Future of Work:
Technology and the Workforce

Considerations for the

Impact of Automation in the

Context of Curriculum

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Take Away from Today

A "Golden Age" for Community Colleges

- Fourth Industrial Revolution

- Automation: Rate of Change and Risk

- Industy as Educators and Digital Credentials

Fourth Industrial Revolution

First: Steam and mechanization, **1800***

Second: Electrification and mass preproduction, **1900***

Third: Computerization and electronics, **1975***

Fourth: Automation and machine intelligence, **2010***

*Fifth: Gene editing and quantum computing, "**Thursday**"*

　　　* all dates are "ish"

Fourth Industrial Revolution, Societal Impact

Everywhere, all at once

Positive impact on production in advanced economies

Drive adoption of Universal Basic Income

Disrupt educational process (in favor of 2-year systems)

End of privacy as we know it

Fourth Industrial Revolution, Impactful Technologies

Block Chain / Smart Contracts   Every Industry, greatest digital transformation since the internet itself

AI / Machine Learning   Every job with an analytical component

Automation / Robotics   Every job with a physical component

IOT Coupled with Big Data   Everything that uses electricity will have an IP address. Signals the end of privacy as we have always understood it.

Quantum Computing   Will drive entirely new industries and material sciences

Gene Editing   Technology such as CRISPR allows of the editing of humans (see, He Juinkui, CCR5 gene, Lulu and Nana)

Fourth Industrial Revolution, Definitions

Automation

Any machine that performs a job with reduced levels of human interaction

Most impactful on physically repetitive or predictable work

Robotics (= automation)

Subset of Automation, where manipulation and mobility are involved

Most impactful on complex repetition and social interaction

Artificial Intelligence (AI) and Machine Learning (ML)

Allows computer to learn a task even if humans can't explain the task

Impacts information processing and remote social interaction

How Do We Evaluate the Impact On Our Curricula?

Analyzing Susceptibility to Automation

"Highly Cited…"

The Future of Employment:
How Susceptible Are Jobs To Computerization?

Carl Benedikt Frey and Michael A. Osborne

Oxford University, 2013

http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

The Future of Employment:
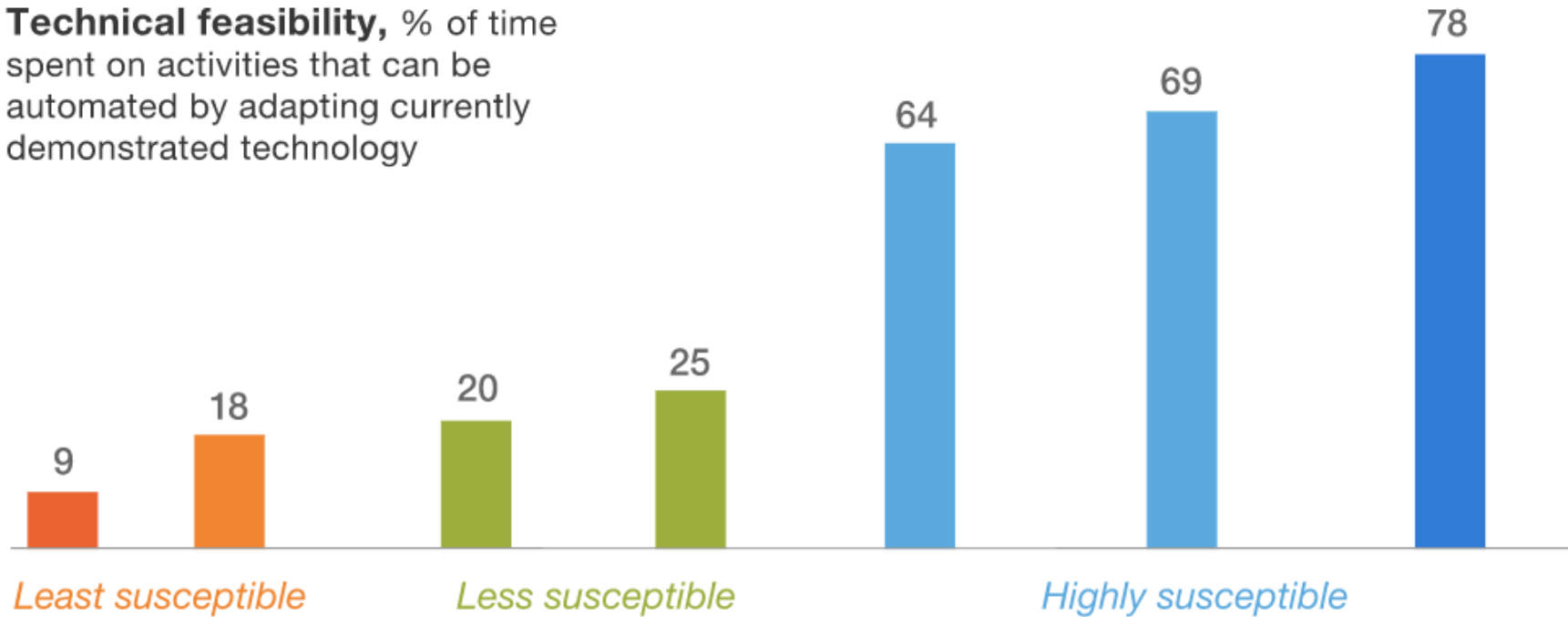# How Susceptible Are Jobs To Computerization?

