

New Technologies, Innovation, and Quality Assurance:

**How to Consider QA and its Key Principles in a World
of Disruptive Technology and Change in the Academy**

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March 2019



Technology and Quality Assurance in Higher Education



- 1 Market pressure for faster degree programs
- 2 Rise of alternative credentials
- 3 Growth of online and competency-based education
- 4 New quality assurance = learning verification

Roadmap



- 1 Market pressure for faster degree programs
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Over 10,000+ colleges and universities worldwide founded in the past 50 years

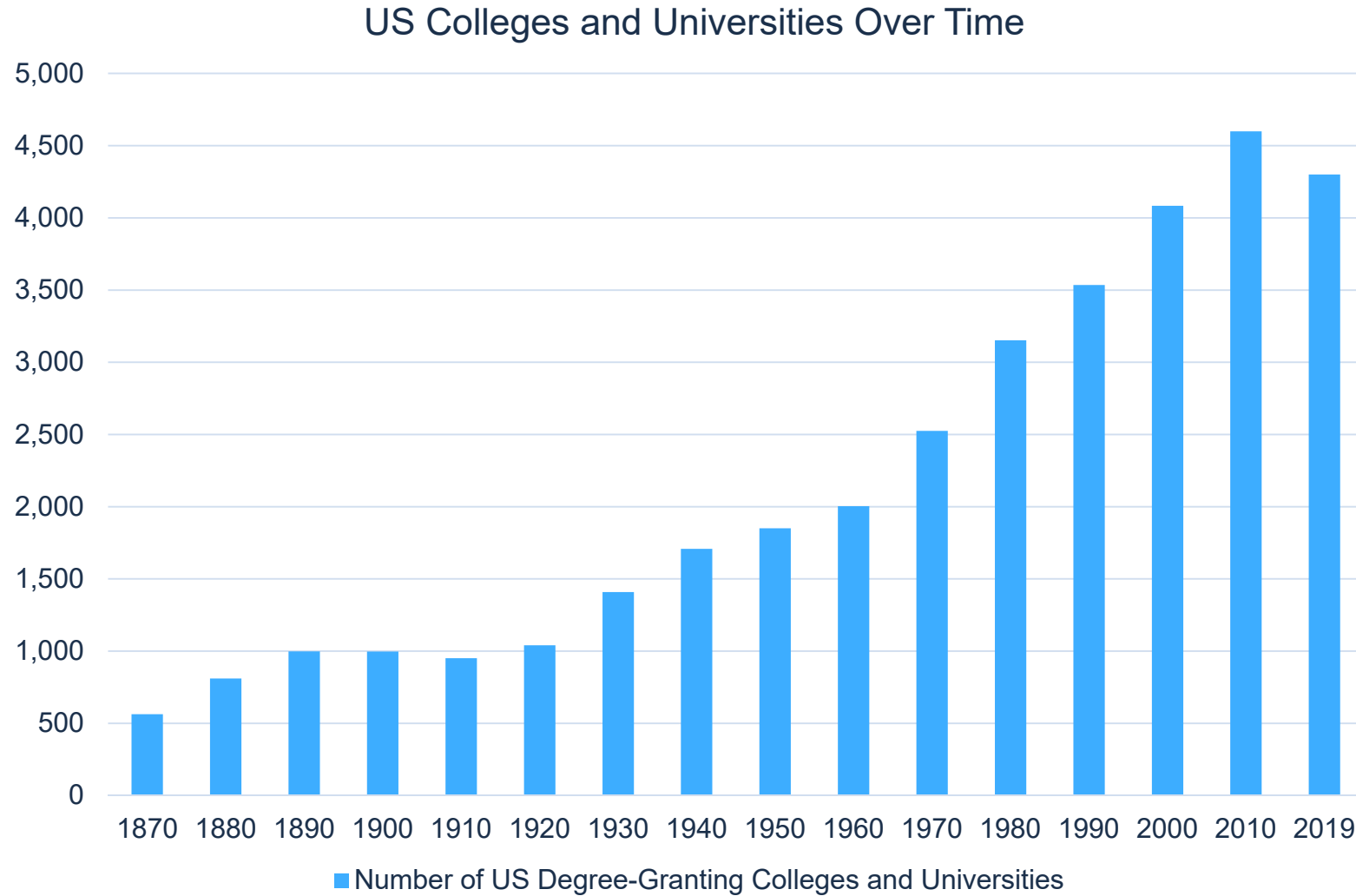


	From...	...To
Year	1500s	2019
Number of institutions	66 universities, primarily in Europe	26,000+ colleges and universities worldwide

SOURCE: World Bank; Our World in Data

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“Peak University” - US university count declining



SOURCE: US National Center for Education Statistics (NCES)

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A research-oriented, faculty-centered, isomorphic university model



Typical University Model

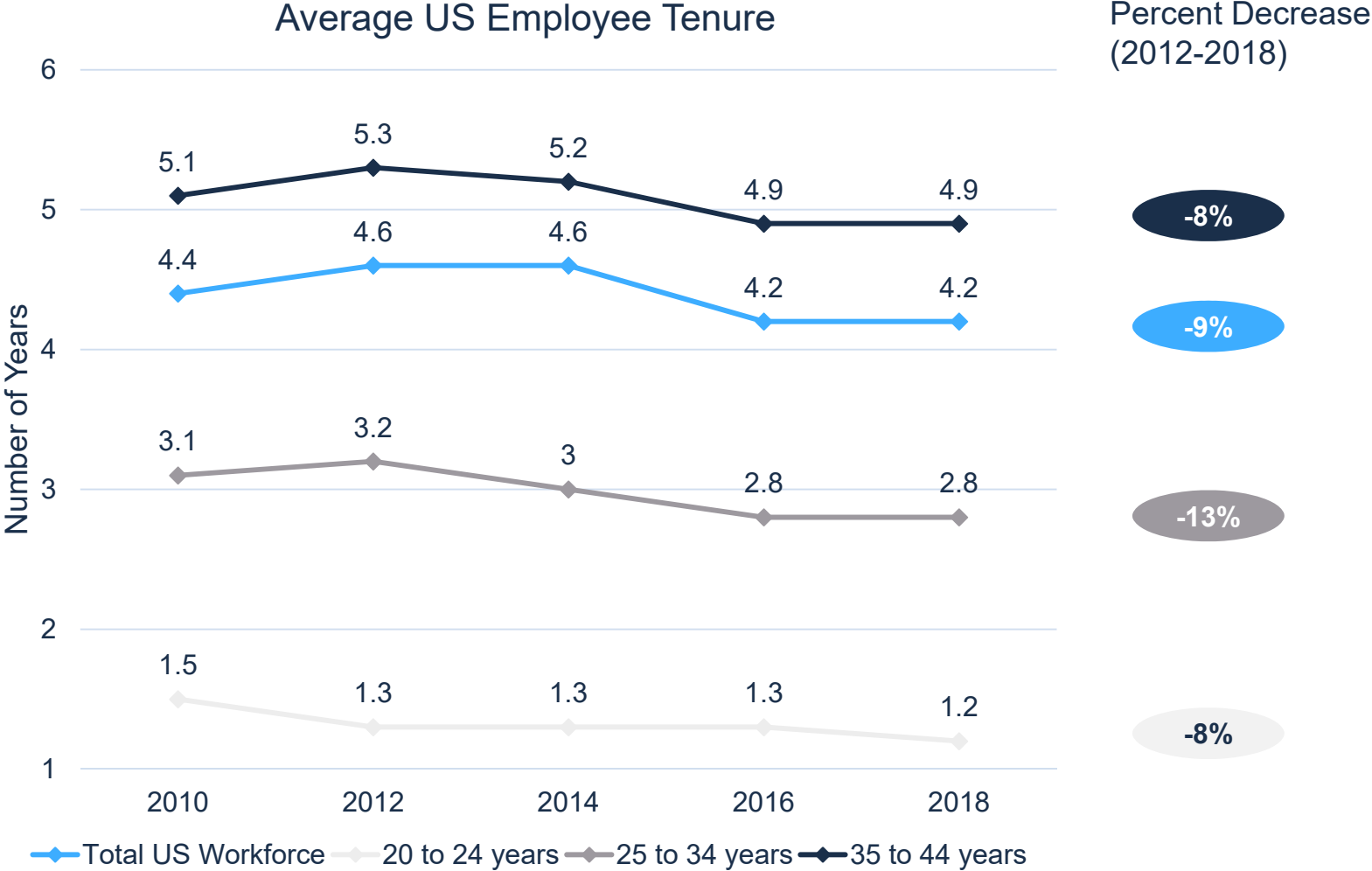
Objectives

- » Advance knowledge and research
- » Prepare students with research and critical thinking skills
- » Serve society through basic research and innovative thought

Governance

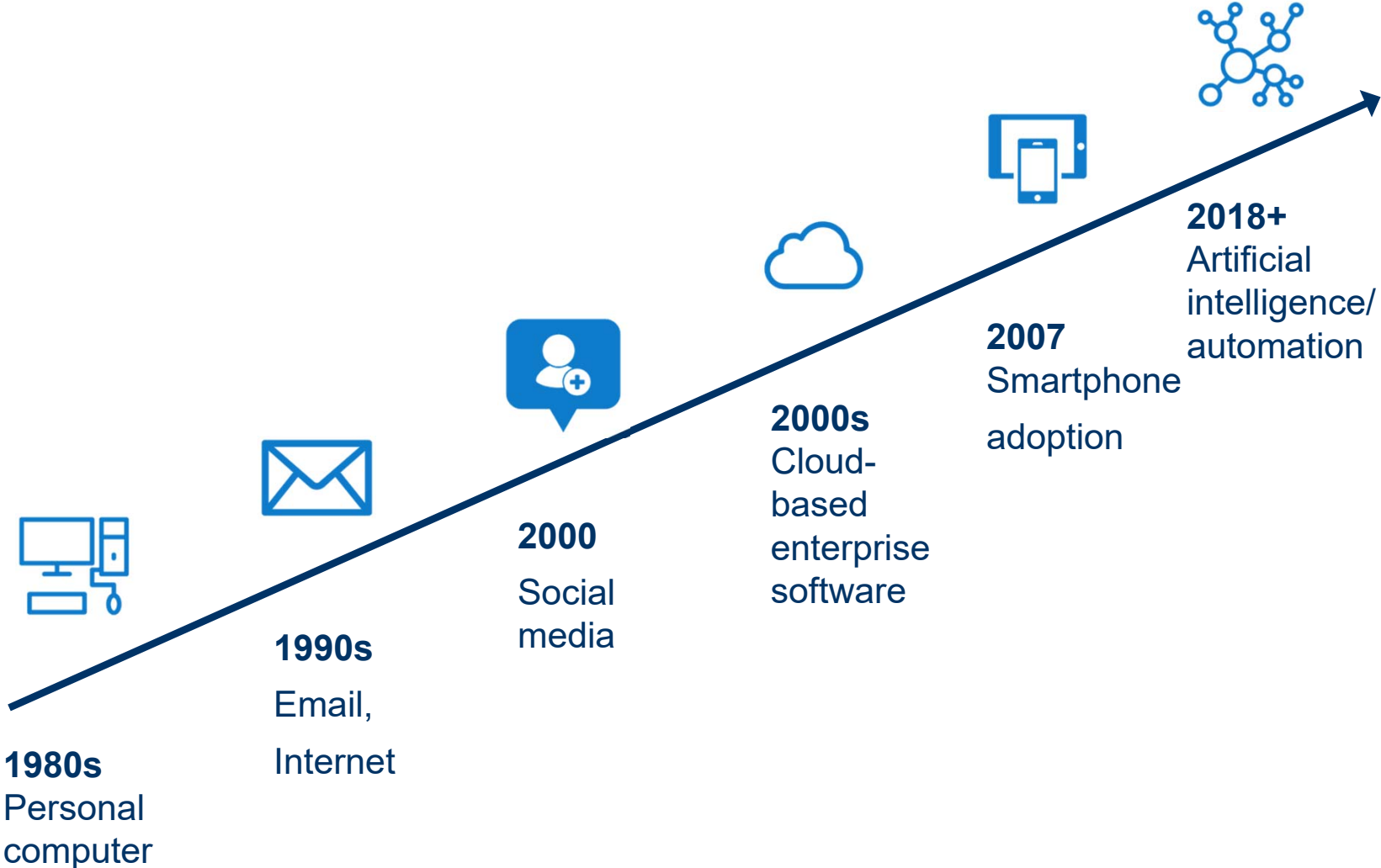
- » Academic departments organized around same set of canonical disciplines (humanities, social sciences, natural sciences, engineering)
- » “Guild-like” tenure system rewards faculty conducting research in core disciplines for traditionally recognized journals

