Arizona State University

Velocity of Change

Community Conversation 2018
“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.”

- Buckminster Fuller
Until 1900, human knowledge doubled every 100 years.

By 1945, it doubled every 25 years.

Nanotechnology: Every 2 years.

Clinical Knowledge: Every 18 months.

Basic Human Knowledge: Every 13 months.

The Internet of Things: Every 12 hours.
Polio cases have decreased by more than 99% from 1988 to 2018.
Life expectancy from birth has increased

8 years for men

10* years for women
Global literacy is nearly 90%.
People living in extreme poverty has decreased by 1 Billion from 1988 to 2018.
British Pounds per Million Lumen-Hours

Year

£0 £5,000 £10,000 £15,000 £20,000 £25,000 £30,000 £35,000 £40,000 £45,000

1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000
65% of children entering primary school today will ultimately end up working in completely new job types that don’t yet exist.
Universities are slow to adapt
$9,770
state investment per FTE student

2017 Dollars
$415 million
university operating budget
2017 Dollars
14.2% four-year graduation rate
$2,577 resident undergraduate tuition and fees 2017 Dollars
<3% undergraduates received Pell Grants
9.9% underrepresented minority in freshman class
$39 million
in annual research expenditures

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Wisconsin – Madison</td>
<td>69</td>
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<tr>
<td>9</td>
<td>UCLA</td>
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<td>13</td>
<td>Washington – Seattle</td>
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<td>17</td>
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<td>23</td>
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<td></td>
<td>Hawai’i – Mānoa</td>
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<td>New Mexico State</td>
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<td>Mississippi State</td>
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<td></td>
<td>Arizona State University</td>
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</tbody>
</table>
#1 in the U.S. for innovation

#1 ASU  #2 Stanford  #3 MIT


 Ahead of Carnegie Mellon, Northeastern, Harvard, Duke, Georgia Tech, Purdue, Cornell, USC, UT-Austin and Yale
<table>
<thead>
<tr>
<th>Discipline</th>
<th>Rank</th>
<th>Universities</th>
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<tbody>
<tr>
<td>Anthropology</td>
<td>1st</td>
<td>University of Michigan</td>
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<td>Harvard University</td>
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<td>Stanford University</td>
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<td>Geological and Earth Sciences</td>
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<td>MIT</td>
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<td></td>
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<td>Social Sciences</td>
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<td></td>
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<td>Cornell University</td>
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<td>UCLA</td>
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<tr>
<td></td>
<td></td>
<td>University of Pennsylvania</td>
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<tr>
<td>Graduate Debt by State</td>
<td>4th Least</td>
<td>Delaware</td>
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<tr>
<td></td>
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<td>Minnesota</td>
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<tr>
<td></td>
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<td>Connecticut</td>
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<td>Humanities</td>
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<td>Yale</td>
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<tr>
<td></td>
<td></td>
<td>Harvard University</td>
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<tr>
<td>HHS (including NIH)-funded</td>
<td>9th</td>
<td>Princeton University</td>
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<td>expenditures among institutions</td>
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<td>Georgia Tech</td>
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<td>without a medical school</td>
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<td>Political Science</td>
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<td></td>
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<td>Duke University</td>
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<td>Electrical, Electronic, and</td>
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<tr>
<td>Communications Engineering</td>
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<td>MIT</td>
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<tr>
<td>Business and Management</td>
<td>14th</td>
<td>University of Chicago</td>
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<td>Engineering</td>
<td>19th</td>
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<tr>
<td></td>
<td></td>
<td>Caltech</td>
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<td>Carnegie Mellon University</td>
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</table>
ASU Charter

ASU is a comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.
$3.1 billion university operating budget
$3,141
state investment per FTE student
50% four-year graduation rate
71% for A students
46% for B students
64% five-year graduation rate
80% for A students
61% for B students
$10,792
resident undergraduate tuition and fees
$2,205

average net tuition paid by resident undergraduates
Arizona Resident Undergraduates in 2016-17
Average Gift Aid Awards by Family Income

