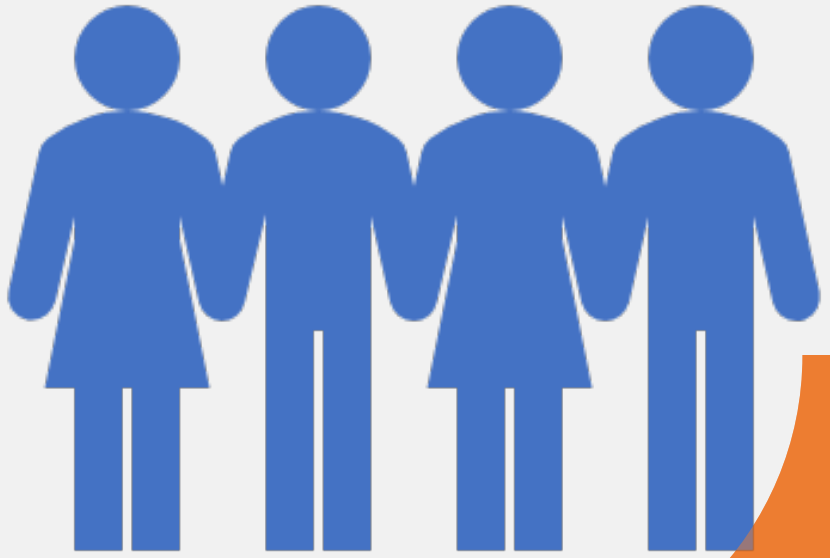
Creating Tomorrow's Workforce…Today

What it takes for future and current workers to be ready to succeed in a dynamically changing workplace



David T Conley, PhD

President, EdImagine

Professor Emeritus, University of Oregon

March 9, 2020

Oregon Talent Summit 2020

The Complex and Unique Oregon Context

What Has It Been Like to Be a Worker in Oregon over the Past 40 Years?

It all depends which sector you were in, which, in large measure, was related to where you lived.

The Complexity of Skills Acquisition in Oregon

- Oregon consists of multiple “states”:
  - Portland metro area
  - Willamette Valley
  - Coast
  - Southern Oregon
  - Central Oregon
  - Eastern Oregon
- Each has unique workforce development issues

Oregon Has Multiple Workforce "Populations"

High school students

Current workforce with highly developed learning skills and access to training resources

Current workforce with less developed learning skills and less access to training resources

	Tomorrow's workforce (high school and college students primarily)	Existing workforce- Able to learn new skills and access to training	Existing workforce- Less able to learn new skills, less access to training
Portland Metro			
Willamette Valley			
Southern Oregon			
Coast			
Central Oregon			
Eastern Oregon			

Geography, Ability to Learn New Skills, and Access to Training

Creating a statewide workforce development plan would require strategies for each cell in the matrix.

One Set of Skills Won’t Last a Career

The Example of Lane County

1970s

Lane County had a strong timber presence, in both logging and milling, had fishing, and was a regional rail hub.

1980s

All the 1970s leading economic sectors declined in the 1980s.

Early 21st century

Recreational vehicle sector went bust in the first decade of the 21st century. Sony, Hynix closed their doors. Call centers grew.

1990s

Lane County added jobs in service area such as client support centers as well as tech jobs (e.g., Sony Manufacturing, Hynix) and, most dramatically, in custom recreational vehicles.

now

The county is now more reliant on education, health care, and tech along with startups and call centers.

How Would a Lane County Worker Have Needed to Adapt?

- The 1970s/80s resource extraction-based workers would have needed to add a range of new skills to work in the 1990s economy of RV construction.
- Many of those workers would then have needed an entirely different skill set when the RV industry collapsed and call centers proliferated.
- They would have needed an entirely new, higher skill set yet again to work in education/health care/tech startups.

What Are the Key Skills for Oregon Workers to Succeed in the Future?

Given the Dynamic Nature of Oregon's Economy, These Skills Are Key

- Adaptability
- Ownership of learning
- Self direction and personal goal setting
- Flexibility
- Occupation-specific technical skills
- Entrepreneurship
- Ability to work with a wide range of people

People Need to Develop These Skills at Three Different Points

Prior to entry into the workforce

In the workforce within an occupation or career track

When changing occupations or career tracks

A Job Is Not Necessarily a Career

Five Levels of Readiness

WORK Ready

- Meets basic expectations regarding workplace behavior and demeanor

JOB Ready

- Possesses specific knowledge necessary to begin an entry-level position

CAREER PATHWAY Ready

- Possesses knowledge and learning skills necessary to begin to focus in an area of study or training

POSTSECONDARY Ready

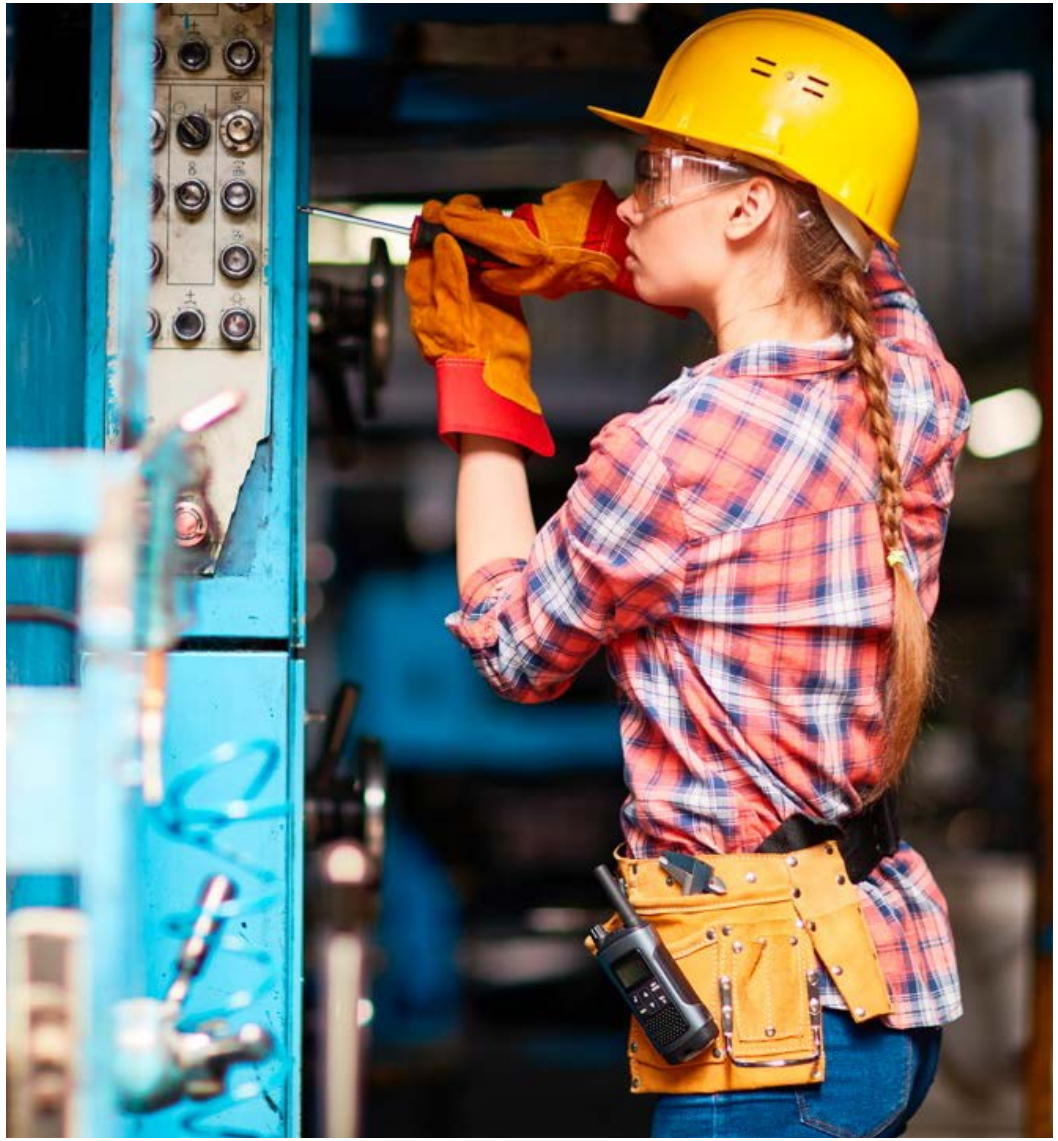
- Is prepared to succeed in a wide range of postsecondary courses

LIFE Ready

- Can pursue a career successfully and lead a fulfilling life as a productive citizen.

What It Takes To Be Career Ready

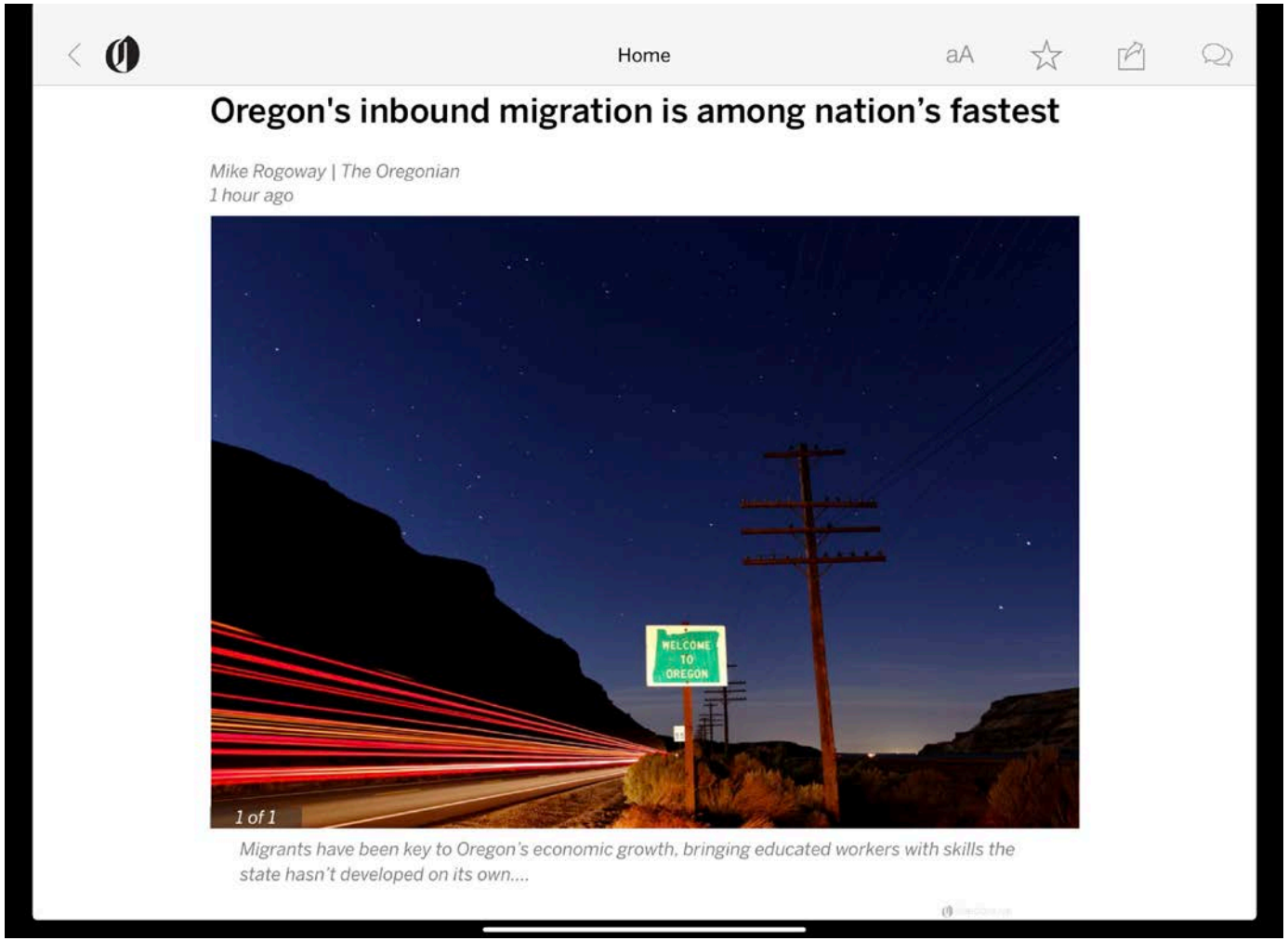
- Career aspirations and goals
- Proficiency in key learning skills particularly the ability to keep learning
- Foundational academic knowledge



Oregon Has Been Importing Talent for Decades

Is this a viable long-term strategy?