Employee tenures are decreasing

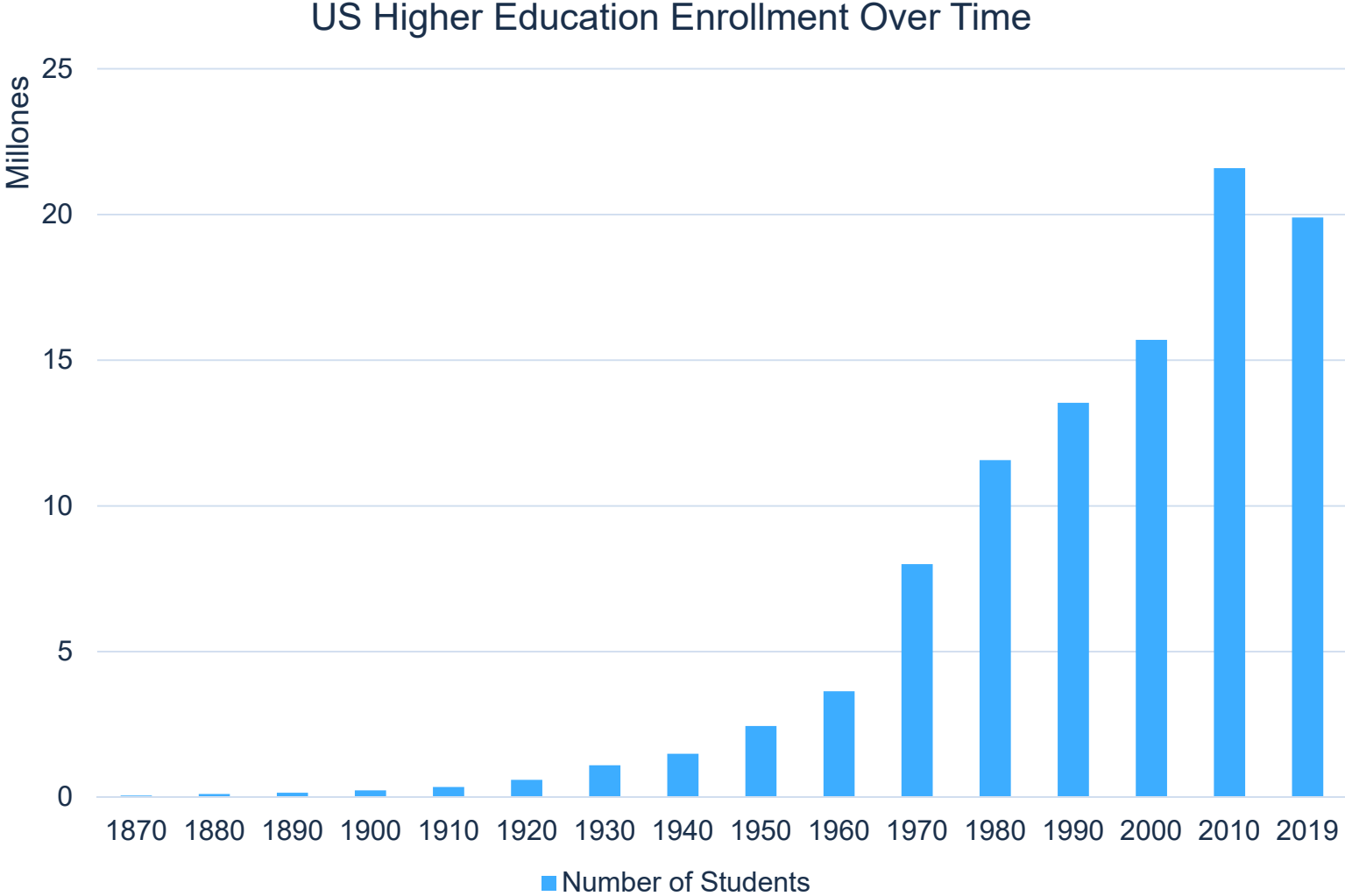


SOURCE: US Bureau of Labor Statistics

Technology is remaking the workplace rapidly



US student count declining



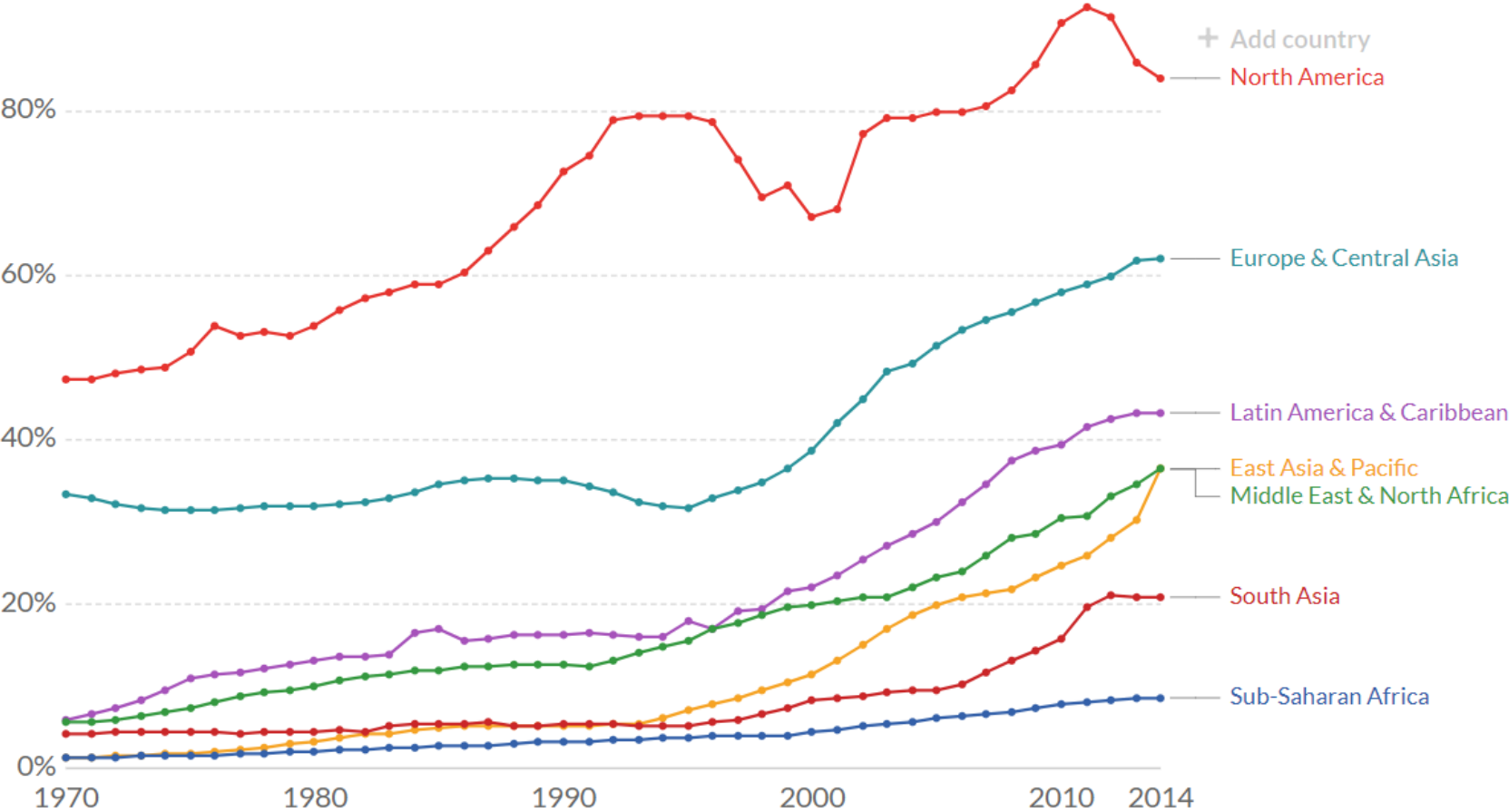
SOURCE: US National Center for Education Statistics (NCES)



