USA Community Colleges, STEM Learning Ecosystems and Their Role in STEM For the Nation…How does this inform the Israel Technical Colleges and the New STEM Ecosystems?

Jan Morrison, Founder and Senior Partner, TIES

26 March 2020
1500 -1930

Israel STEM ecosystems

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WHAT IS STEM?

WHAT ISN'T STEM?

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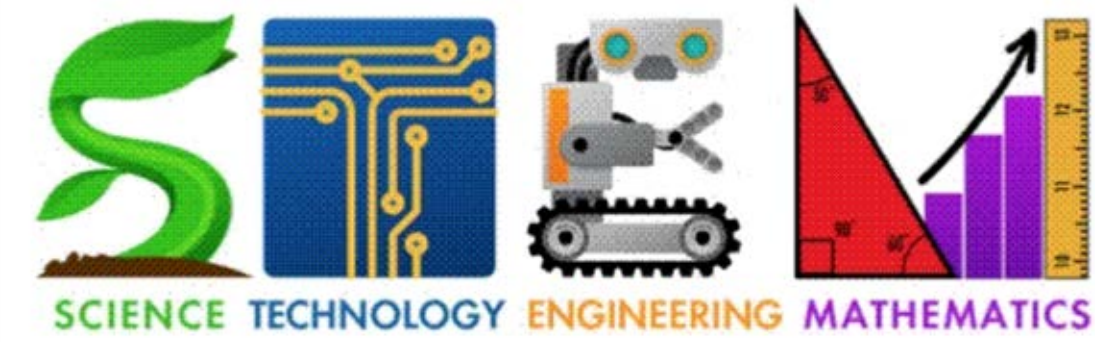
FIRST 10 YEARS!

STEM



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STEM Is A Mindset

It's a fundamental opportunity to solve our world's most ***grand challenges***!

It's a fundamental opportunity to be competent to create, design and implement ***innovative tools****!*

It's Science, Technology, Engineering, Mathematics, *Design Thinking/Literacy, Computational Thinking/Literacy, Digital Arts, Agriculture and Areas Not Currently Known*!

Success is linked to the ***Measurement*** **of What Works and Why!**

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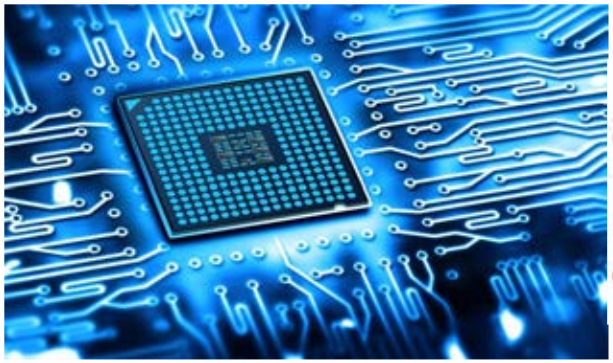
STEM FOR ALL BUT DESIGNED FOR EACH



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STEM for ALL is Aligned with Workforce!

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STEM HAPPENS EVERYWHERE!!

INFORMAL

HOME

FORMAL

BUSINESS/INDUSTRY

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Engineering Design Process

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COLLABORATION IS NOT A NATURAL ACT…

ENLIGHTENED SELF-INTEREST IS!!!

STEM SUPPORTS A REDESIGN OF TEACHING AND LEARNING AT ALL GRADE LEVELS

What About…

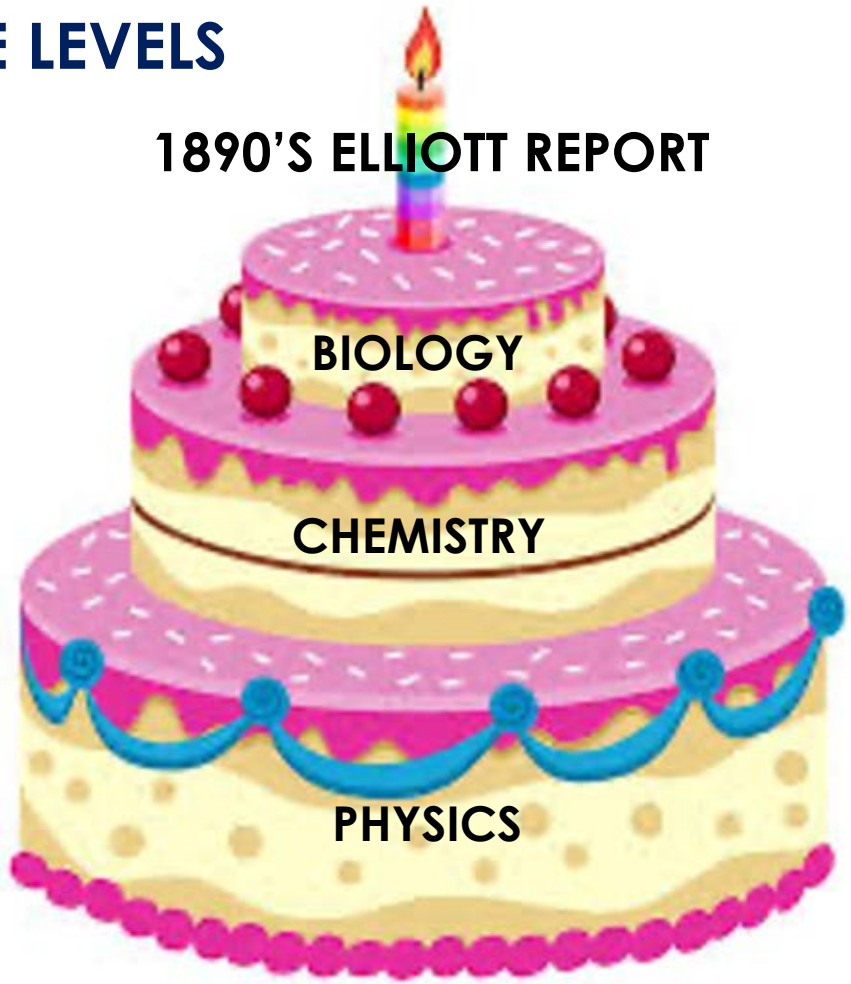
Nanobiotechnology?