Should it be the state's solution to talent development?



Home

aA

Oregon's inbound migration is among nation's fastest

Mike Rogoway | The Oregonian
1 hour ago

Migrants have been key to Oregon's economic growth, bringing educated workers with skills the state hasn't developed on its own....

In Short, No Simple, One-dimensional Solution Will Work

What Can Be Done to Develop Talent for Today and Tomorrow?

What Schools Can Do

- Develop and measure the skills that make students lifelong learners.
- Build in career exploration earlier for *all* students.
- Work with local employers to create work exploration programs.
- Create entrepreneurship opportunities.
- Leave comprehensive occupational training to community colleges and build bridges to those programs.
- Offer online options for well established certificates.

What Colleges Can Do

- Develop lifelong learning skills more systematically for all students.
- Create internships/mentorships in all majors.
- Partner with the public and private sector on program development and delivery.
- Help “stranded” workers develop foundational skills and new how-to-learn skills along with technical training.
- Emphasize entrepreneurship opportunities.
- Reach out to disenfranchised and geographically isolated worker.

What the State Can Do

- Fund cross-sector collaborations between schools/colleges and the public and private sectors.
- Create fiscal incentives for employers to partner with schools/colleges.
- Assess lifelong learning skills.
- Monitor schools' uses of Measure 98 and Student Success Act funds to ensure desired results are being achieved.
- Consider a requirement for all students to have an entrepreneurship or internship experience.
- Expect schools to offer career exploration opportunities.
- Gather data on student career goals.

What Employers Can Do

- Partner more closely with secondary and postsecondary education.
- Create incentives for workers to develop new skills.
- Make clear to the education system and education policy makers the value of key skills such as adaptability and lifelong learning.
- Develop business councils that identify what it takes to succeed in a particular business sector and the curriculum to develop those skills.

Big U.S. Companies Design Their Ideal High School Courses

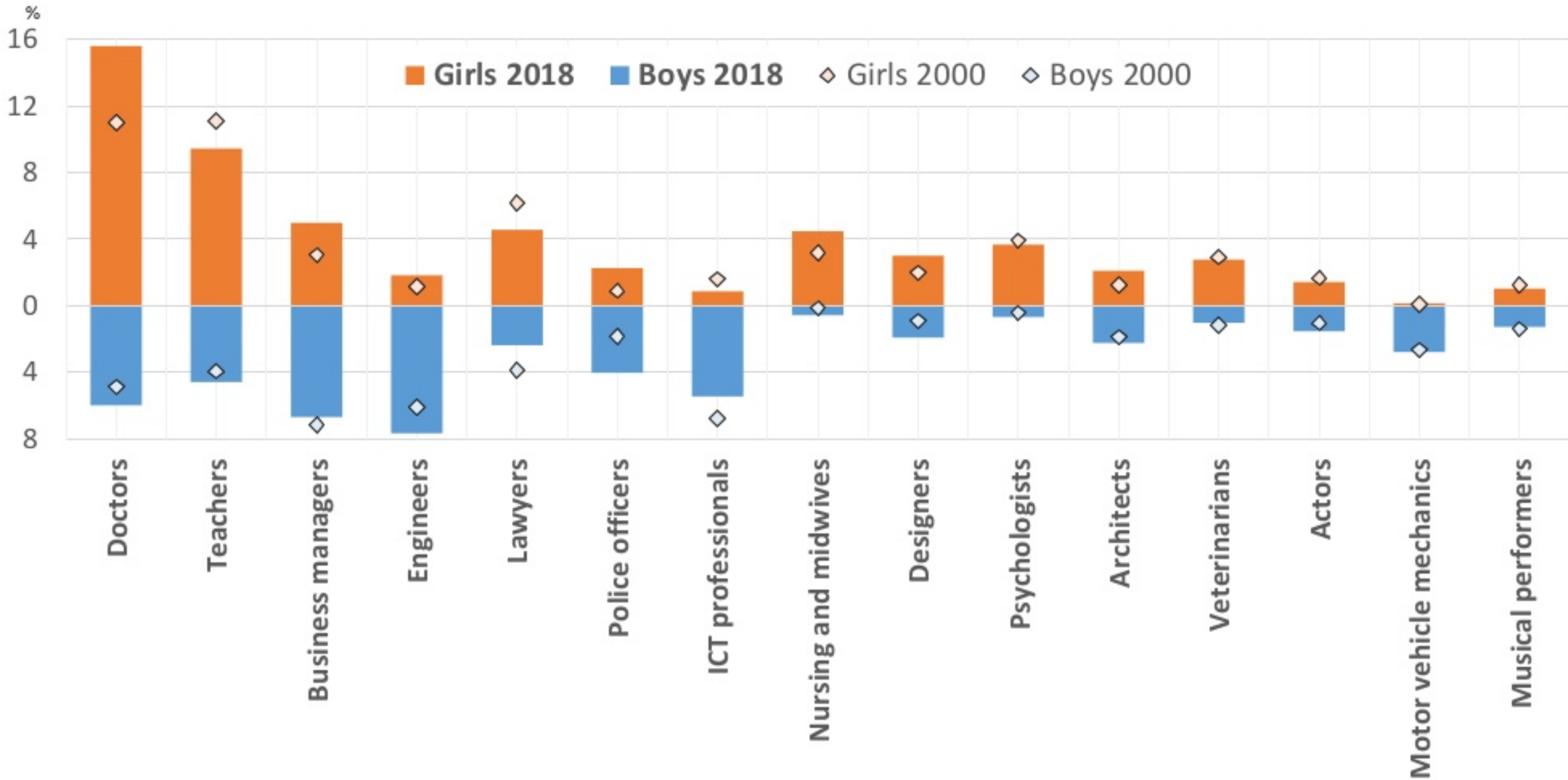
From: *Education Week*

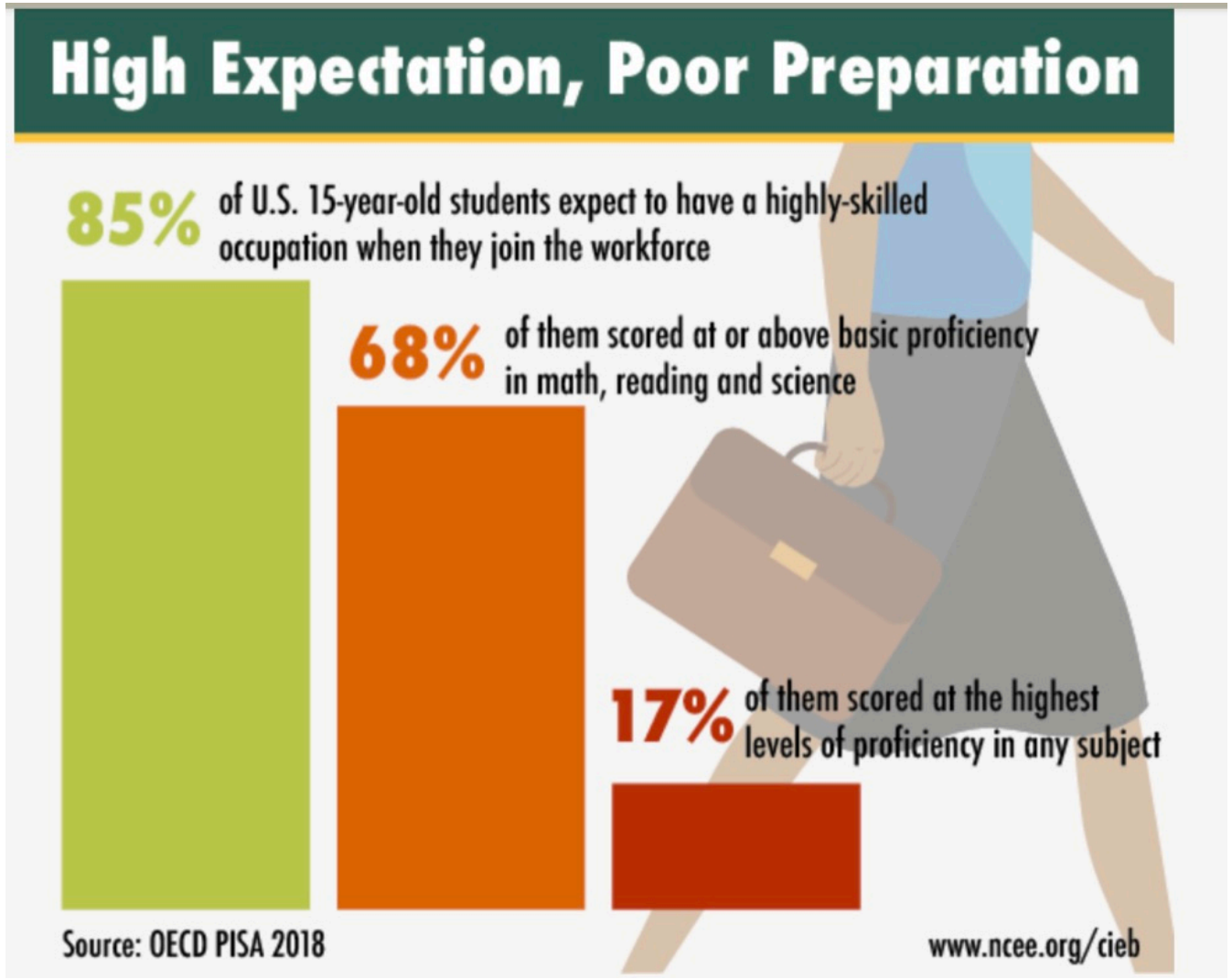
Company	Course
Abbott- health care	Creativity and Complex Problem Solving
Adobe- computer software	creative storytelling equipping students with critical skills to use media and digital tools to create change and have impact
American Airlines- aviation	The value of kindness
Aramark- food service	A dual course about self-awareness and surviving failure
AT&T- telecommunications	Continuous learning course
Bank of America- finance	A holistic financial education curriculum
IBM- technology	Human Relations 101
Intuit- technology	A capstone course that would teach students how to use an entrepreneurial mindset when identifying and solving difficult challenges by learning and applying design-thinking techniques
Microsoft- technology	A blend of technical skills, work skills and social and emotional skills
Navient- consumer lending	A class that teaches practical financial skills to help high school juniors and seniors make informed decisions about higher education and career training
NVIDIA- technology	A course that first teaches high schoolers the fundamentals—how to collect data, how to train your computer on that data, how to get your AI to a place where it's learning on its own.
Oracle- technology	A course around design thinking
Regeneron- pharmaceuticals	the Zen Buddhism concept of "beginner's mind" and teaching students how to develop and retain an attitude of open-mindedness in order to not be trapped by conventional wisdom or what is and is not believed to be "possible.
SentinelOne- security software	The Basics of Hacking
ServiceNow- cloud computing	Tech of Tomorrow's Businesses, Today
Verizon- telecommunications	A course that incorporates emerging technologies to give students ownership of their learning and to expose them to future careers

Caution! Few Students Are Developing Realistic Plans for Their Future Careers

The fifteen most common occupational expectations among 15-year-olds

Responses from 600,000 students in 79 OECD countries




High Expectation, Poor Preparation
85% of U.S. 15-year-old students expect to have a highly-skilled occupation when they join the workforce
68% of them scored at or above basic proficiency in math, reading and science
17% of them scored at the highest levels of proficiency in any subject
Source: OECD PISA 2018
www.ncee.org/cieb

Workforce Development Should Benefit Employers and Workers Equally and Lead to a More Equitable Economic Future for All Oregonians

EdImagine

http://www.edimagine.com

david_conley@edimagine.com

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Why does AI matter?