Global participation in higher education

Gross enrollment ratio in tertiary education

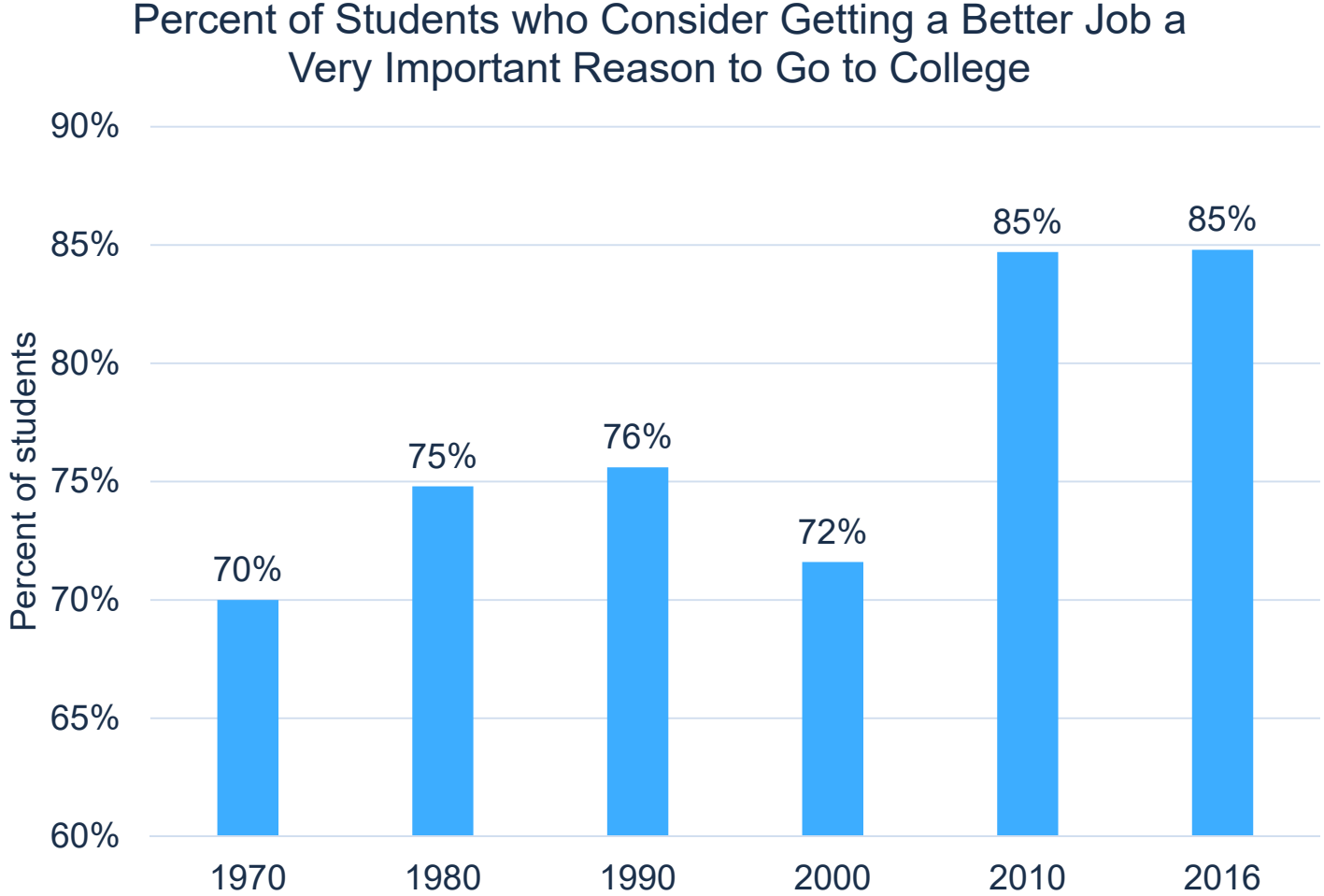
Total enrollment in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving.



SOURCE: World Bank; Our World in Data

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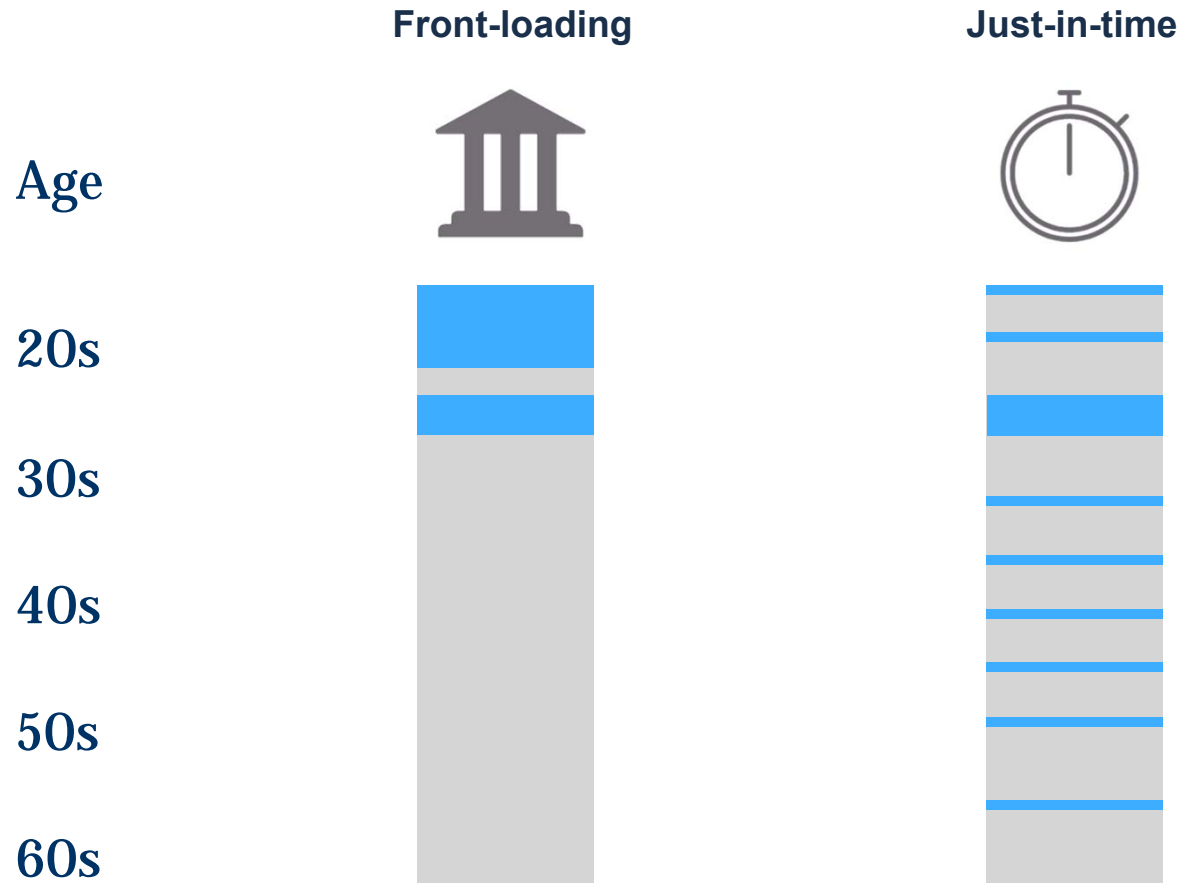
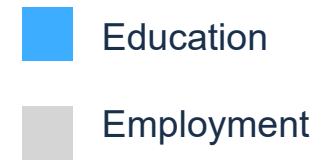
Increasingly, students go to college to get a better job



SOURCE: National Freshmen Survey (UCLA)

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Two models of education



Coding “boot camps” address student employment goals



Traditional University



Coding Boot Camp

Length of study

4 years

2-3 months

Total tuition

\$200K+

\$15-20K

Job placement rate

81%

85%+

Expected salary

\$50K

\$85K

Boot camps will proliferate across many industries



Selected Industries

Software Engineering

Medical Training

Design

Sales

Illustrative Boot Camps



New technical skills are necessary



The grid contains logos for various industries:

- ENERGY/UTILITIES:** SEE, OILPRO, RIGUP, TACHYUS, Mtel, Mercatus, OPPOWER, AutoGrid, Faraday, GENABILITY, PETROFEED, BUILDING ROBOTICS, enACT, Geostellar, drillingair, Dispatchr, EnergySavvy, SPACE-TIME, voltaiq, enlighted, noSS, FIRSTFUEL, TREX, GASCORE, Energy, SOLVEX, ENERINDO, analytics, BUKOFA, PDCOMPLUTE.
- REAL EST/CONSTR:** REALPAC, STACK, nestio, ZUMPER, HIGHTOWER, PROCORE, JOIST, BRIDGT, coplo, srifata, Yreasio, Floored, BuildingConnected, fasco, floors, propertybase, COMPSTAK, MALGOV, carvan, FIELDLENS, URBAN COMPASS, agoraty, Follow, Rentlytics, Loggly, Elastic, LMMake, Textural, smartuse, onigatud, Pexos, Chimeapp.
- HOSPITALITY:** GUESTDRIVEN, RoomsKey, VOYAT, innRoad, Front Desk, STAYNTOUCH, concilio, HOTELOGEX, ROOMSTORM, apartmentlist, Arand Systems PC, objective logistics, frontdesk Anywhere, harni, REFFR, ALICE.
- GOVERNMENT:** enigma, GovPredict, Credence ID, Prolific, Socrata, rally, point, EN FiscalVote, OPENGOV, BasicGov, ONVIA, CITY SOURCED, mark43, .govini, NONPROFIT, Fonte, Rev, blackbaud, FUNDLY.
- HEALTHCARE:** WebPT, ACUPERA, Scrie, patient, aptible, chrona, mediky, clisovo, mada, GRAND BOUNDS, doximity, LIST, veeva, BridgeCrest, pingmd, BridgeCrest, gluko, Care, GREENLIGHT, pingmd, Greenlight, M E D I O, careInsync, simplepractice, HEALTHCOOP, SimplyInsured, ProcureHealth, Human API, PATIENTPING, Benchling, CoreCloud, image, GINGER.io, BeesDoctor, hc1.com, dabo, healix, LYRA, BlueTalon, MEDISAB, mobitor, AUGMEDIX, ClearCare, ELIGIBLE, OrderGroove, Weltek, mscripts, assay depot, ARTERYS, PRESTINE, healthtech, TeleSis, nightgale, COBE, medidata, othenhealth, SmartIndoor, MedAnalytics.
- EDUCATION:** elucian, Udacity, MATCHRIP, evertrue, engrade, courses, Desire2Learn, KNEWTON, CIVITAS LEARNING, 2U, University, edmodo, LearnOut, Silverback, Board.
- RETAIL:** RETAILNEXT, SWARM, TULIP RETAIL, retailgen, everisight, Wisar, REDROCK, SIGNAL, shelospace, 42, WISDOM, Event Planning & Fashion, doubledutch, StyleSeat, NuORDER, cvent, THREADSUITE.
- LEGAL:** RocketLawyer, RAVEL, Clio, Lex Machina, LegiStorm, vpcounsel, LawPat, MAGNET, logikcui, ASSISTANT, HIR, MyCase, exterro, mycase, MAGNET, AMICUS, SimpleLegal, TIMES9, AbacusLaw, Anaqua, DISCO, JUDICATA.
- WATER:** VALOR WATER, WaterSmart, Oph, Tefab, FATHOM.
- WASTE:** compology.
- OTHERS:** WELLNESS & TRAVEL: springshot, MINDBODY; MEDIA & ENTERTAINMENT: convertmodo, ASSEMBLE, GAGG; RESTAURANTS & FOOD/BEVERAGE: ChowNow, Etouch, giguel, DigitalHead, Innovize, PRESHING, tabbedout, cover, panzhh.