Top 25

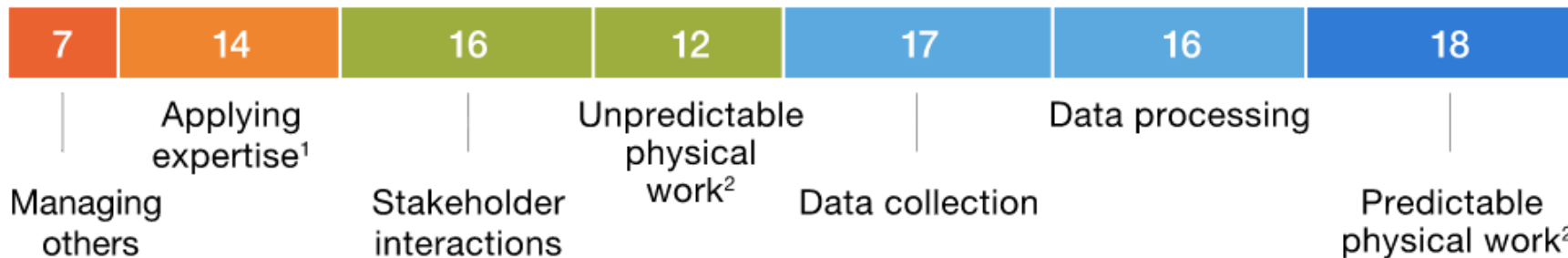| Rank	Probability	Occupation
702	0.99	Telemarketers
701	0.99	Title Examiners, Abstractors, and Searchers
700	0.99	Sewers, Hand
699	0.99	Mathematical Technicians
698	0.99	Insurance Underwriters
697	0.99	Watch Repairers
696	0.99	Cargo and Freight Agents
695	0.99	Tax Preparers
694	0.99	Photographic Process Workers and Processing Machine Operators
693	0.99	New Accounts Clerks
692	0.99	Library Technicians
691	0.99	Data Entry Keyers
690	0.98	Timing Device Assemblers and Adjusters
689	0.98	Insurance Claims and Policy Processing Clerks
688	0.98	Brokerage Clerks
687	0.98	Order Clerks
686	0.98	Loan Officers
685	0.98	Insurance Appraisers, Auto Damage
684	0.98	Umpires, Referees, and Other Sports Officials
683	0.98	Tellers
682	0.98	Etchers and Engravers
681	0.98	Packaging and Filling Machine Operators and Tenders
680	0.98	Procurement Clerks
679	0.98	Shipping, Receiving, and Traffic Clerks
678	0.98	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic

Bottom 25

Rank	Probability	Occupation
1	0.0028	Recreational Therapists
2	0.003	First-Line Supervisors of Mechanics, Installers, and Repairers
3	0.003	Emergency Management Directors
4	0.0031	Mental Health and Substance Abuse Social Workers
5	0.0033	Audiologists
6	0.0035	Occupational Therapists
7	0.0035	Orthotists and Prosthetists
8	0.0035	Healthcare Social Workers
9	0.0036	Oral and Maxillofacial Surgeons
10	0.0036	First-Line Supervisors of Fire Fighting and Prevention Workers
11	0.0039	Dietitians and Nutritionists
12	0.0039	Lodging Managers
13	0.004	Choreographers
14	0.0041	Sales Engineers
15	0.0042	Physicians and Surgeons
16	0.0042	Instructional Coordinators
17	0.0043	Psychologists, All Other
18	0.0044	First-Line Supervisors of Police and Detectives
19	0.0044	Dentists, General
20	0.0044	Elementary School Teachers, Except Special Education
21	0.0045	Medical Scientists, Except Epidemiologists
22	0.0046	Education Administrators, Elementary and Secondary School
23	0.0046	Podiatrists
24	0.0047	Clinical, Counseling, and School Psychologists
25	0.0048	Mental Health Counselors

Susceptibility to Automation, McKinsey

Technical feasibility, % of time spent on activities that can be automated by adapting currently demonstrated technology

Least susceptible — 9, 18

Less susceptible — 20, 25

Highly susceptible — 64, 69, 78

Time spent in all US occupations, %

7	14	16	12	17	16	18

Managing others

Applying expertise[1]

Stakeholder interactions

Unpredictable physical work[2]

Data collection

Data processing

Predictable physical work[2]

Fourth Industrial Revolution, Negatively Impacted

Pilots and Drivers

Factory Workers

Retail Workers

Home Health Care

Dental labs

Financial Analysis

Real Estate

Brick Layers

Telemarketing

Garment Manufacturing

Customer Service

Food Service

Fourth Industrial Revolution, Not Negatively Impacted

Electrician

Teacher

Manager

Skilled Nursing

Cosmetology

Mental Health

Social Services

Criminal Justice

Aviation Operations

Automation Support

Conference Presenter

It's Ultimately About the Cost

$$Likelihood = Profit / Complexity$$

The Impact on Education?

Impact on Education

Education system will become highly distributed and will move away from a 4-year model

Degrees will begin go away, replaced by "micro degrees"

Starting with high technology, industry will more directly dictate the curriculum

Impact on Education

The demographics of the 2-year system will change dramatically

Soft and basic skills training will become less necessary

The hard-to-serve will become the impossible-to-serve

Industry as Educator

Google Career Certificates

1,000,000 scholarships ($245 per) via non-Profits and WIBs

Delivered through Coursera

Will serve as Micro Credentials

Widespread hiring industry recognition

Questions and Discussion

Thank You!

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Links to resource materials

Call, write, or connect with me on LinkedIn