Competency Based Education in Data Science and Big Data Analytics

Fariba Nosrati, Parisa Lak and Ayse Basar Bener
Societal Need

Big data can generate significant financial value across sectors

- **US health care**
  - $300 billion value per year
  - ~0.7 percent annual productivity growth

- **Europe public sector administration**
  - €250 billion value per year
  - ~0.5 percent annual productivity growth

- **Global personal location data**
  - $100 billion+ revenue for service providers
  - Up to $700 billion value to end users

- **US retail**
  - 60+ percent increase in net margin possible
  - 0.5–1.0 percent annual productivity growth

- **Manufacturing**
  - Up to 50 percent decrease in product development, assembly costs
  - Up to 7 percent reduction in working capital

SOURCE: McKinsey Global Institute analysis

Hiring Demand by Metro Area for Big Data Experience in Canada

- Toronto
- Vancouver
- Calgary
- Montreal
- Edmonton
Target Participants

- wish to become, or already are, professionals who wish to use Data Analytics, Big Data and Predictive Analytics to optimize performance
- are interested in the field of Data Analytics and wish to contribute to a range of employment and technical disciplines, and
- are employed in a related field such as data warehousing, data management, IT, etc. and wish to gather the necessary competencies and credentials for promotion or other advancement
From Oracle White Paper, 2013
Competency Based Learning (CBE)

- Explicit learning outcomes with respect to the required skills (standards for assessment)
- Flexible time frame to master these skills
- Variety of instructional activities to facilitate learning
- Criterion-referenced testing of the required outcomes
- Certification based on demonstrated learning outcomes
- Adaptable programs to ensure optimum learner guidance
Competency Based Learning (CBE)

- In CBE, the outcomes are tied to job skills or employment needs
  - Identify functions of a specific role/job and establish the performance standards for each function (competency framework)
  - Assess current performance gaps
  - Provide plans to achieve the required performance standards and prove support in implementing the plans
  - Assess the application of new skills and knowledge in a work environment

- We have used “Certified Analytics Professional (CAP) job task analysis (JTA)” as our competency framework and designed a curriculum for a Certificate in Data Analytics, Big Data, and Predictive Analytics.
Certificate’s Curriculum Structure

- Curriculum is designed to meet the requirements of INFORMS Certified Analytics Professional (CAP®) program. CAP® requires proficiency and skills in the following seven domains:
  - Business Problem Framing
  - Analytics Problem Framing
  - Data
  - Methodology
  - Model Building
  - Deployment
  - Model Life Cycle Management
Curriculum and Competency Mapping
Courses

- Introduction to Big Data Analytics - Fall 2014
- Data Access and Management - Fall 2014
- Basic Methods - Fall 2014
- Advanced Methods - Winter 2015
- Big Data Analytics Tools - Winter 2015
- Capstone Course: Emerging Best Practices in Data Analytics and Predictive Analytics - Spring 2015

- 186 people registered in Fall 2014
Interdisciplinary Certificate

- Three teaching departments:
  - Math, Computer Science, and Industrial Engineering
  - Housed in Faculty of Engineering and Architectural Science

- Co-coordinators:
  - from Faculty of Science and Faculty of Engineering and Architectural Science

- Standing curriculum committee: members from three faculties:
  - Faculty of Science, Faculty of Engineering and Architectural Science, Ted Rogers School of Management
Ryerson Big Data Initiatives (BDI)

- OMARS Venture
  - Exclusive academic partner for training
- Big Data Institute(s)
  - Privacy
  - Tools and Applications
- Existing Research Centres
  - Data Science Lab
  - RC4 High Computing Facility
- Degree programs
  - Master of Science in Data Science and Analytics- Fall 2015
  - Specializations in undergrad and grad programs
- Collaborative Projects
  - Canadian Big Data and Analytics Talent Gap Analysis Project
Upcoming Programs - Fall 2015

Yeates School of Graduate Studies

GRAD

Master of Science in Data Science and Analytics

www.ryerson.ca/gradviewbook
Thank You