STAYNTOUCH®

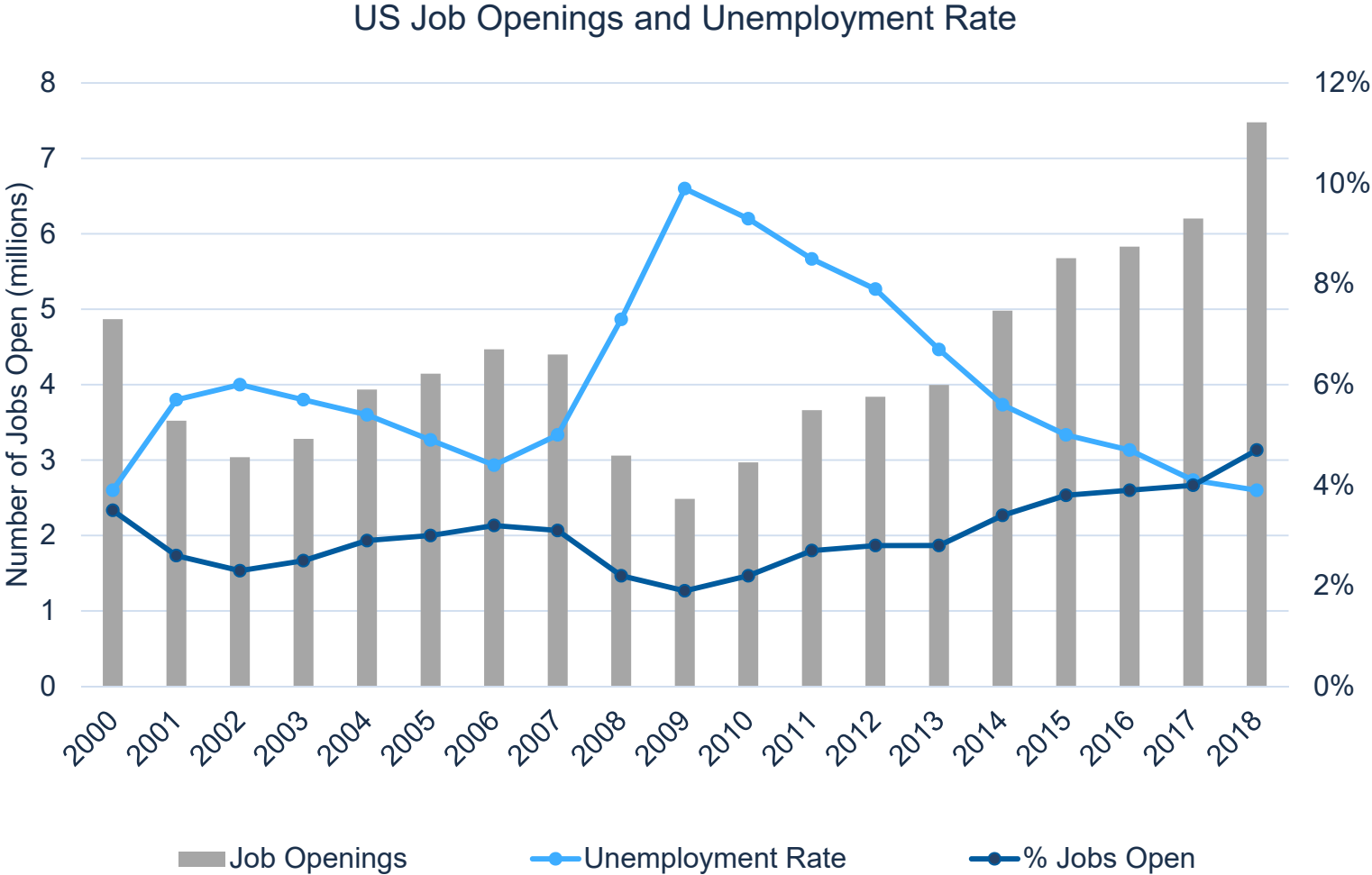
blackbaud™
power your passion

salesforce

Epic

Clio®

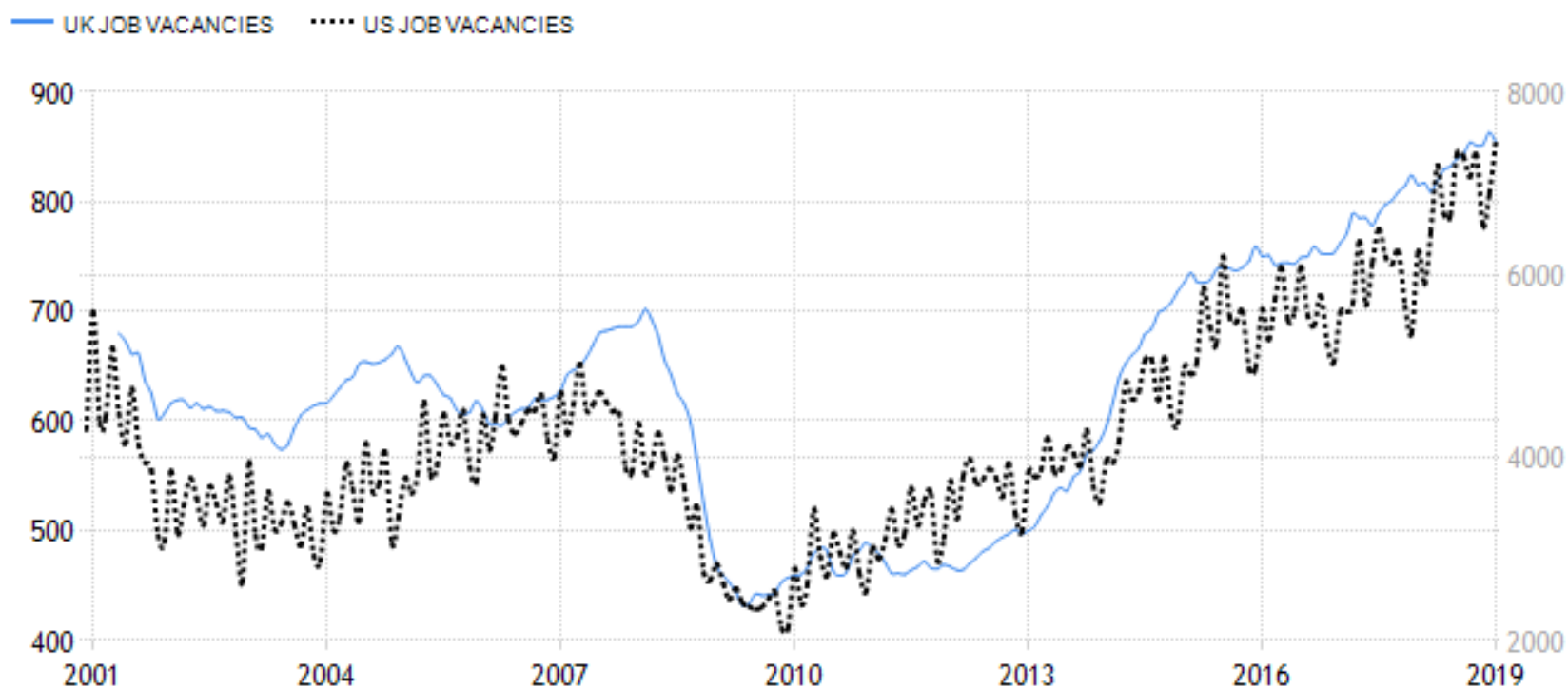
The skills gap has widened



SOURCE: US Bureau of Labor Statistics

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Is the Skills Gap a broad phenomenon?



SOURCE: Trading Economics

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The mechanics and technology of hiring have changed



Hiring managers that use Applicant Tracking Systems:

<1%

2000:

75%

Today:

Companies that use social media to recruit:

<1%

2000:

73%

Today:

Most popular application mediums:



2000:

Today:



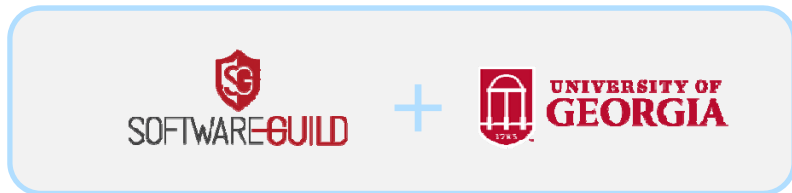


Why are employment outcomes worse?

Proliferation of technical skills

Career Area	Technical Skills Specified	Cognitive and Soft Skills Specified
Information Technology	75%	25%
Healthcare	74%	26%
Engineering	71%	29%
Life/Physical Science and Math	68%	32%
Manufacturing and Production	68%	32%
Design, Media, and Writing	66%	34%
Research, Planning, and Analysis	65%	35%
Personal Care and Services	63%	37%
Finance	62%	38%
Marketing and Public Relations	62%	38%
Management and Operations	61%	39%
Education and Human Services	60%	40%
Hospitality, Food, and Tourism	59%	41%
Sales	59%	41%
Human Resources	57%	43%
Clerical and Administrative	57%	43%
Customer and Client Support	49%	51%

In response, universities are launching boot camps



In the US, more than 40-50 universities have launched coding boot camps

SOURCE: Course Report

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How the Skills Gap will impact higher education



- » Boot camp and shorter degree programs will proliferate
 - Second and third tier universities must adapt
 - Regulation needs to support these programs
 - The traditional 3-4 year degree will decline in popularity
 - Boot camps will be integrated into higher education

Roadmap



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Micro-credentials address the communications gap between educators and employers



Digital credentials are at the nexus of key market trends



89%

Engagement a Priority

89% HR pros: a recognition system at work improves the employee experience. Lifts productivity & the bottom line.

#1

Millennials

Almost 75% of workforce, they rank learning & growth as top priority in job selection.

70%

Skill-Based Hiring

Reduces cost-to-hire by 70%, time-to-train by 50%; Companies organize around skills, not job titles.

51%

Skill-based Learning

51% employers already moving to competency-based microlearning.

\$1.6T

Debt

\$1.56T in US student debt and degree half life is short; other credentials are on the rise.

81%

Certifications Growing

81% of adults with a non-degree credential say it's very useful for getting a job.

85%

Lack of Trust

85% of employers found a lie or misrepresentation on a resume or job application.

43%

Gigs & Freelancing

43% of workforce by 2020 will be free agents, driving demand for trusted skill indicators.