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three eras of digital integration

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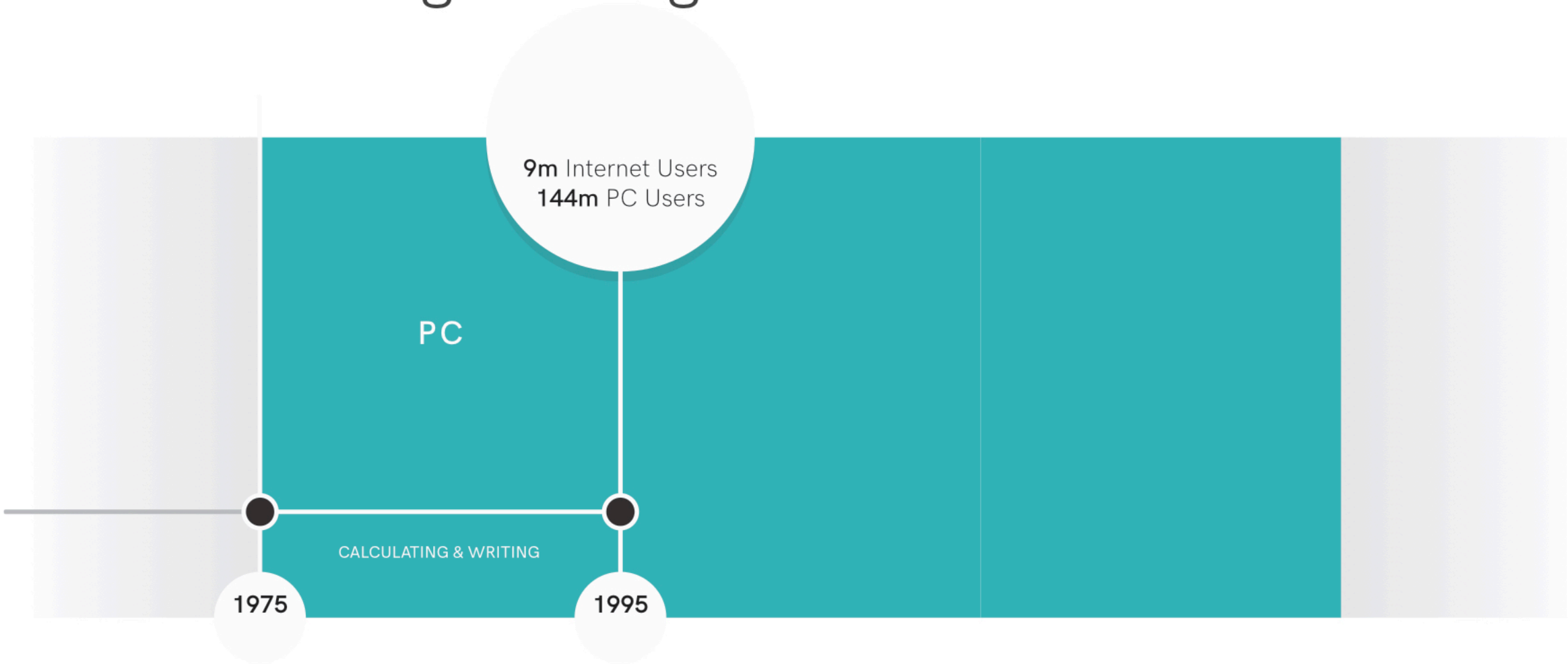
three eras of digital integration



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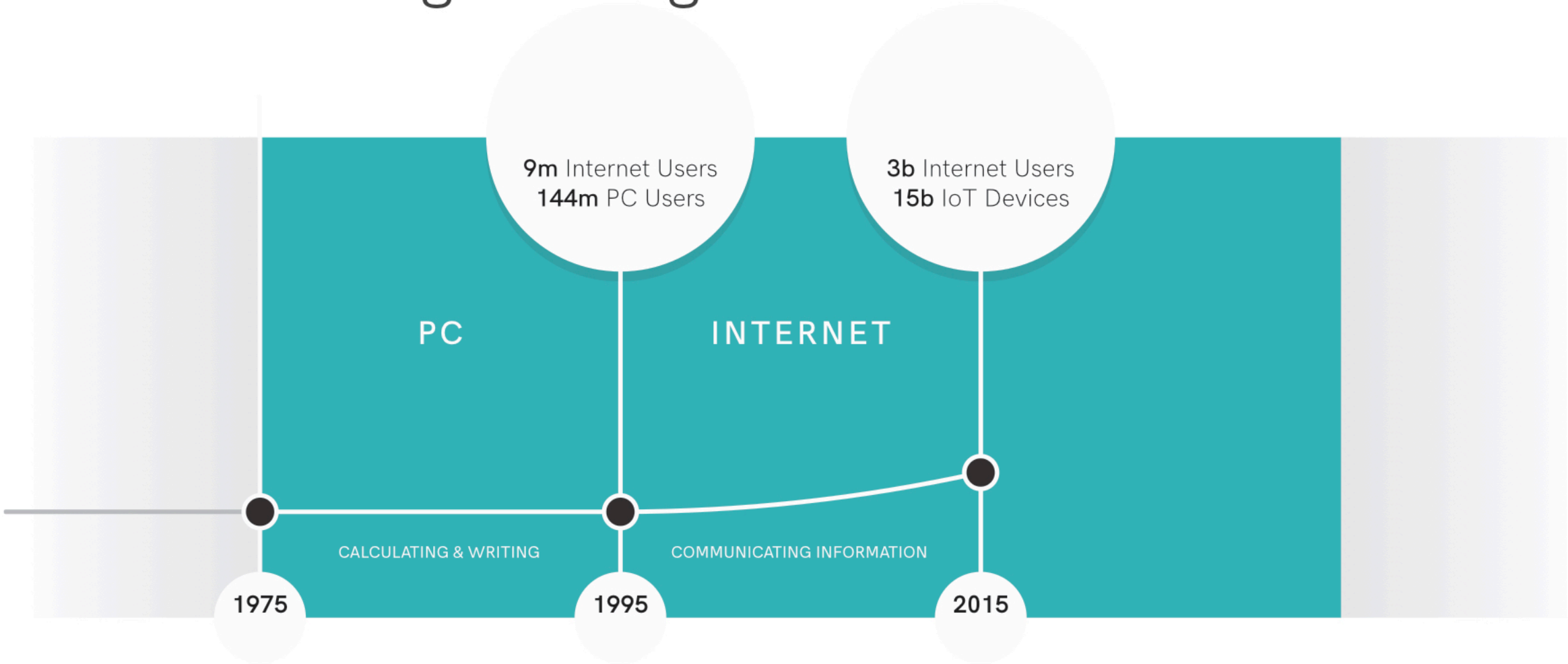
three eras of digital integration



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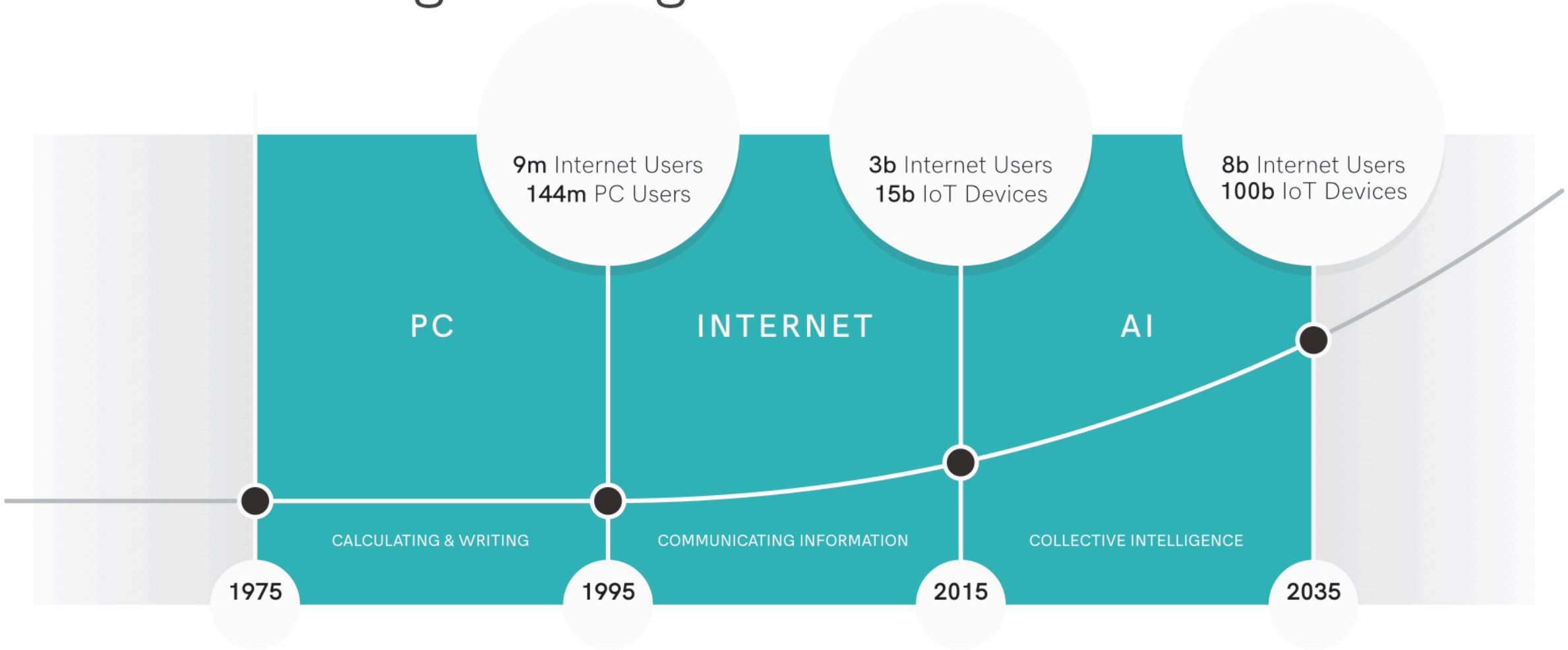
three eras of digital integration