Tuition & Mandatory Fees
Institutional Gift Aid
Federal Gift Aid
State Gift Aid
Private/External Gift Aid
Average Student Payment

<table>
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<tr>
<th>Income Range</th>
<th>Average Gift Aid (in $)</th>
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<tr>
<td>&lt; $20K</td>
<td>$2,328</td>
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<tr>
<td>$20K - $34,999K</td>
<td>$0</td>
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<tr>
<td>$35K - $49,999K</td>
<td>$2,000</td>
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<tr>
<td>$50K - $64,999K</td>
<td>$4,000</td>
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<td>$65K - $79,999K</td>
<td>$6,000</td>
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<td>$80K - $119,999K</td>
<td>$8,000</td>
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<tr>
<td>$120K+</td>
<td>$10,000</td>
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</table>

Average Student Payment: $14,000
ASU First-Time Full-Time Freshmen Enrollment by Adjusted Family Income

Freshman Enrollment

Fall 2002
Fall 2009
Fall 2017
34.2% undergraduates receiving Pell Grants
40.8% Arizona undergraduates receiving Pell Grants
50/50
freshman class
diversity
$545 million
in annual research expenditures

8  Wisconsin – Madison
12 Washington – Seattle
14 Texas – Austin
22 Arizona State University
26 Ohio State

28  UCLA
51  Hawai’i – Mānoa
60  Mississippi State
79  Oklahoma State
114 New Mexico State
The old way of teaching
One possible future
Another possible future
What might the student of the future expect?
Seamless, uninterrupted access to resources and experiences
Transparent, crowd-verified information and accountability
Freedom to personalize interactions, experiences and environments
Unlimited access to crowdsourced expertise and artificial intelligence that provides personal guidance
Instantaneous and convenient access
Immersive virtual environments that facilitate socialization, collaboration and entertainment.
Now:
Distinct Life Stages

A
- Pre K
- K-12
- Technical School

B
- Pre K
- K-12
- Undergraduate

C
- Pre K
- K-12
- Graduate

0 40 80+
age
Future:
Universal Learning

- "Pre K"
- Lifelong Learner
- "K-12"
- Jobs and Personal Fulfillment

0-40-80+

age
Universal Learning at ASU

Evolving a model capable of being of service to all learners, at all stages of work and learning, from all socioeconomic backgrounds, through educational, training, and skill-building opportunities
Full Immersion
Pre-K Learners
K-12 Learners
On-Campus ASU Learners

Knowledge Core
What is ASU doing to serve universal learners?
Expanded Open Scale Offerings

ASU Prep Digital

ASU Online

Global Freshman Academy
New Technologies: Virtual Reality Learning
PROJECT: SWAN DIVE SPACE TOURISM
SITE: VALLES MARINARIS BASE CAMP
LEADER: ELAINE CALHOUN
The Diamond Age
(Neal Stephenson, 1995)

Adaptive Tutoring/ Mentoring System

A Young Lady's Illustrated Primer

in the form of Interactive Book with Digital Text and Animations

follows a Narrative

has integrated Artificial Intelligence (Pseudo-Intelligence)

reads by Human Actor

understands a Narrative guides learner through a Transferability

generated by Artificial Intelligence (Pseudo-Intelligence)

aims for Connection Between Real Life and Story

in an Socio-cultural Constructivism

fosters Situated Learning

through Cognitive Apprenticeship builds on Learner's Existing Knowledge

through Four "Nighttime" Friends

teaches Independent Critical ("subversive") Thinking

uses for Context-specific Information

allows showing Natural Voice Commands

records Sensors

uses for Situated Learning

establishes Connection Between Real Life and Story

through Vanishing Scaffolding

through Four "Nighttime" Friends Die/Disappear

By Beat A. Schwendimann, 2011