SOURCE: Credly

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Micro-credentials will require a marketplace, verification, and collaboration among issuers



Individual Candidates



Academic Institutions



Verification Intermediaries



Credential Marketplace



Credential Issuers



Employers

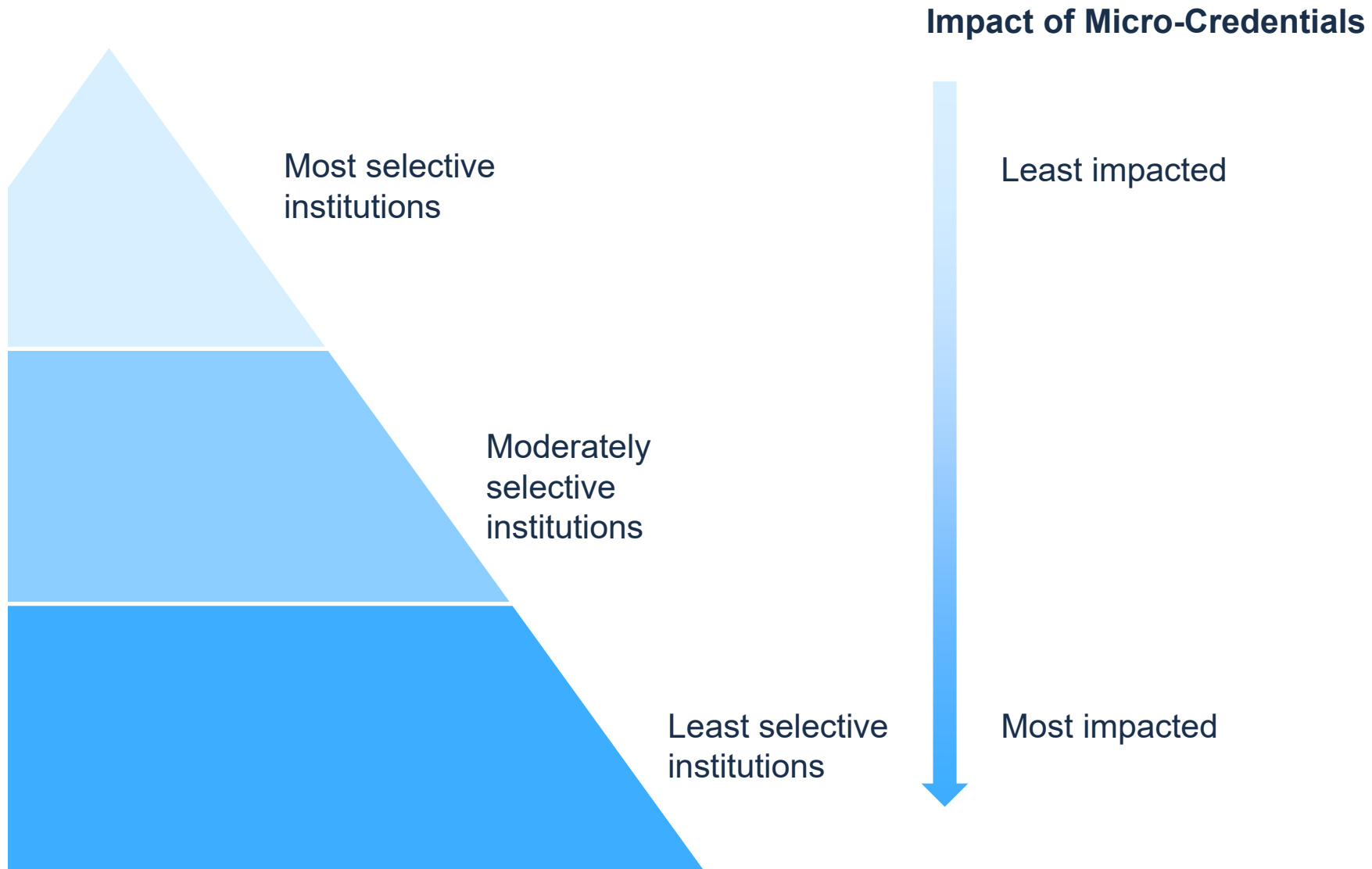


Recruiting Intermediaries



Training Providers

Less selective universities will be impacted more by micro-credentials



University degrees will have value based on graduate performance



Uber



Driver rating

ebay



Seller rating



Restaurant rating



THE OHIO STATE
UNIVERSITY



University rating

Regulations are tied to time-based measures



Minimum Program Lengths at US Higher Ed Institutions

- Associate's, Bachelor's, Graduate or Professional Degree
- At Least a **Two-Year** Program that Is Acceptable for Full Credit toward a Bachelor's Degree
- At Least a **One-Year** (Federal Definition) Program that Leads to a Credential and Prepares Students for Gainful Employment in a Recognized Occupation

Minimum Program Lengths at US Proprietary Institutions

- At Least 15-Week Undergraduate Program with **600 Clock Hours** or 16 Semester or 24 Quarter Credits, for Students without an Associate's Degree
- At Least 10-Week Program with **300 Clock Hours** or 8 Semester or 12 Quarter Credits at Graduate Level, only for Students with at Least an Associate's Degree
- At Least 10-Week Undergraduate Program with **300-599 Clock Hours** that Admits Students without an Associate's Degree and that Has Verified Completion and Placement Rates of at Least 70%

SOURCE: US Department of Education FSA Handbook 2018-2019

The US Department of Education launched an innovative model with EQUIP



OFFICE OF
Educational Technology

- » EQUIP provides federal financial aid to eligible students enrolled in non-traditional training programs (e.g., boot camps)
- » The program will improve access to innovative training opportunities that lead to good jobs and strengthen outcomes-based quality assurance processes

Non-Traditional Provider

Institution

Program

GUILD



- » 1-year certificate in Management and Leadership Fundamentals

straighterline



- » Associate of Science in Business Concentration
- » Associate of Arts in Criminal Justice Concentration



General Electric

Northeastern University

- » B.S. in Advanced Manufacturing

SOURCE: US Department of Education

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Income Share Agreements (ISAs): the Next Generation of Student Financing



An ISA is a **contractual agreement** in which a student receives **education funding** in exchange for a **percentage of post-graduation income** over a **defined number of years**

SOURCE: Vemo Education

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Universities worldwide are adopting income-linked financing programs



Income-share agreements



The Atlantic

Purdue University Income-Share Agreements Could Solve Debt Crisis (2017)



 U of U launches financing program to help students finish their degrees (2019)



FINANCIAL TIMES

Clarkson University [and others] have started [ISA] programmes..this could revolutionize higher ed (2019)

Income-based loan repayment



SOURCE: The Atlantic; Fox News; Financial Times

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Credly is a marketplace that houses and verifies credentials



Portable, digital,
verified achievements



20M+ credentials
documented



10M+ people;
195 countries



400+ providers
and schools

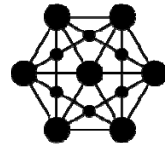
Partners include corporations, training providers, and certification associations



SOURCE: Credly

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What is blockchain?



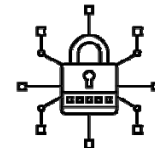
Distributed Ledger
System of record with new transactions propagated to entire network



No single point of failure
Centralized data bases prone to tampering or physical damage



Transparent
Immutable record of all transactions



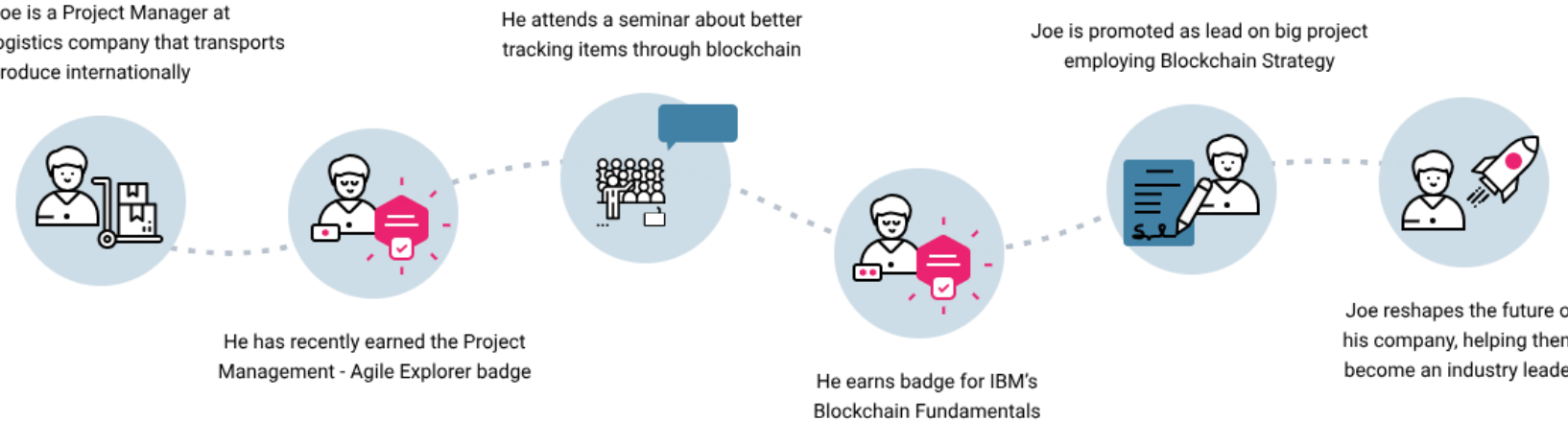
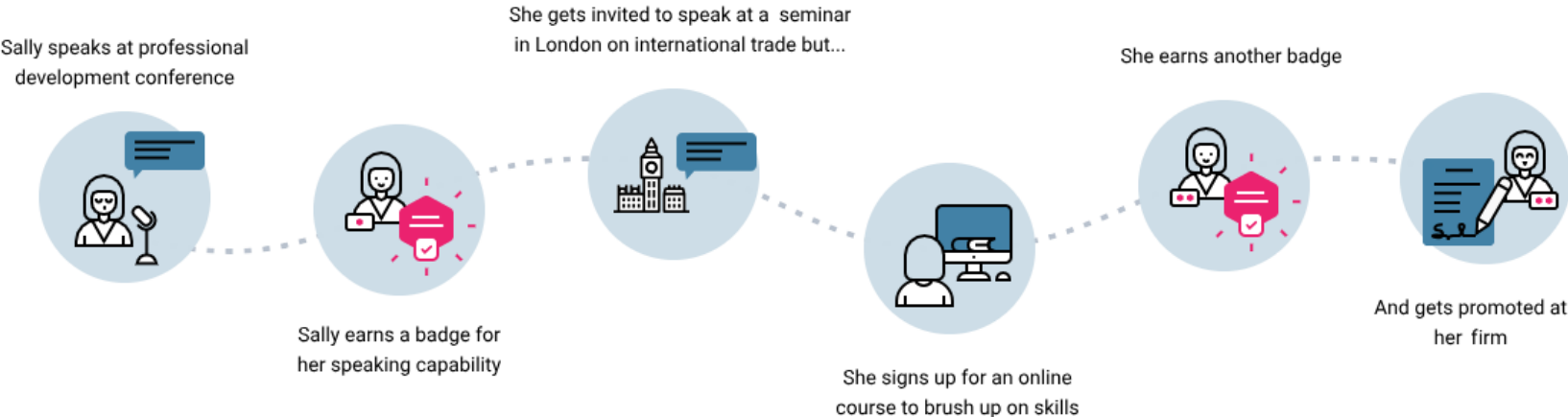
Secure
Economically impractical and physically challenging to hack

Blockchain – a continuously growing list of records, called blocks, which are linked and secured using cryptography