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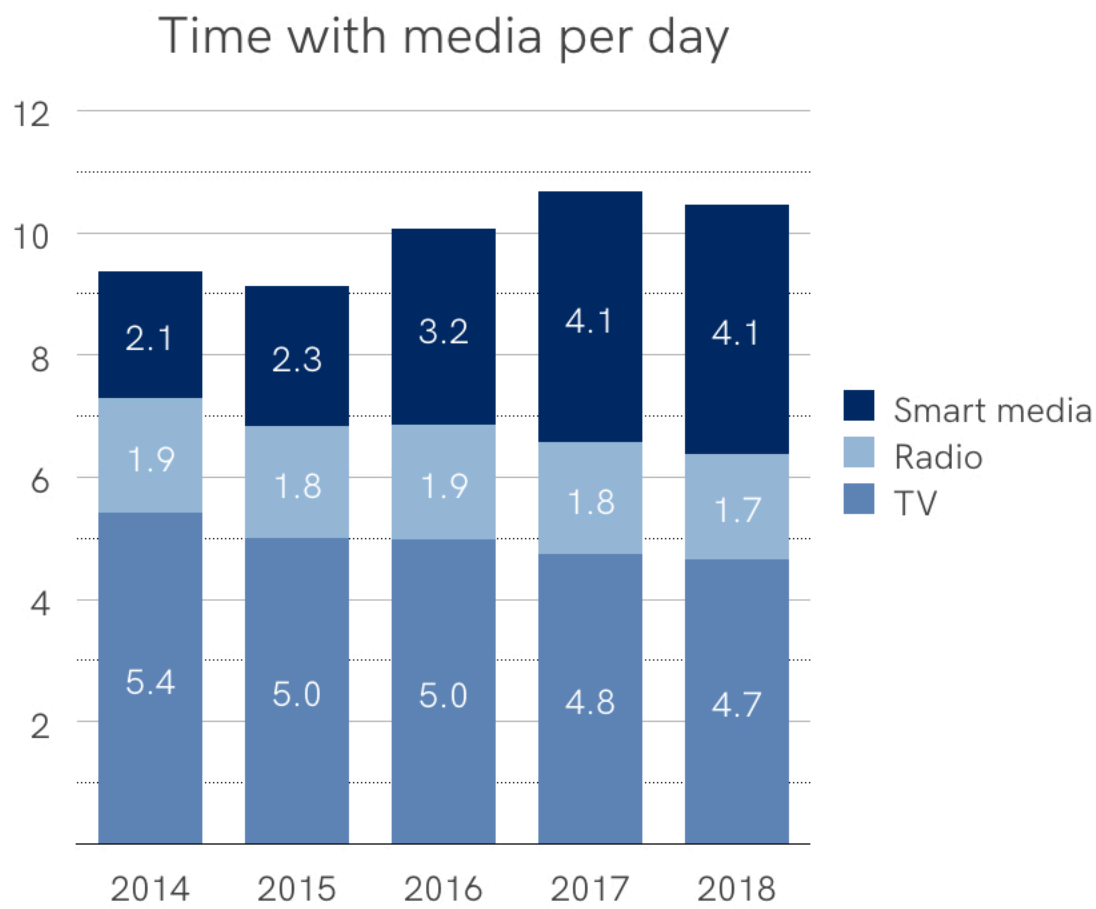
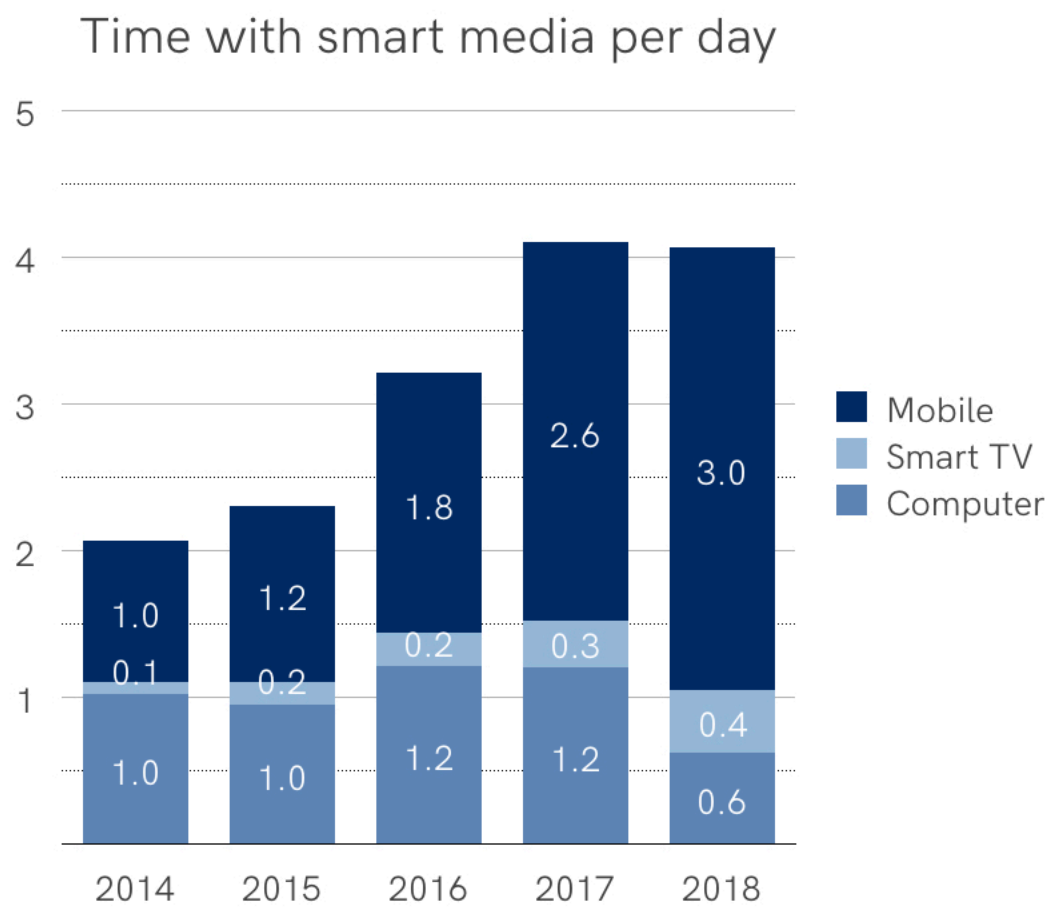
time with AI





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competition—the big five

experiences	information	productivity	retail	connections

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competition—the big five

experiences	information	productivity	retail	connections
advertising	advertising	advertising	advertising	advertising
electronics	electronics	electronics	electronics	electronics
fashion			fashion	
finance	finance	finance	finance	finance
health	health	health	health	
media	media	media	media	media
publishing	publishing	publishing	publishing	publishing
retail	retail		retail	retail
software	software	software	software	software
telecom	telecom	telecom	telecom	telecom
	transportation		transportation	

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resources—machine employees

- strategy has always asked: what resources and capabilities do we use?
- machine employees create a new resource with new capabilities
- human roles will be augmented to make best use of AI allowing humans to take on new roles that they weren't before
- how do you plan for this new human-machine operating system?

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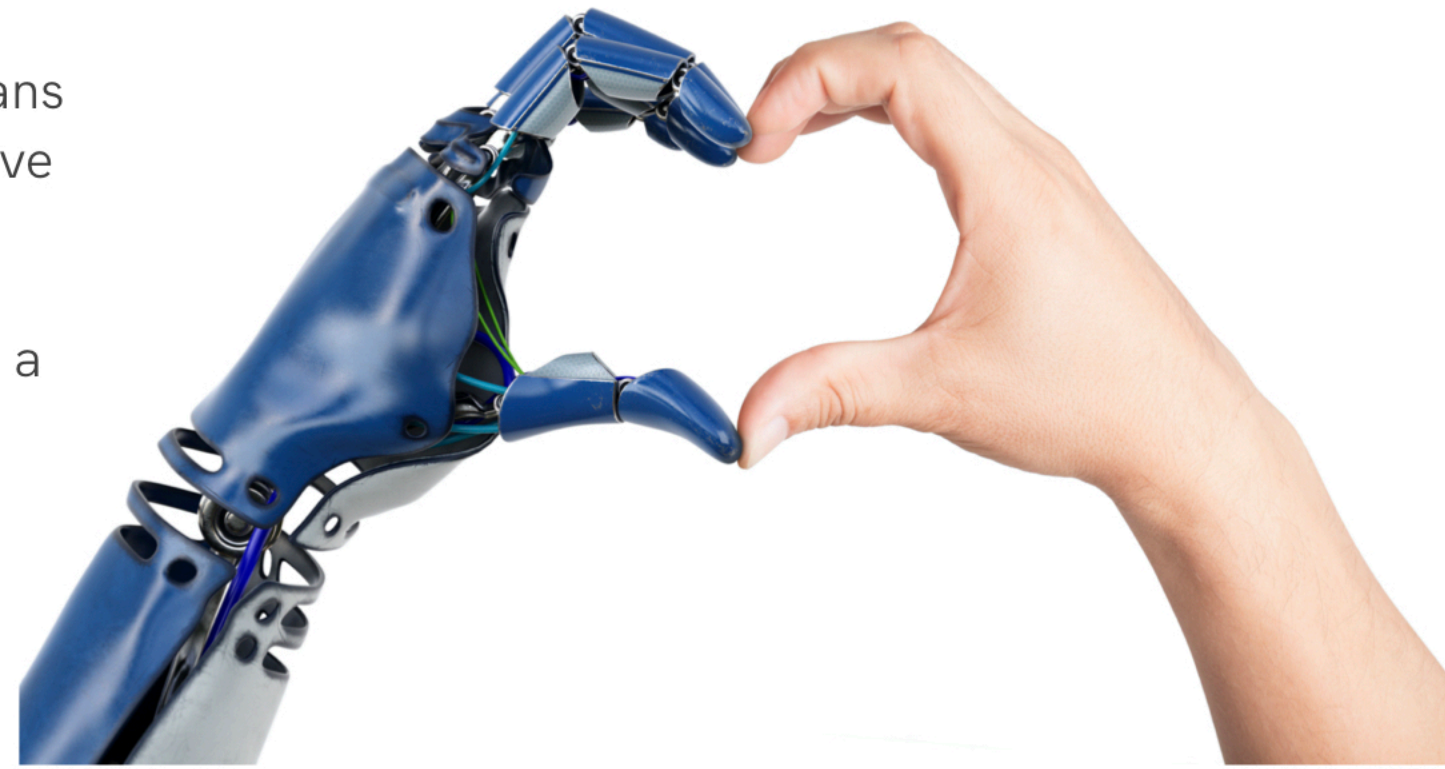
value—the human-machine interaction

- humans + machines create new kinds of data; offline & online worlds are merging
- the interaction points between humans and machines are the new competitive value, the new competitive barriers
- but it's all changing quickly, creating a new kind of strategy challenge



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What is AI?

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Machines following rules

KNOWLEDGE OR EXPERT SYSTEMS

IF THIS, THEN THAT

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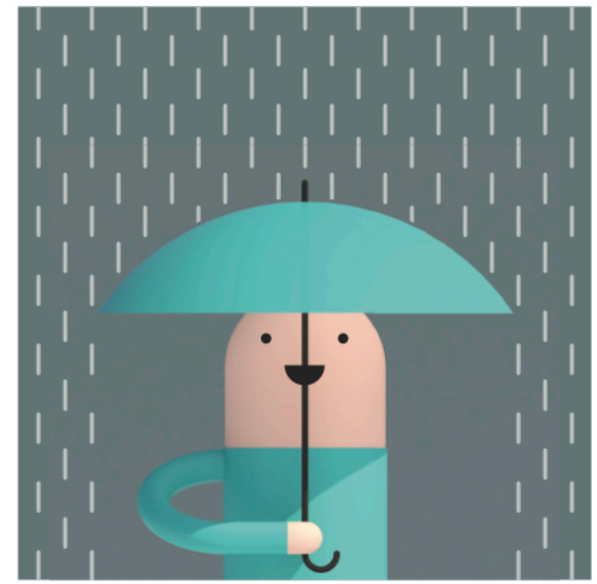
Machines following rules

KNOWLEDGE OR EXPERT SYSTEMS

IF Weather forecast app shows rain tomorrow,

THEN Alert me with a mobile notification



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Machine Learning Systems

USES

STATISTICAL TECHNIQUES

COMPUTER SCIENCE TOOLS

TO MAKE

MODELS

PREDICTIONS

AGAINST

PERFORMANCE

MEASURE

THEN DETERMINES

I'M DOING WELL

CONTINUE

IMPROVE

LEARN

I'M NOT DOING WELL

REROUTE

TEST AGAIN

LEARN

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Machines learning from humans:

SUPERVISED LEARNING

HERE IS A LOT OF DATA
(in this case, a bowl of fruit)

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Machines learning from humans:

SUPERVISED LEARNING

HERE IS A LOT OF DATA
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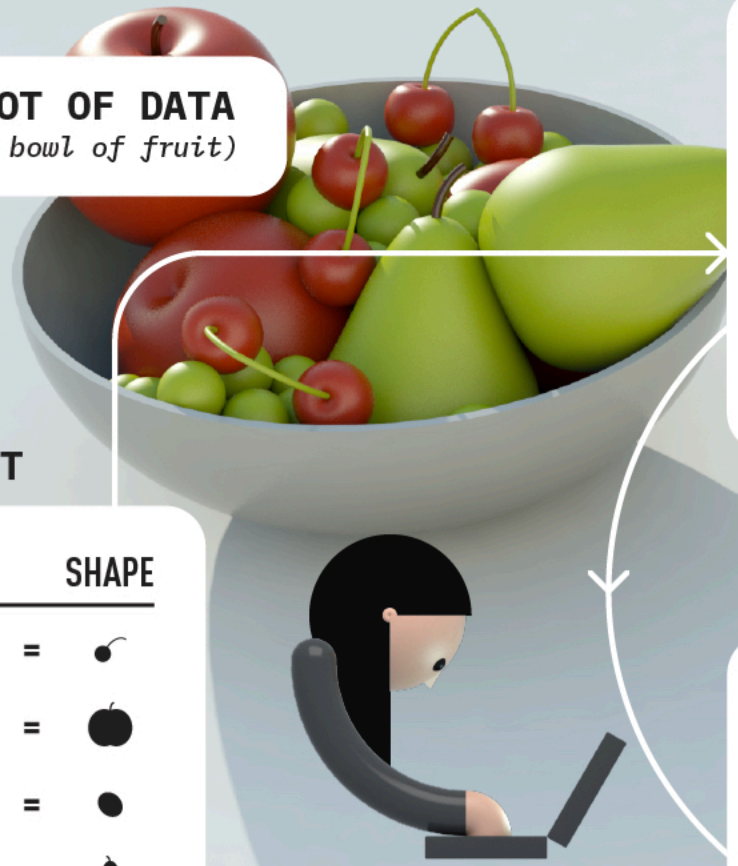
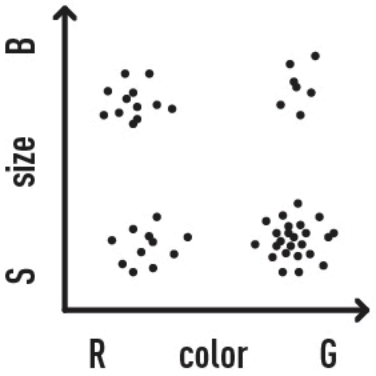


TRAINING DATA INPUT

SIZE		COLOR		SHAPE
•	+	●	=	🍒
●	+	●	=	🍎
•	+	●	=	•
●	+	●	=	💧

a human does training and adjustment

PATTERNS
CATTEGORIES
CLUSTERS
CORRELATIONS



relies on labeled data

TRAINING

INPUT		OUTPUT
BIG, GREEN	=	PEAR ☑
SMALL, GREEN	=	PEAR ☒

ERROR
- GO BACK -

APPLY KNOWLEDGE

TO NEW DATA

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Humans learning from machines:

UNSUPERVISED LEARNING

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Humans learning from machines:

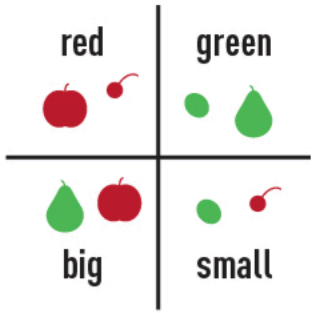
UNSUPERVISED LEARNING

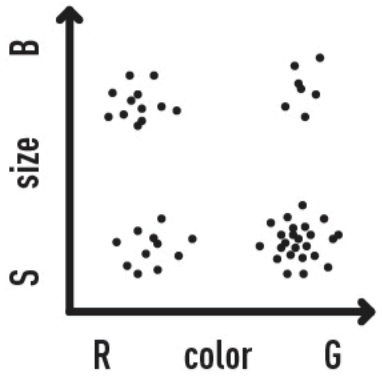
What's in the bowl?

