





Addressing Skill Aging and Mismatch in Modern Economy



Yi Deng, Ph.D., Dean
College of Computing and Informatics
UNC Charlotte

Yi.deng@uncc.edu
<http://cci.uncc.edu>





A Bit of History

AT&T CEO, 1950s: ...At this rate of growth, every woman in America will soon have to be a telephone operator ...

Do you know anyone who works a telephone operator today?



Skill Aging and Mismatch

- Skill aging – the knowledge and skills of experienced professionals become obsolete due to changes in economy
- Skill mismatch – the supply of professionals with certain set of knowledge and skills does not match with market needs
- Increasingly a more serious problem for both individuals and society



21st Century Economy

- The 21st Century economy:
 - Knowledge- and innovation-driven
 - Fast paced
 - Fast evolving industries, business functions, employee roles and skills
 - Globalized (and no one can change that!)
 - Technology make time and distance disappear
 - Changing societal needs and challenges
 - Aging population, climate change, scarce resource...
- Bottom Line
 - A rapidly shifting job market



It's a Tough Job Market, for Whom?

- Many people were laid off in this recession
 - Still a close to 10% unemployment rate
- There are no jobs today?
 - Tech jobs in Silicon Valley
 - 50,000 health IT professionals needed
 - Shortage of 140,000 – 190,000 deep data analysts
 - 60+ companies recruited in UNC Charlotte's College of Computing and Informatics in 2010-11
 - ...



Wall Street Journal, October 3, 2011

- Number of job openings for every 1000 people employed in that occupation
 - Occupational therapists: 784
 - Software engineers: 318
 - Marketing managers: 108
 - Registered nurses: 82
 - Preschool teachers: 2
 - Mental health counselors: 2
 - Civil engineers: 7
 - Librarians: 7
- New York Fed/NYU Study
 - 1/3 of the increase in unemployment among college-educated from 2006 onward was result of not having right skills



Tomorrow's Job Market

- The US Department of Labor estimates:
 - today's learner will have 10-14 jobs by the age of 38
 - 1 out of 4 workers today is working for a company for whom they have been employed less than 1 year
- Top 10 jobs that will be in demand in 2015 may not exist today
- We are preparing students for jobs that don't yet exist, using technologies that haven't yet been invented
- Bottom line: we are at early stage of major structural change of job market, things are only going to get "worse" (but for whom?!)



What Shall We Do?

- Solvable problem, but no silver bullet
- Education institutions need to become more agile and responsive to market
 - Enhanced STEM education is necessary but not sufficient
 - Need to integrate conventional and continuing education
 - Need T-shaped people (strong technical knowledge, soft skills, creativity)
- Businesses need to be more deeply involved and invest in education
 - Not as a charity, but a fundamental self-interest
 - Treat continuous employee skill refresh and career development a key corporate priority
 - New model of industry-community-university partnership needed
- Individuals need plan to proactively and continuously refresh and upgrade skills
- Governments need to encourage and facilitate the changes



“IT Industry” – A Case Study



The “IT” Revolution

- The “old” IT revolution
 - 1% workforce, 4% GDP
 - Credited for up to 25% GDP growth since 1990s
 - Changed every industry and everyone’s life...
- On the verge of a new “informatics” revolution
 - And massively different “IT” job market



Coming Informatics Revolution

- **Informatics** – Technologies and processes of turning (big) data into business insights, innovations and values
- Examples
 - Wal-Mart’s customer tracking mines petabytes (10^{15}) of data to understand customer preferences and buying behavior
 - NC DHH’s analysis of 2 million Medicaid records to detect fraud, estimated saving of \$37 million in year one
- Why should we care? (McKinsey, MIT Sloan, IBM, Economist)
 - \$300 billion - annual value to US healthcare
 - 60% - potential increase in retailers’ operating margin
 - \$100 billion – estimated data management and analytics market alone
 - Wal-Mart: data...raw material of business in 21st Century, an economic input...almost on par with labor and capital
 - Microsoft: we are at convergence of the “data-centric economy”
 - All these means: jobs, jobs, jobs!



Informatics Industry

- Informatics – Nerve Center for the 21st Century Economy
 - Informatics is EVERYWHERE: Smart energy management, future banking, personalized medicine, risk prediction, personalized customer relations....
- We are at convergence of a major Informatics Industry
 - It exists not only in IT, but also in financial services, retail, energy, healthcare, ...



Informatics Jobs

- Informatics jobs everywhere, need people to fill them
 - 140,000 – 190,000 deep analytic talents; projected shortage 440,000 by 2018
 - 1.5 million data-savvy managers
 - 50,000 healthcare IT professionals...
 - Few universities train them now
 - Skills of existing managers/professionals aging
- Need new generation of talents
 - Informatics expert, knowledge about vertical industry, business savvy, soft skills
 - Surging demand, near non-existent or in short supply



Charlotte Informatics Partnership

- Academic-industry, public-private partnership to establish Charlotte region as a leader in Informatics
 - Executive/professional training to retool knowledge/skills
 - New degree programs for 21st Century jobs
 - Health informatics, bioinformatics, financial informatics, business analytics & informatics, cyber-security and privacy
 - Ideas Labs: Industry-oriented for business innovation & investments
 - Collaboratory to build eco-system
- Business competitiveness, high-end jobs, economic development



Keys to Success

- Partnership is essential for success
 - No single organization succeed alone in this kind of undertaking
 - New model of talent development and innovation requires strong university-industry collaboration
 - Opportunity to combine industry, state and federal investments
- Speed, Scale and Quality
 - Challenging in this economic environment



Final Thoughts

- Emphasis on STEM education is important, but not enough
- Short term, reactive job training will have limited impact
- Structural changes (slide 9) needed to address structural changes in job market
- Governments should play an active role to enable change
 - Avoid impulse to freeze everything in challenging times
 - It is imperative to invest in new education/training programs in targeted high growth areas
 - Federal government should fund EXPERIMENTS in new programs and partnerships that are replicable and have broad impacts
 - Enable and drive initiatives that facilitate new kind of workforce development



Thank You
&
Questions