Many universities are exploring digital credentialing



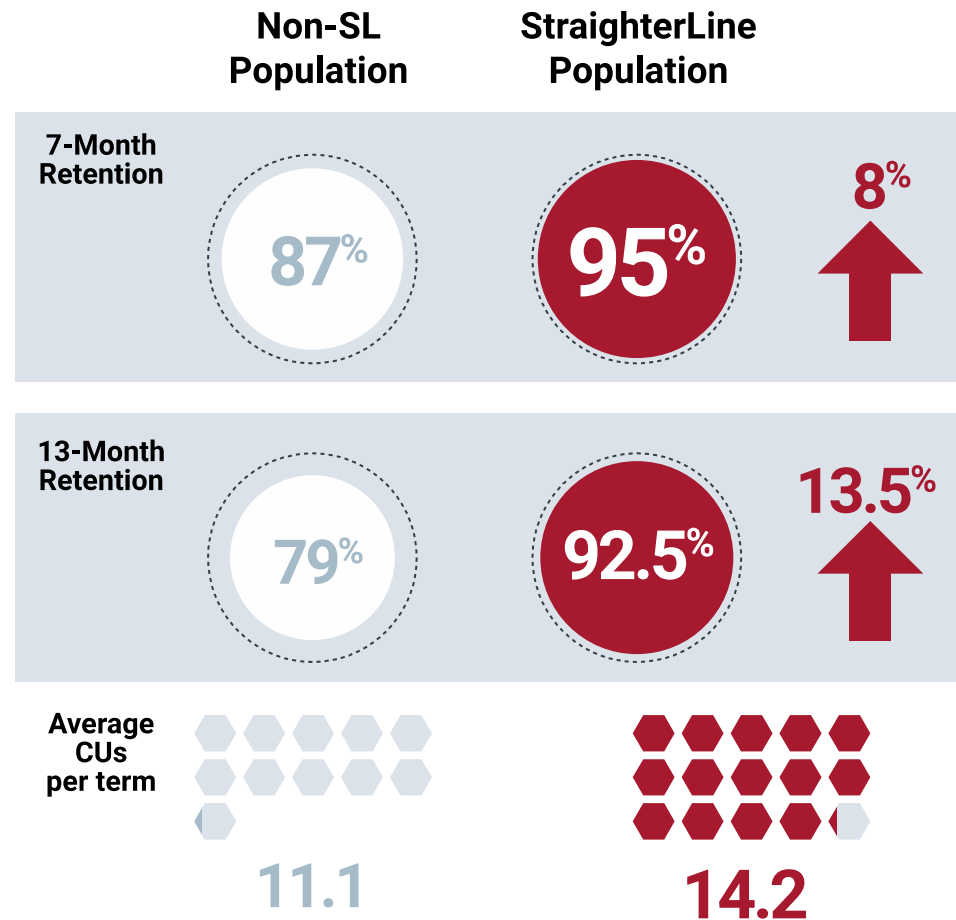
Credentials will stack to advance an employee's career



SOURCE: Credly

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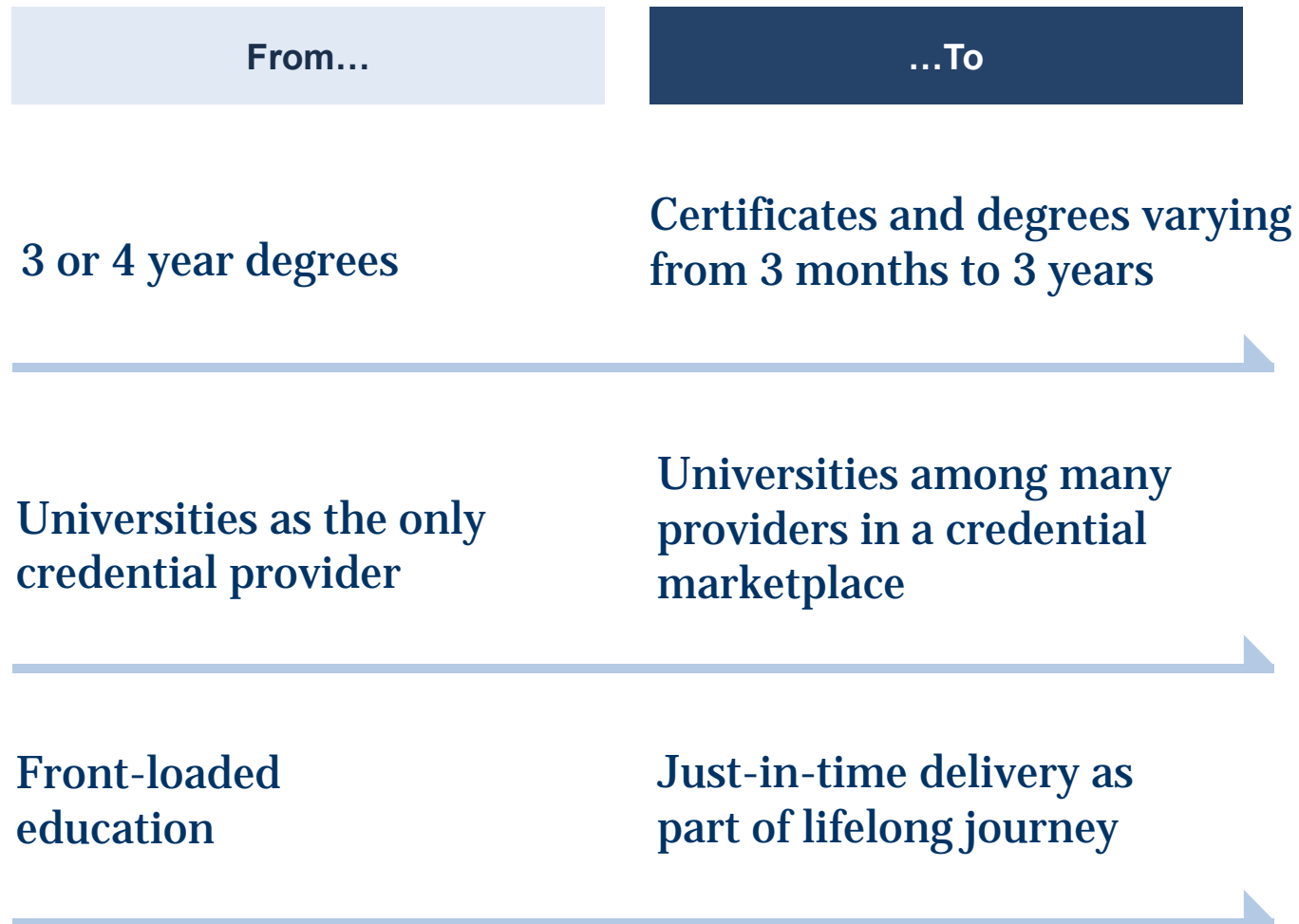
StraighterLine lowers the cost and risk of pursuing a degree



- » Offers **60+** online, competency-based, general education courses directly to students for a **\$99/month** subscription, plus one-time course fee of ~\$59.
- » Enrolled **30,000** unique students over the past twelve months
- » Credit transfer agreements with **130+** regionally accredited colleges and universities.
- » Results: **30%** yield of students who enroll in the program, with higher retention and faster progress

SOURCE: StraighterLine

How the rise of alternative credentials will impact higher education



Roadmap



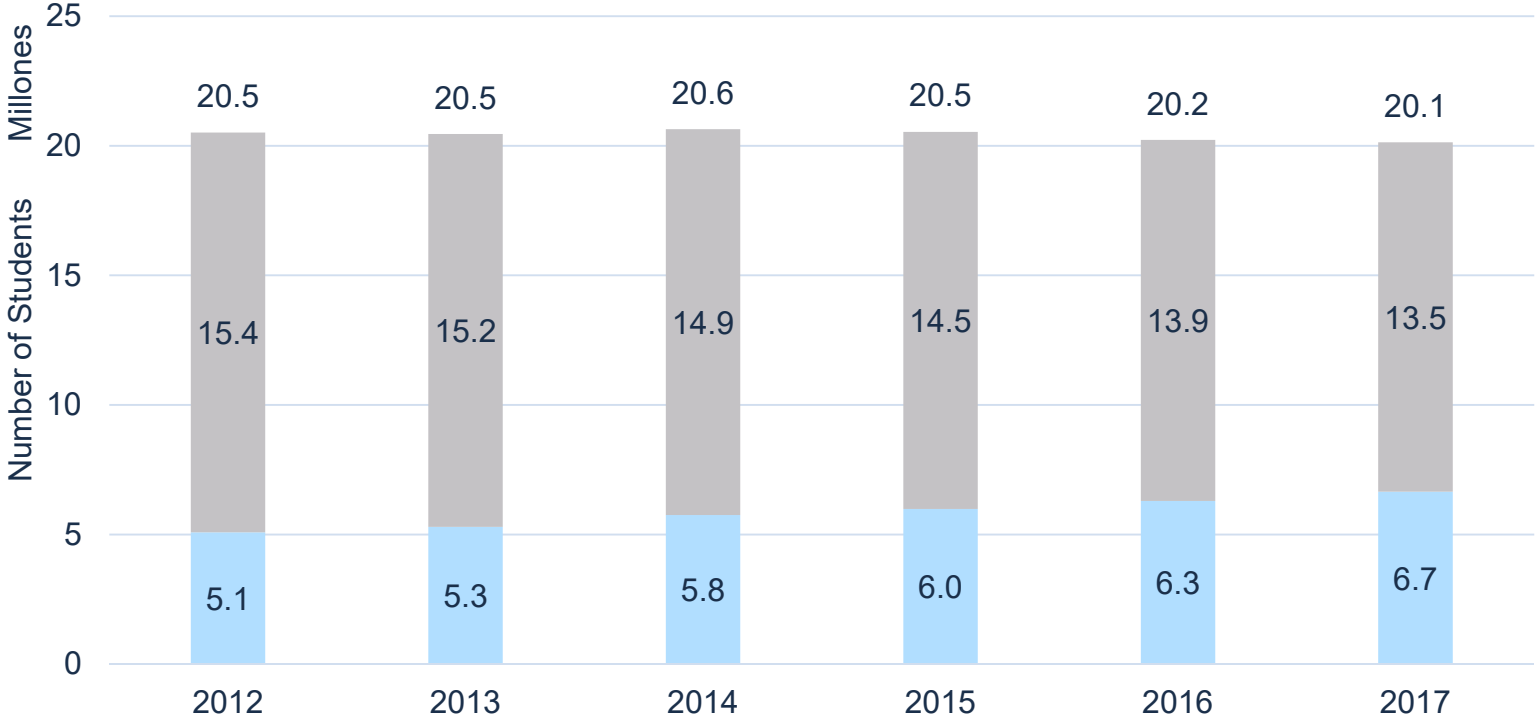
- 1 Market pressure for faster degree programs
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Students are moving online