No prior knowledge

INPUT DATA

CLUSTER DATA POINTS





SIZE		COLOR		SHAPE
•	+	●	=	
●	+	●	=	
•	+	●	=	•
●	+	●	=	

NEW KNOWLEDGE

2	APPLES
3	PEARS
9	CHERRIES
42	GRAPES

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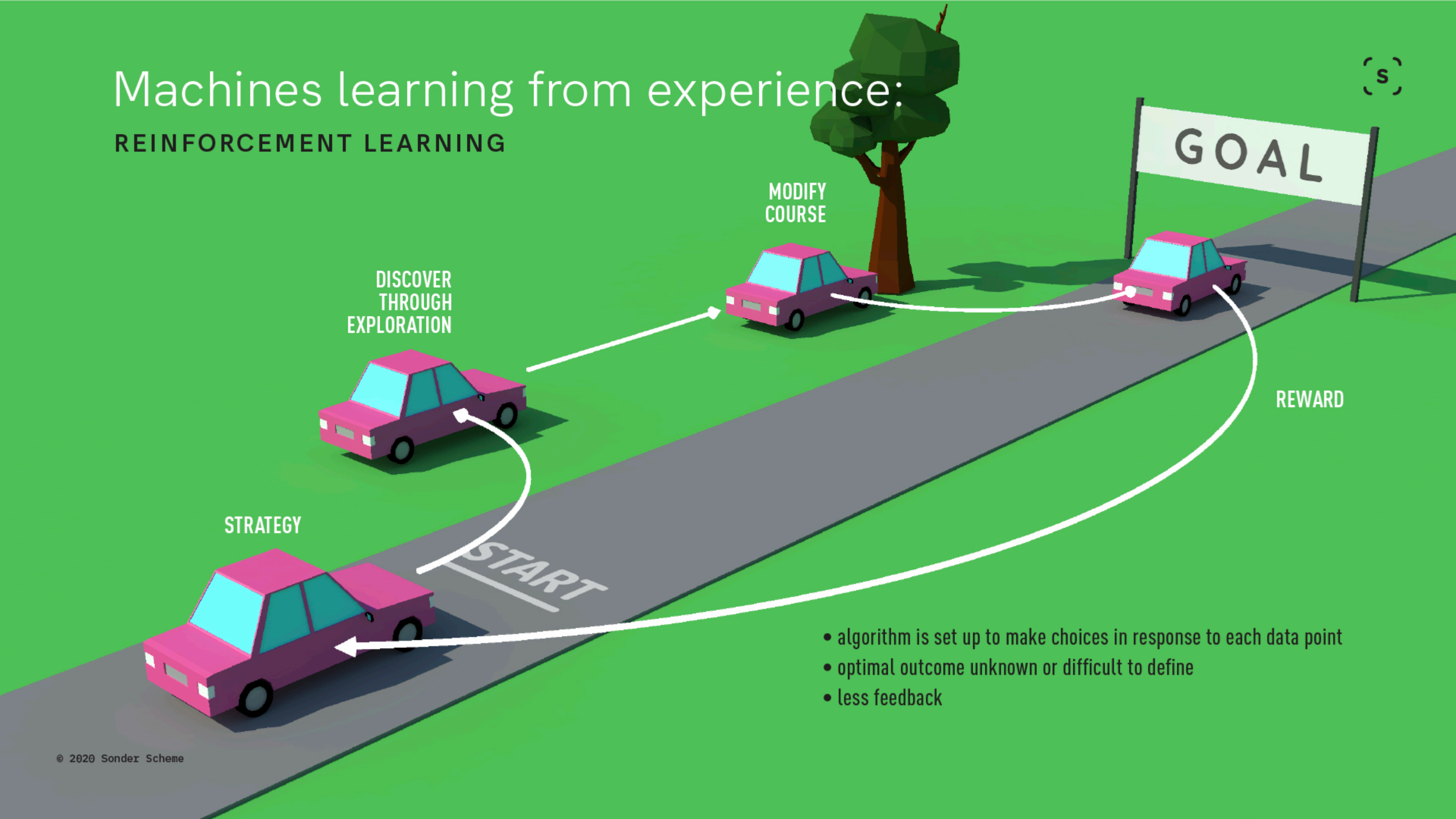
Machines learning from experience:

REINFORCEMENT LEARNING



- algorithm is set up to make choices in response to each data point
- optimal outcome unknown or difficult to define
- less feedback

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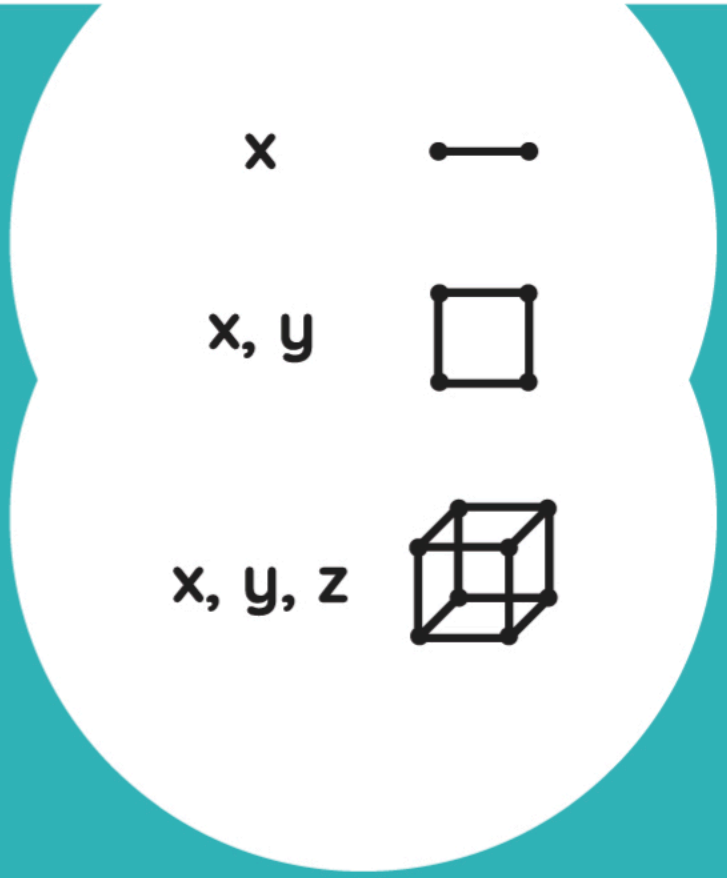
Why artificial intelligence?



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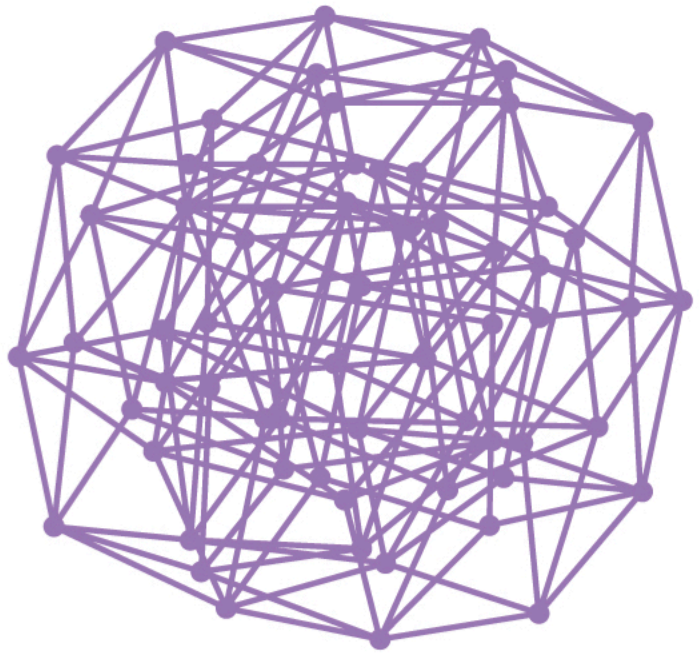
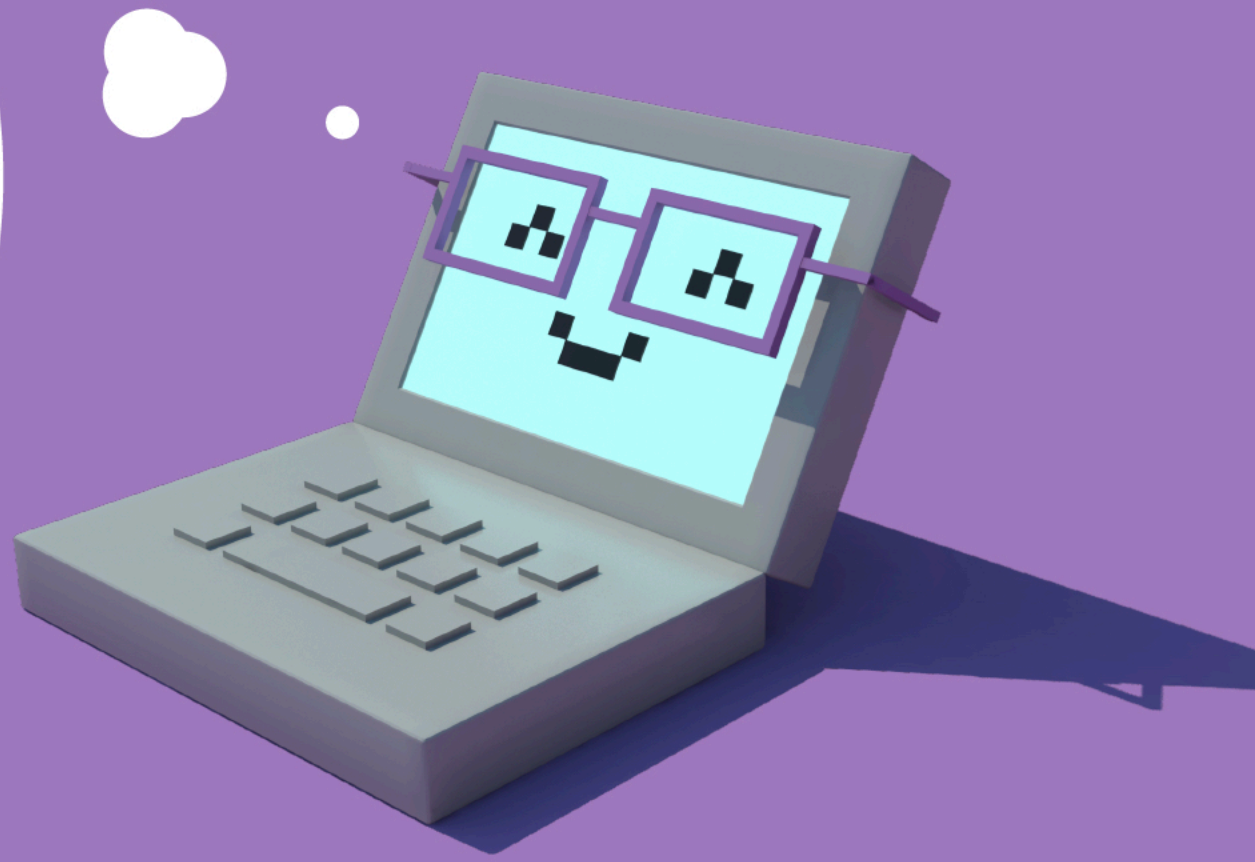
Computers think in *n* dimensions



