</td>
</tr>
<tr>
<td></td>
<td>Email content is centrally managed 60%+ more often.</td>
</tr>
<tr>
<td></td>
<td>Archive retrieval requests are completed within 1 hour nine times more often.</td>
</tr>
<tr>
<td></td>
<td>Archive retrieval requests are completed within 24 hours 60%+ more often.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endpoint security</th>
<th>PCs are protected from viruses, spyware, and adware in accordance with IT policies twice as often.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Virus, spyware, and adware infections are automatically detected and repaired more than twice as often.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client management</th>
<th>Client/servers with current backups of system images are available for restoration more than three times more often.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>User data, settings, and profiles are automatically transferred during system upgrade more than five times more often.</td>
</tr>
</tbody>
</table>
## Organizational Capability: Comparison of capability - LOB

<table>
<thead>
<tr>
<th>Category</th>
<th>Company</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Finance</strong></td>
<td><strong>Aquarion Water</strong></td>
<td>40% increase in finance staff productivity</td>
</tr>
<tr>
<td></td>
<td><strong>Singareni Colleries</strong></td>
<td>50% reduction in year end closing time</td>
</tr>
<tr>
<td></td>
<td><strong>CargoJet Income Fund</strong></td>
<td>10-15% reduction in audit costs</td>
</tr>
<tr>
<td><strong>Human Resources</strong></td>
<td><strong>Erie County, NY</strong></td>
<td>Eliminated paper data entry of time sheets, reducing the level of effort by 25%</td>
</tr>
<tr>
<td></td>
<td><strong>Basic Energy</strong></td>
<td>Achieved 75% faster payroll processing with 20% fewer errors</td>
</tr>
<tr>
<td></td>
<td><strong>MindTree</strong></td>
<td>15% increase in HR productivity</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td><strong>Dabur</strong></td>
<td>7% increase in full, on-time deliveries</td>
</tr>
<tr>
<td></td>
<td><strong>Klabin</strong></td>
<td>8% increase in plant productivity</td>
</tr>
<tr>
<td></td>
<td><strong>Dubai Aluminium</strong></td>
<td>12% reduction in plant maintenance expense</td>
</tr>
<tr>
<td><strong>Service</strong></td>
<td><strong>Aquarion Water</strong></td>
<td>50% reduction in call center time to answer service work inquiries</td>
</tr>
<tr>
<td></td>
<td><strong>SwissPost</strong></td>
<td>600% reduction in repair time for reusable packaging</td>
</tr>
<tr>
<td></td>
<td><strong>Kaeser Kompressoren</strong></td>
<td>60% reduction in service order processing time</td>
</tr>
<tr>
<td><strong>Supply Chain</strong></td>
<td><strong>SAF Holland</strong></td>
<td>45% increase in on-time delivery performance</td>
</tr>
<tr>
<td></td>
<td><strong>Graybar Electric</strong></td>
<td>38% less stock-outs</td>
</tr>
</tbody>
</table>

*Source: SAP and companies*
Organizational Capability: Team Skill & Project Success

Small change in overall skill
To move from 30% to 70% success rate

N = 515
Note: Respondents are IT managers responsible for 515 IT projects.
Organizational Capability: Training Spend & Project Success

Add 1.5% of project budget to training

To move from 50% to 80% success rate

N = 515
Note: Respondents are IT managers responsible for 515 IT projects.
Organizational Capability: Hours of Training & Project Success

Add 9 hours of training per person to move from 50% to 80% success rate.

N = 515
Note: Respondents are IT managers responsible for 515 IT projects.
Organizational Capability: Implications for training vendors

- “Fully trained” matters
- But what does that mean in context of a specific client?
- How do you know what your client needs?
- Who else might know what the client needs?
  - Inside your organization
  - Outside your organization
Essential Guidance: CEdMA

- It’s Not a Delivery Problem and not a Next-Gen problem
- Consider Opportunities in the Context of your Objectives
- Build Content the Matters
  - Demonstrate that it matters
  - Develop a POV on what skills are important
  - Develop a POV about how clients should maintain skills (maintenance)
- Give guidance to training channel on what matters
Additional References

**External references**