■ Students Enrolled in at Least One Distance Course
■ Ground Students

US Post-Secondary Online and Ground Enrollment



Percent Students Enrolled in at Least One Distance Course

25.9%
27.9%
29.2%
31.2%
33.1%

Percent Students Enrolled Exclusively in Distance Courses

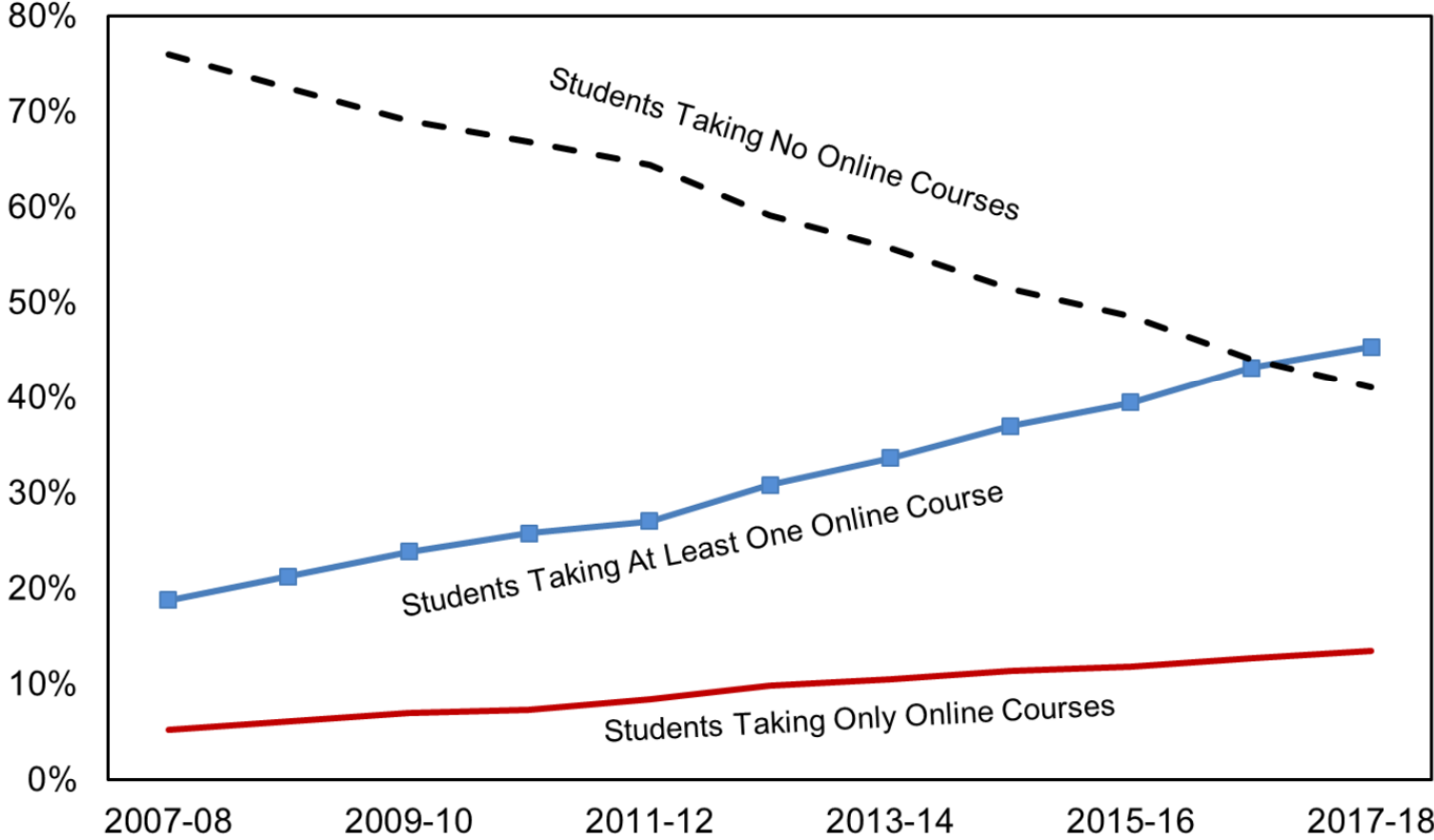
11.9%
13.6%
14.0%
14.7%
15.4%

SOURCE: US National Center for Education Statistics (NCES)

Over half of on-ground students take online courses in Oregon Public Universities



Oregon Public Universities: 2007 to 2018



SOURCE: Oregon Higher Education Coordinating Commission; Office of Research and Data

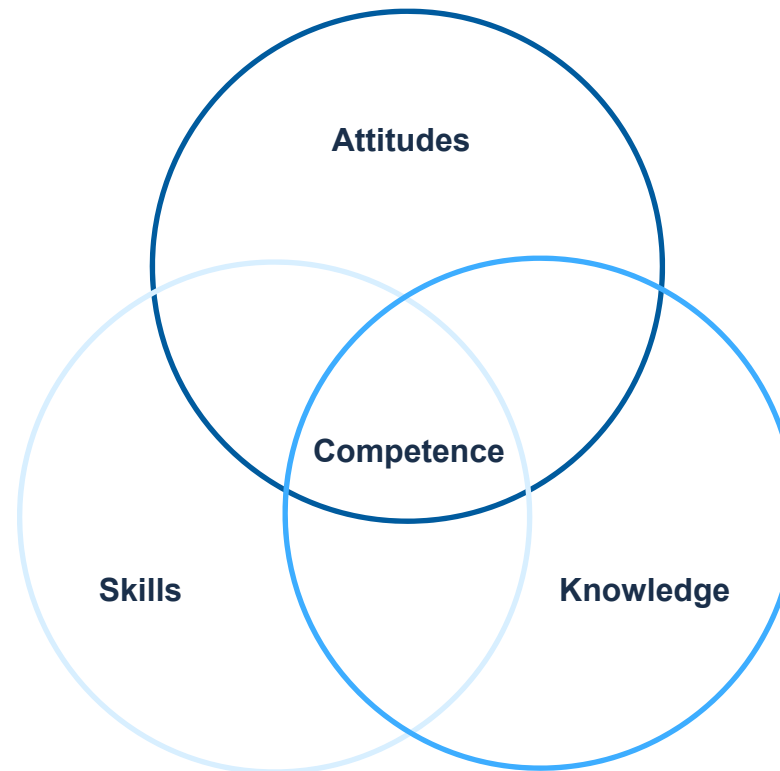
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Competency-Based Education (CBE) is emerging



Characteristics of CBE

- » A mastery-based measure of study, not a time-based measure
- » Theory is integrated with skill practice; knowledge supports performance
- » Learning is self-paced, flexible, skill-based, personalized, and affordable



The Carnegie credit hour is a time-based model of mastery



1 degree



40 x



40 courses



120 x



120 credit-hours

Western Governor's University has made competency-based education its cornerstone



Western Governor's University

- » Online university launched in 1997 to expand access through online, competency-based programs
- » Currently has over 100,000 students, or 0.5%+ of all US college students
- » Uses over 1,800 attributes to flag at-risk students and deliver interventions
- » Delivers a highly personalized education experience, allowing each student to move at their own pace
- » Aligns students' financial incentives with course completion and graduation

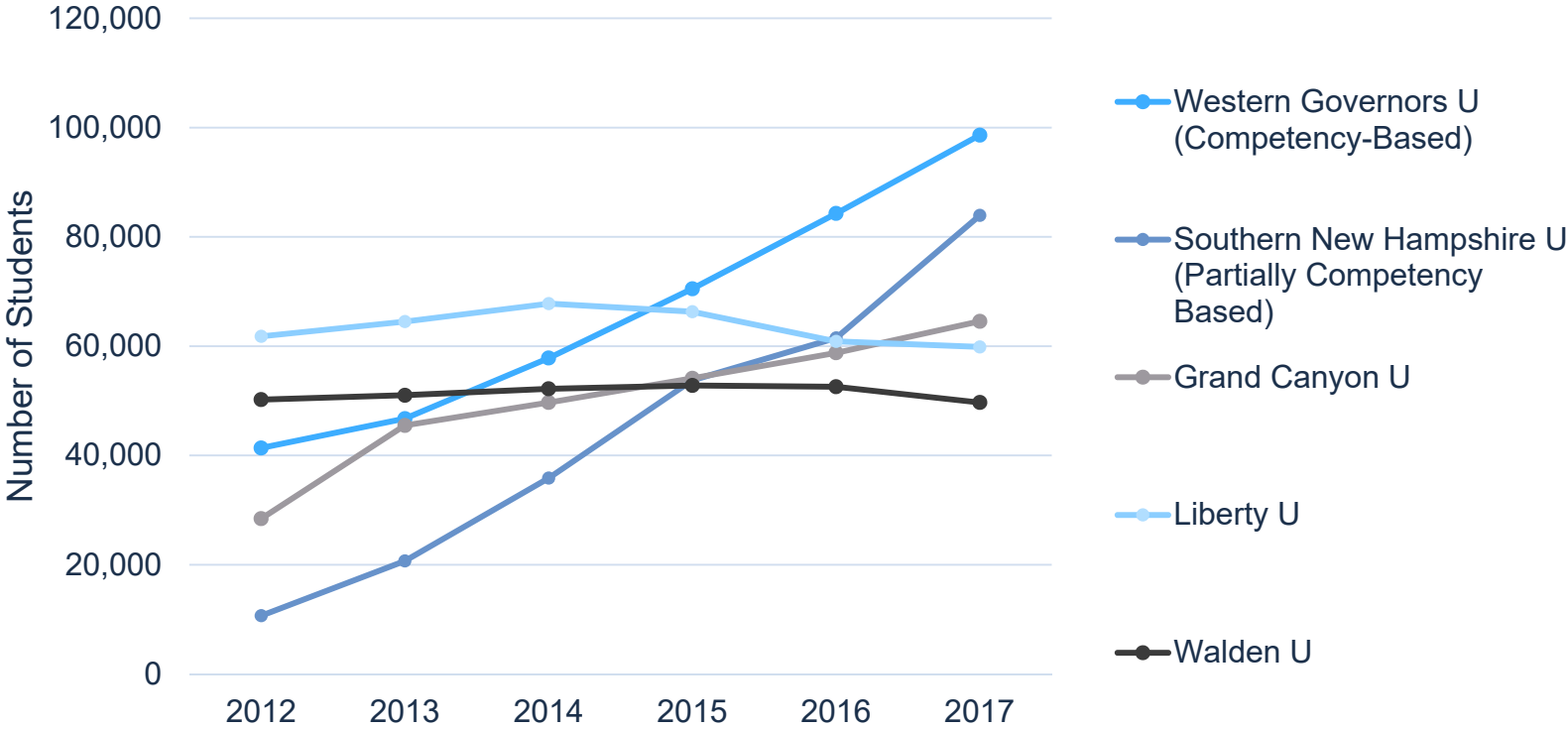
SOURCE: WGU Press Releases

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Students are moving to online and competency-based education



Enrollment of Largest Online Universities



SOURCE: US National Center for Education Statistics (NCES)

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Western Governors University's competency-based model questioned



POLITICO

Education Department's Inspector General probes Western Governors University (2015)

The Education Department's Office of Inspector General is auditing whether a leading institution in competency-based education complied with federal financial aid and other regulations...