x, y, z, … n



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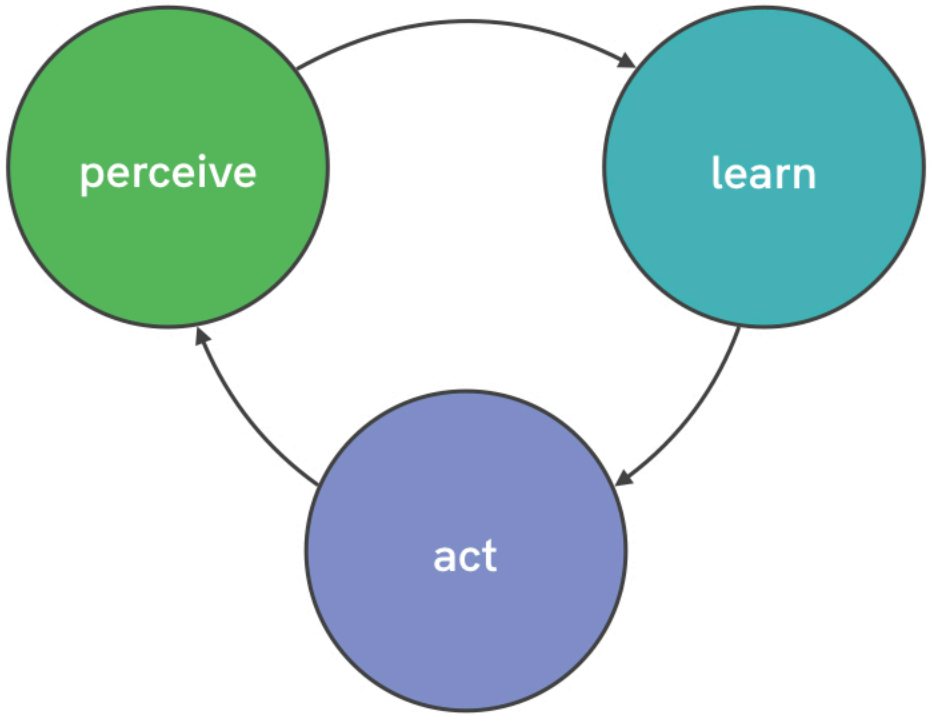
machine-assisted intelligence

retrieving and presenting information at vast scale and speed



creating knowledge by understanding how information can be useful

recommending optimal actions and application of knowledge

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Humans + Machines

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humans & machines

humans	
good at:	unpredictable things
	understanding context
	defining outcomes
	social knowledge
	inquiry, questioning
need:	connection
	belonging
	safety
	purpose
	progress
makes decisions:	cognitive biases
	intuition
	emotions
	analysis

machines	
good at:	predictable things
	speed
	scale
	accuracy
	known space
need:	data
	oversight
	control
	research
	goal setting
makes decisions:	AI biases
	predictions
	false +/-
	overfit and drift

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Future of human skills

Technical — navigating complexity

Soft — empathetic action

Contingency — handling real-time

Management — human-machine collaboration

Personalization

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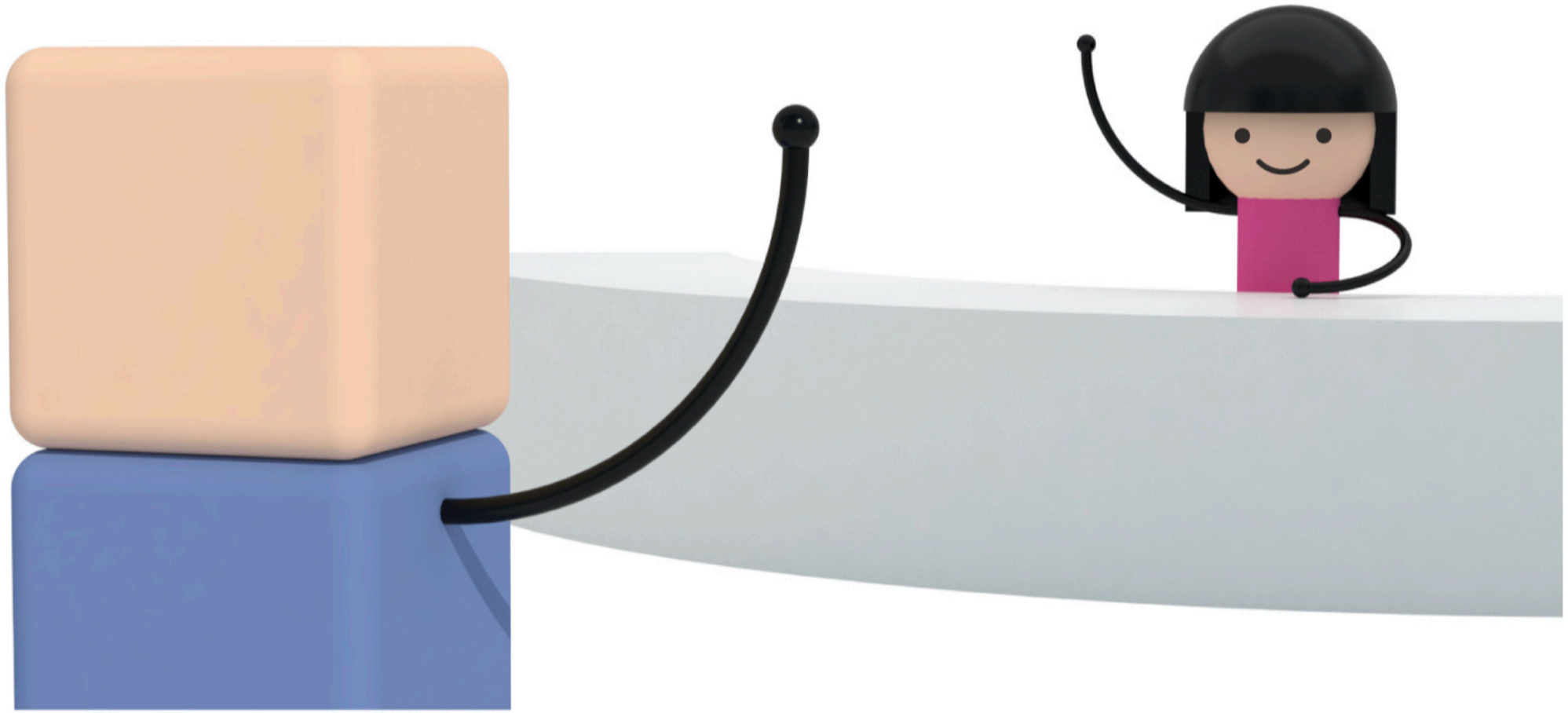

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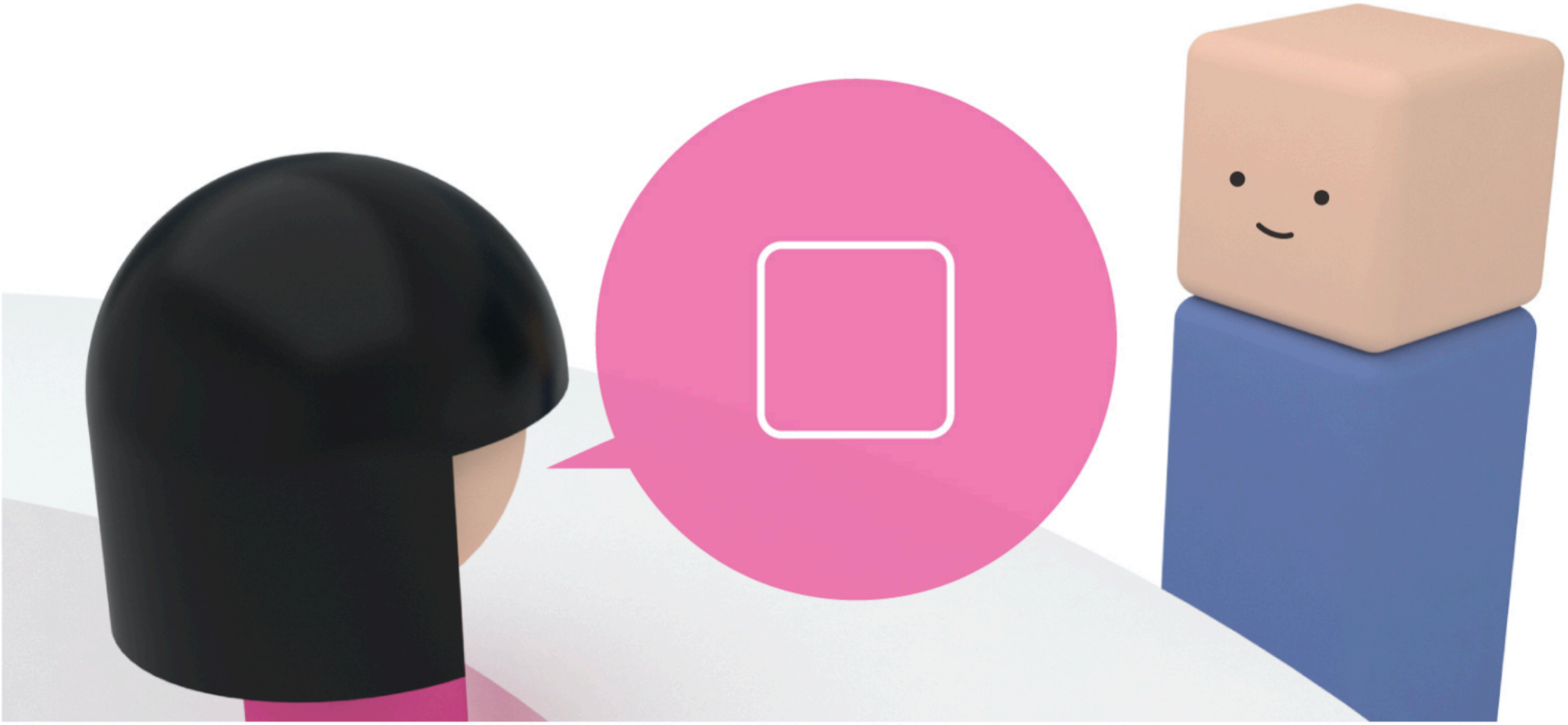

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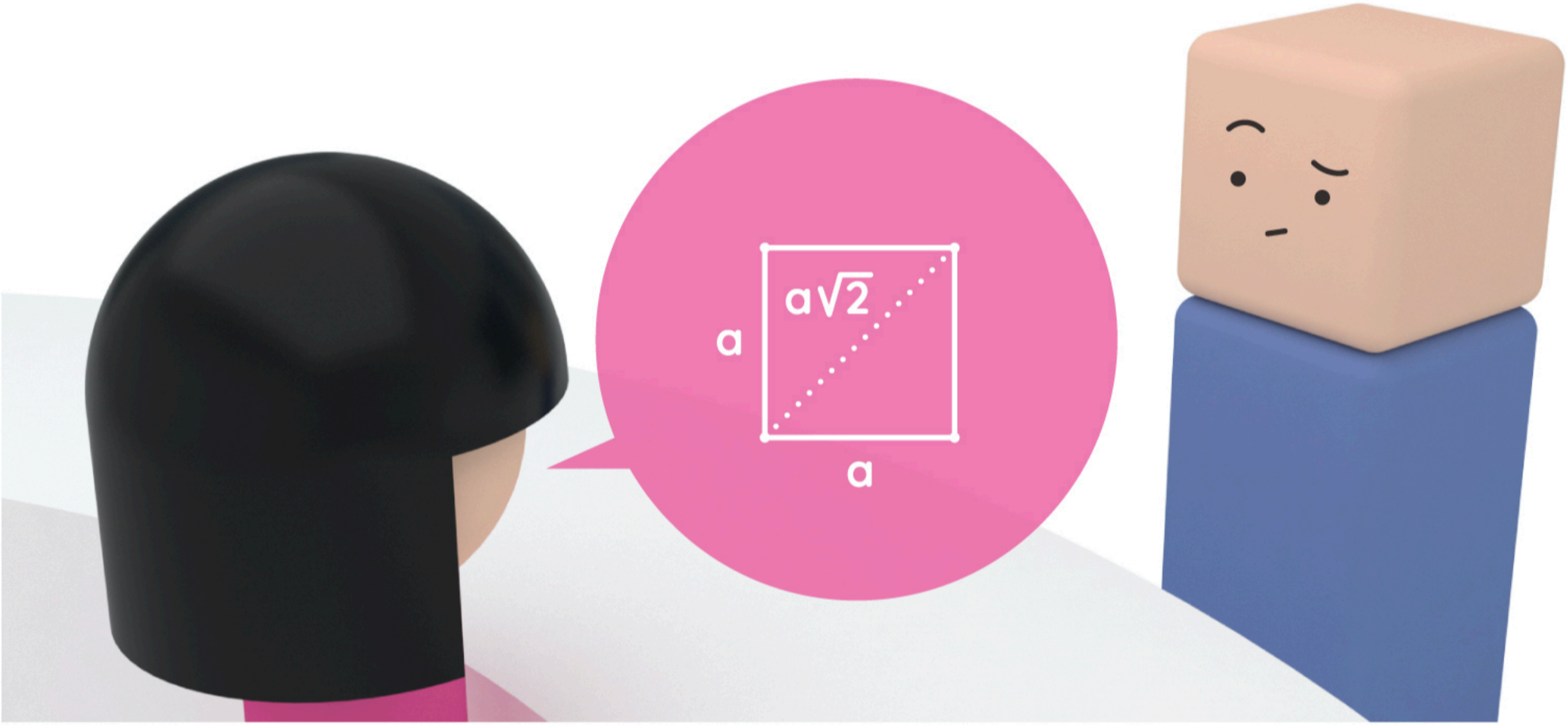

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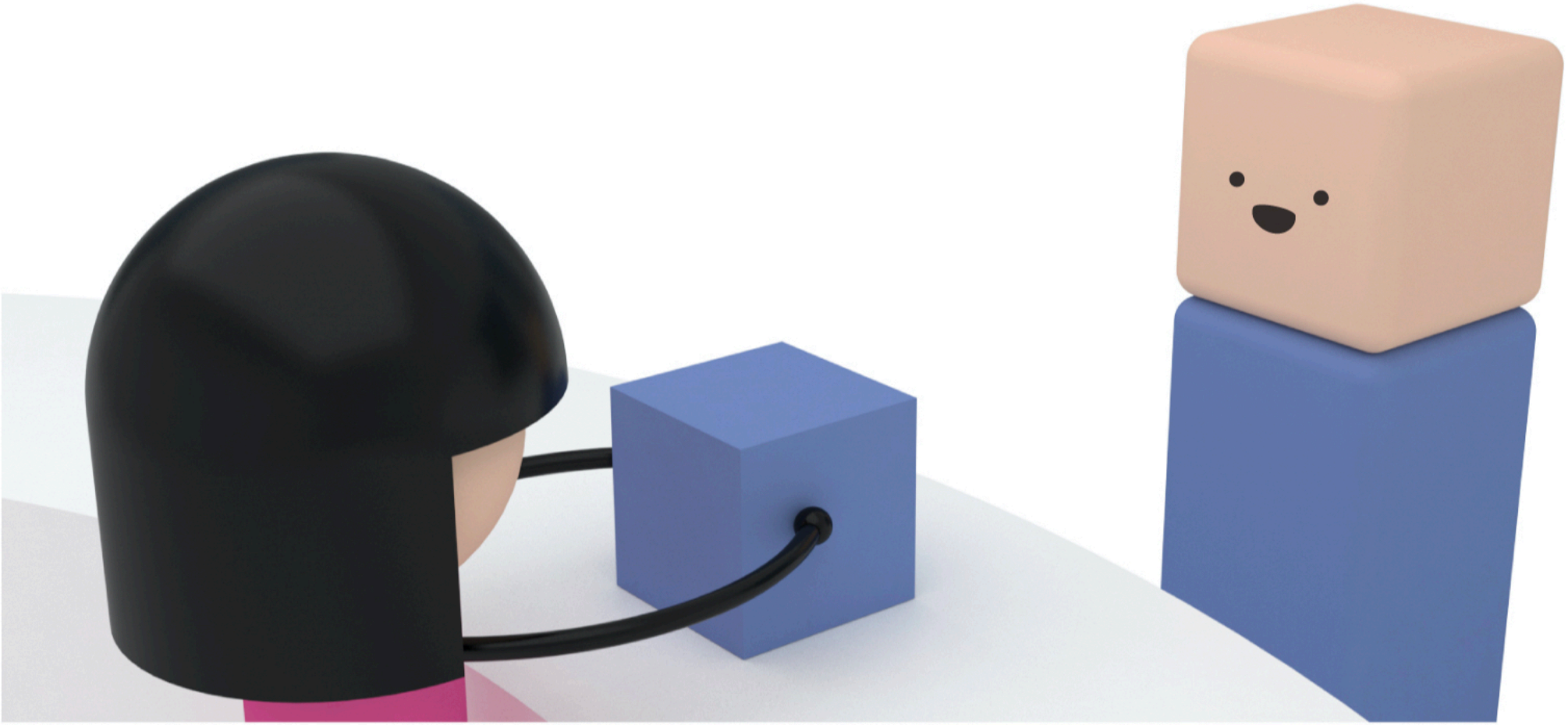

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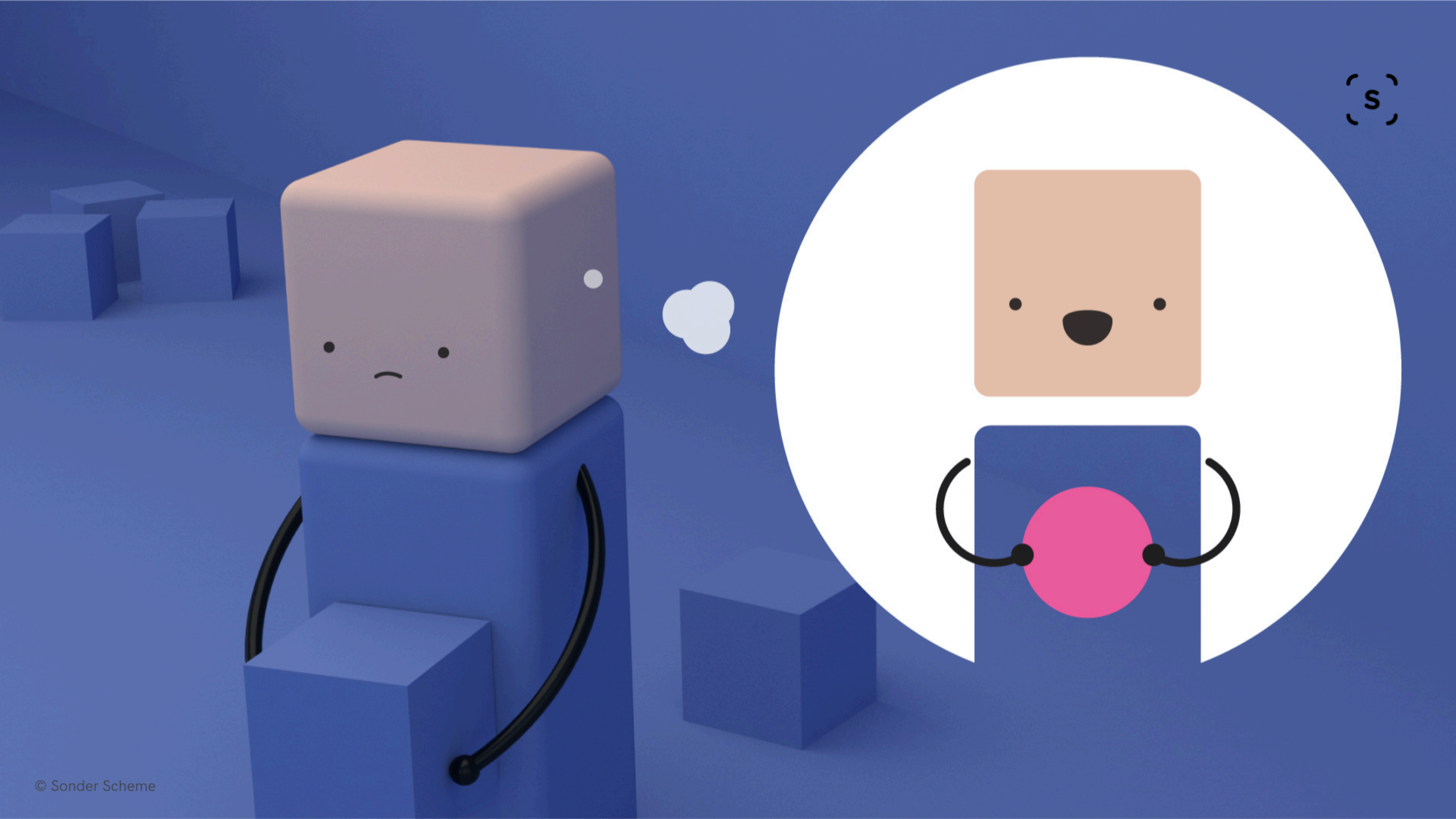
S
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Agency

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Paradox of Personalization

The best way to personalize a person's future is to make that future less personalized.

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Human-Centered Design | HCD

Understanding the future you — to create an offer you will want.

Human-Futures Design | HFD

Creating the future you — so that you will accept what they offer.

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Agency
Vulnerability
Empathy

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What kind of animal is this?

A dog

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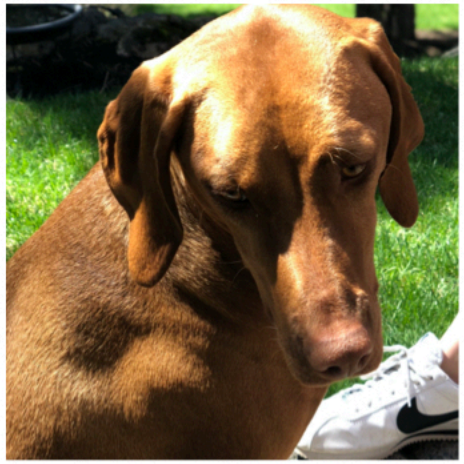
Snow

Not Snow



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Human thinks

Fanta

Hollie

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Machine thinks

Shoe

No shoe

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Human thought: “Dog vs Dog”

Machine did: “Shoe vs No Shoe”

Human couldn’t see the problem

Who is responsible?

The human.

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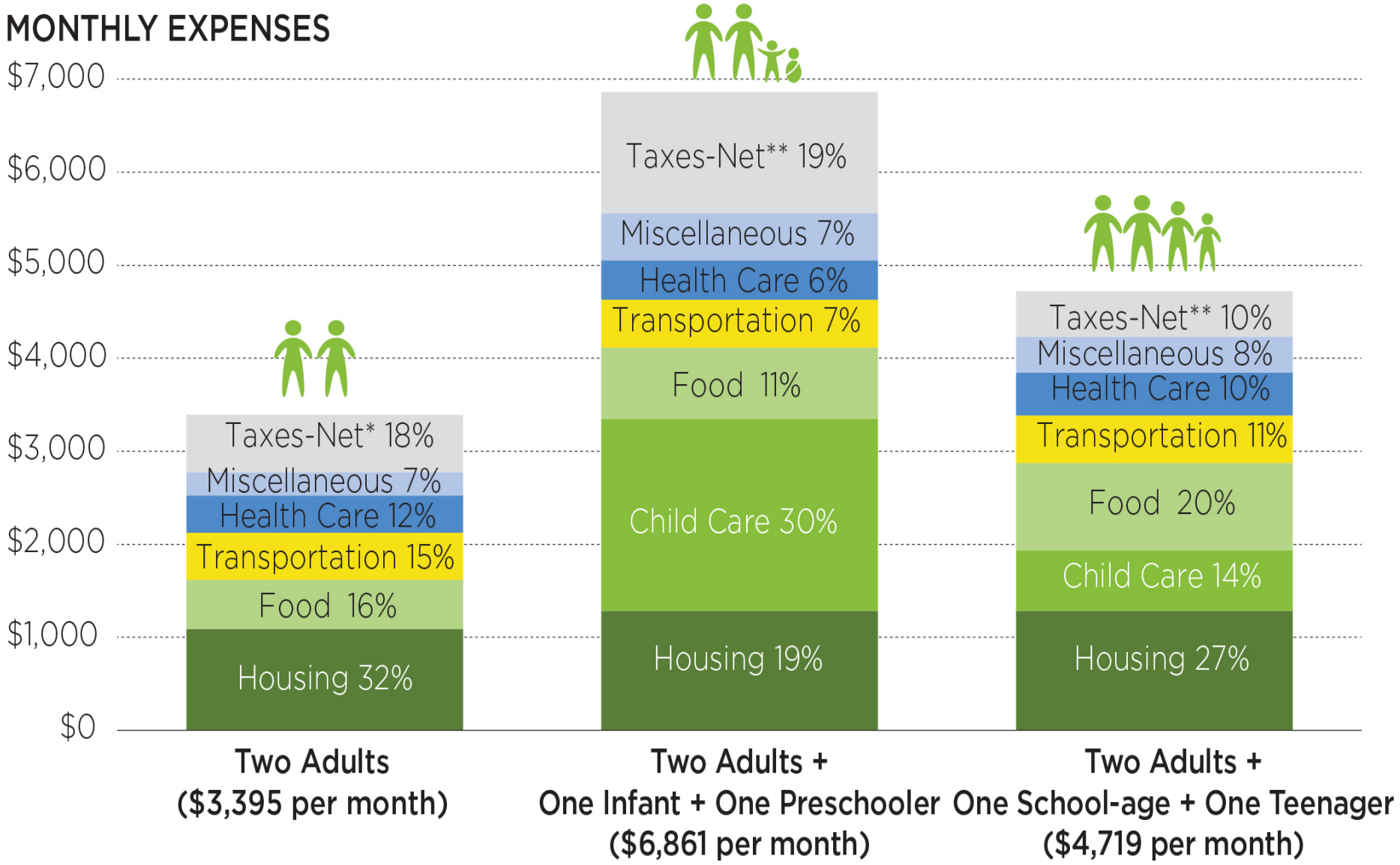
Self-Sufficiency Varies by Family Type