The biggest theme, he said, seems to be "regular and substantive interaction," a federal rule that says students in competency-based programs must have a certain amount of contact with instructors.

U.S. Department of Education

U.S. Department of Education Issues Final Audit Determination for WGU (2019)

Today, the U.S. Department of Education's Federal Student Aid (FSA) office determined Western Governors University (WGU) is indeed eligible to participate in federal student aid programs.

FSA determined that, particularly in light of a lack of clear guidance from the Department at the time of the audit period, WGU's efforts to comply with the governing law and regulations were reasonable and undertaken in good faith.

SOURCE: Politico; US Department of Education

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How the rise of online, competency-based programs will impact higher education



- » Regulatory framework must be updated
- » Universities must focus on the quality of outcome rather than quality of inputs
- » Universities must adopt new learning verification models
- » Online, faster, competency-based programs require modern quality assurance standards

Degrees are often signals for hiring managers



What is Signaling?

- » Signaling occurs when the actions of a person with privileged information, an “insider,” triggers selling or buying behavior by those who do not have information
- » The insider’s behavior is taken as a ‘*market signal*’ to others about a company’s value – hence, ‘signaling’



[Many economists] believe that college...is mostly signaling. Don't most people go to college because they think it will get them a job?

SOURCE: Market Business News; The Library of Economics and Liberty

Generic college degrees don't increase performance



**Harvard
Business
Review**

**Higher Education Is Overrated;
Skills Aren't (2010)**

“Knowledge may be power, but “knowledge from college” is neither predictor nor guarantor of success.”

QUARTZ

**Degrees don't matter anymore,
skills do (2015)**

“More and more, employers are going to want to see some proof that a potential employee has actually gained particular skills.”

 **MARKETPLACE®**

**Even in a robust economy, all
graduates are not equal (2018)**

“Students...going to less selective schools, maybe getting two-year degrees instead of four-year degrees...might have less specialized skills.”

SOURCE: HBR, Quartz, Marketplace.org

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No degree, no problem: PwC, Deloitte, and EY hiding college degree information from hiring managers



Deloitte.



- » De-emphasizing formal education in recruitment process, beginning 2015
 - Deloitte hiding the name of the candidate's university from recruiters in its search for entry-level talent
 - EY eliminating the requirement of a college degree
 - PwC hiding from hiring manager whether applicants have a college degree
- » Goal is to diversify their talent pool and focus on candidate attributes that more positively correlate with strong job performance

SOURCE: SHRM.org

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15 large multinational companies recently announced that no college degree is required to apply

QUARTZ

Apple, IBM, and Google don't care anymore if you went to college

By Corinne Purtill • August 23, 2018

“Companies will hire the candidates whose experience and skills best suit them for the job. Many of those successful applicants will have university degrees. Some of them will not.”



SOURCE: Quartz; Glassdoor

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Authenticating learning in the online space



Key questions for online learning verification

- » How does the online program ensure the student of record has done the work?
- » How are they authenticated? How frequently?
- » How effective are authentication technologies?

There is a wide variety of authentication technologies commercially available



Selected Authentication Methods



Live ID

- » Test-taker presents identification to proctor with video recording



Mobile ID

- » Mobile biometrics authenticate test-taker
- » Dual log-in technologies (mobile and PC)



Auto ID

- » Biometrics including keystroke matching, facial recognition, knuckle recognition, and voice recognition

The challenge with authentication in online learning



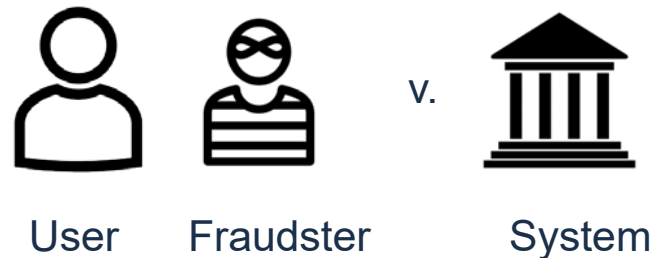
Most Authentication Systems

- » User cooperates with institution to prevent fraud
- » Example: bank wants person to be able to access account but deny fraudsters



Authentication in Online Learning

- » User (student) often attempts to commit fraud against institution (cheating)
- » Example: student tries to fool system into thinking that another student is them



Online proctoring / remote invigilation is growing rapidly



Estimated US Online Proctoring Market Size



» Growth of online learning will drive rapid growth in online proctoring / remote invigilation

SOURCE: 2015 Survey of Online Learning; NACE Career Services Survey; Non-profit Form 990s; NCES; IPEDS; Association of Governing Boards of Universities and Colleges; Council of Graduate Schools; Tyton Partners

Online proctoring generally comes in three forms



Proctoring Offering

Description



Live Proctoring

- » Most secure offering – test-taker accesses platform and is monitored by remote proctor via audio, video, and screen sharing



Record & Review

- » Audio, video, and screen share feeds are recorded for duration of exam and are subsequently reviewed



Automated Proctoring

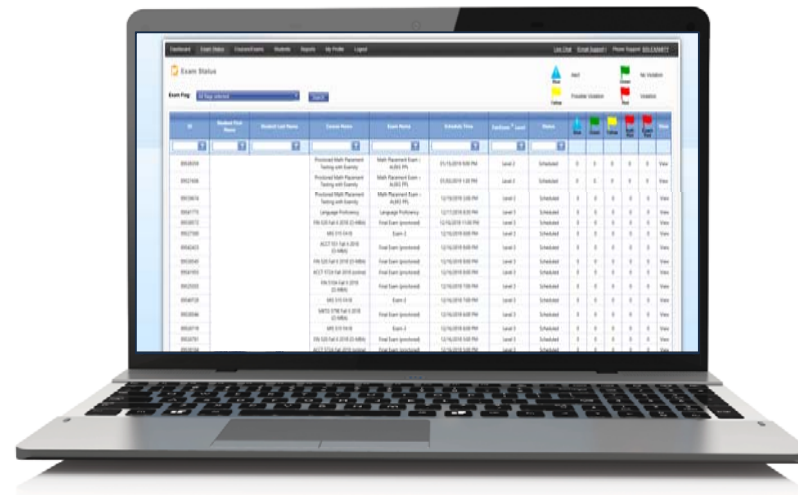
- » Captures audio, motion, and systematic changes to identify inappropriate behaviors with reviewable video recording
- » Monitors test-taker and alerts instructor of inappropriate behaviors with photo evidence

Challenge for quality assurance: Institutional conflicts with enforcement



Online proctoring platform generates flags, with reviewable evidence

- Anomalies in behavior
- Rule violations
- Outright cheating



However, what does the institution, department, or professor actually do with these flags?

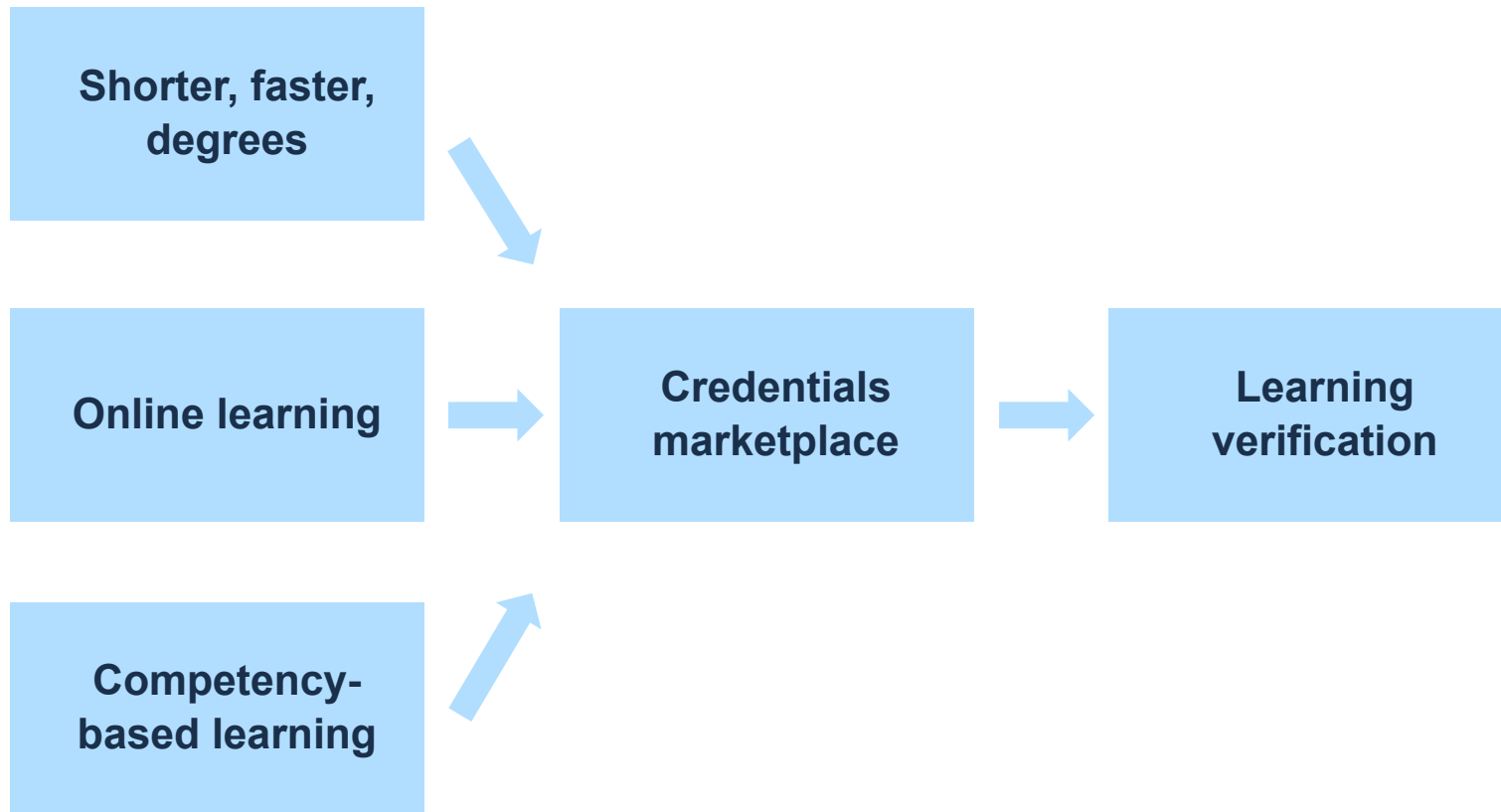
New technologies and trends driving the need for learning verification



How are institutions reviewing instances of cheating, and how will they hold students accountable?

- » In today's market environment, it may not be in the near-term interest of an institution to penalize the student
- » However, it is in the long-term interest of higher education to make sure that these degrees stand for actual learning

With these trends in mind, quality assurance entities must prepare for the future of higher education





University Ventures

troy@universityventures.com