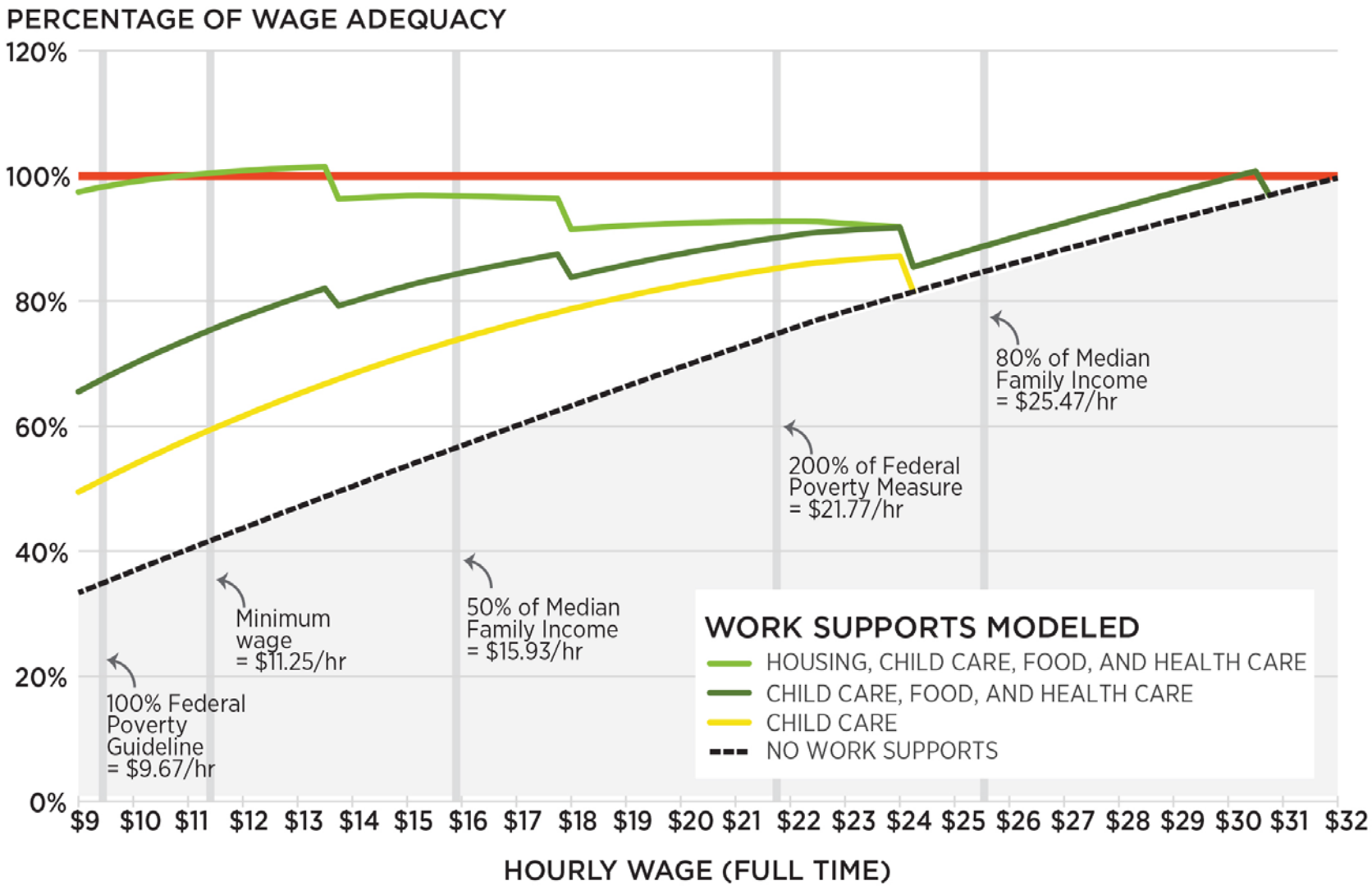
Percentage of Standard Needed to Meet Basic Needs for Three Family Types
Clackamas County, OR 2017



www.selfsufficiencystandard.org

Getting to Self-Sufficiency

Impact of Work Support on Wage Adequacy
One Adult, One Preschooler, & One School-Age Child:
Washington County, OR 2017

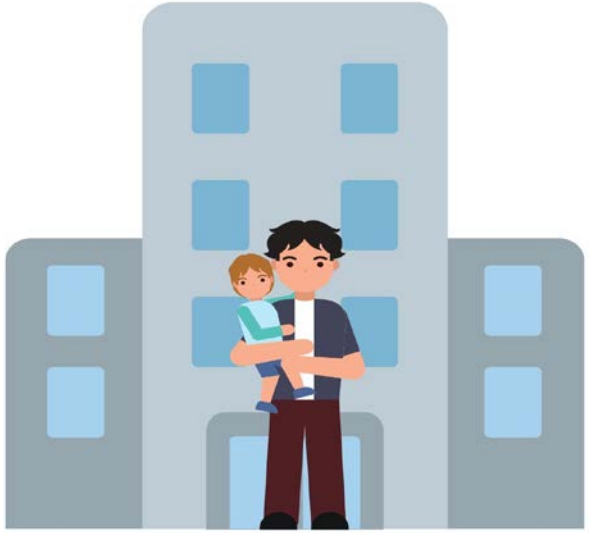


www.selfsufficiencystandard.org

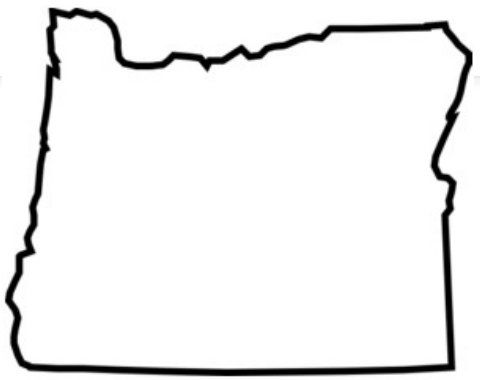
Meeting the Need for Affordable Child care

Child Care Subsidies are “WIN WIN WIN”

Good for the **Child**,
Good for the **Parent**, and
Good for the **Employer**



Raise Child Care Subsidy Levels (use 2018 child care costs survey)

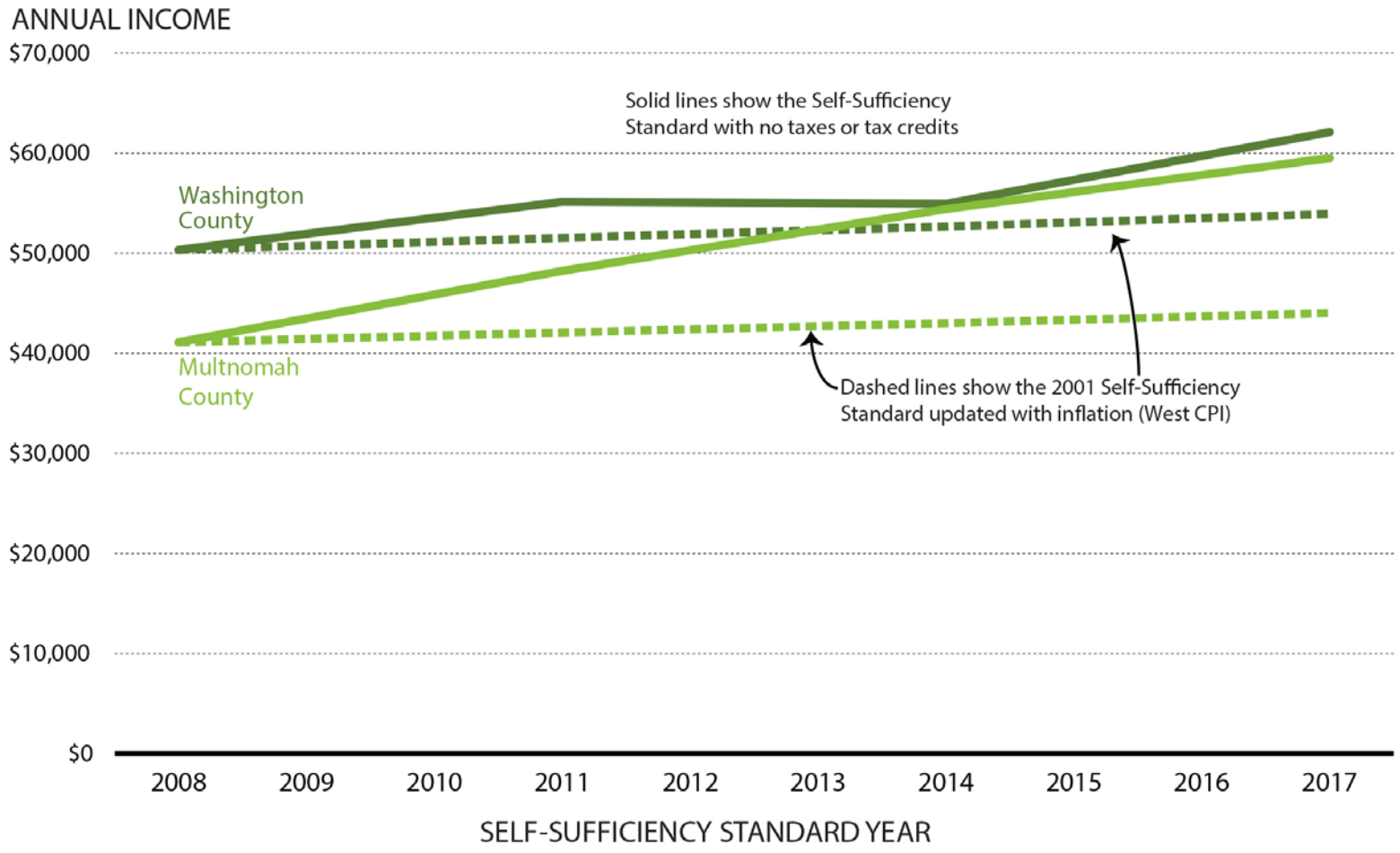


Raising the Eligibility Level for federally funded child care **to 150% of the federal poverty level** would make **10,600 more Oregon families** eligible for child care, and about **1300 more mothers** would be able to join the workforce

www.selfsufficiencystandard.org

PRE-K FOR ALL

New York City’s universal Pre-K program for 4 year-olds cuts child care costs in half, lifting about **3,500 families above** the **Self-Sufficiency Standard**

CPi*-Measured inflation underestimates real Cost of Living increases: A Comparison of the Self-Sufficiency Standard and the Consumer Price index, 2008-2017

Multnomah and Washington Counties, OR: Two Adults, One Preschooler, and One School-Age Child