Genetic Engineering?

Bioinformatics?

Aquaponics?

Biophysical Engineering?



STEM IS NEW TOOLS, NEW SKILLS ALL DRIVEN BY 21ST CENTURY SKILLS

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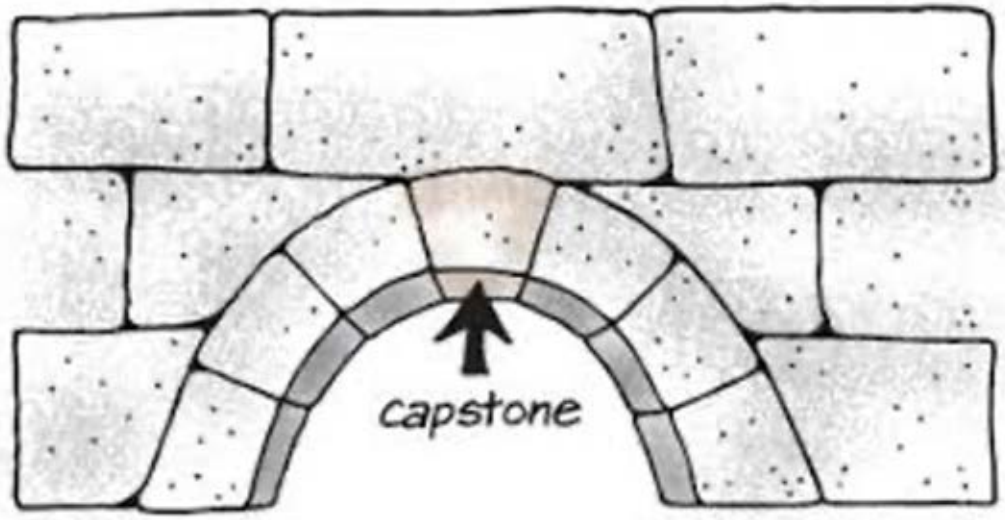
Not Just Hands-On but Solving *REAL* Problems



CAPSTONE PROJECTS TO SOLVE ISRAEL'S GRANDEST CHALLENGES

WHAT IS A STEM ECOSYSTEM AND WHY IS IT NEEDED?

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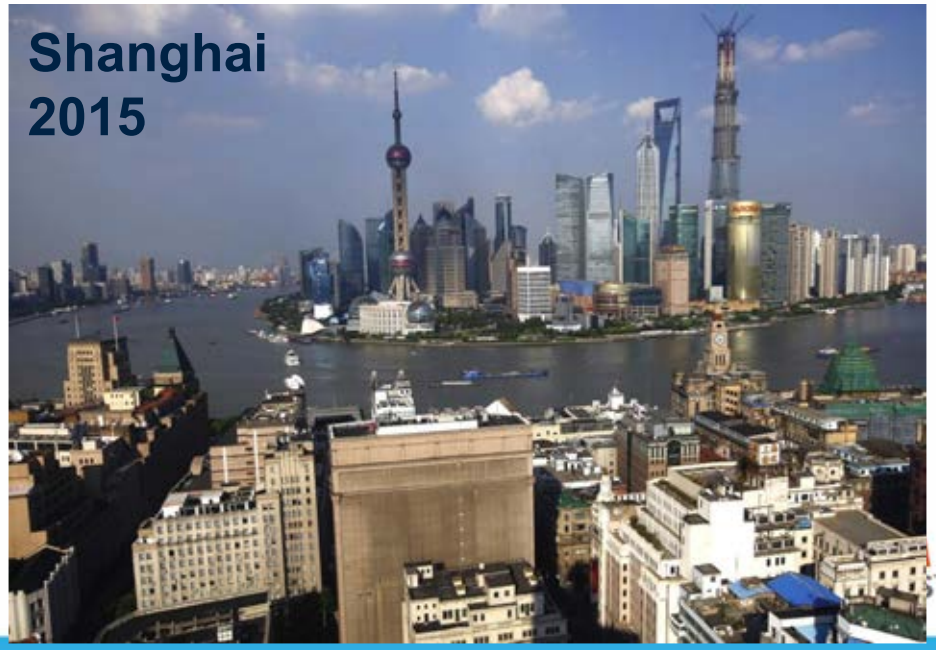
Unprecedented Global Competition



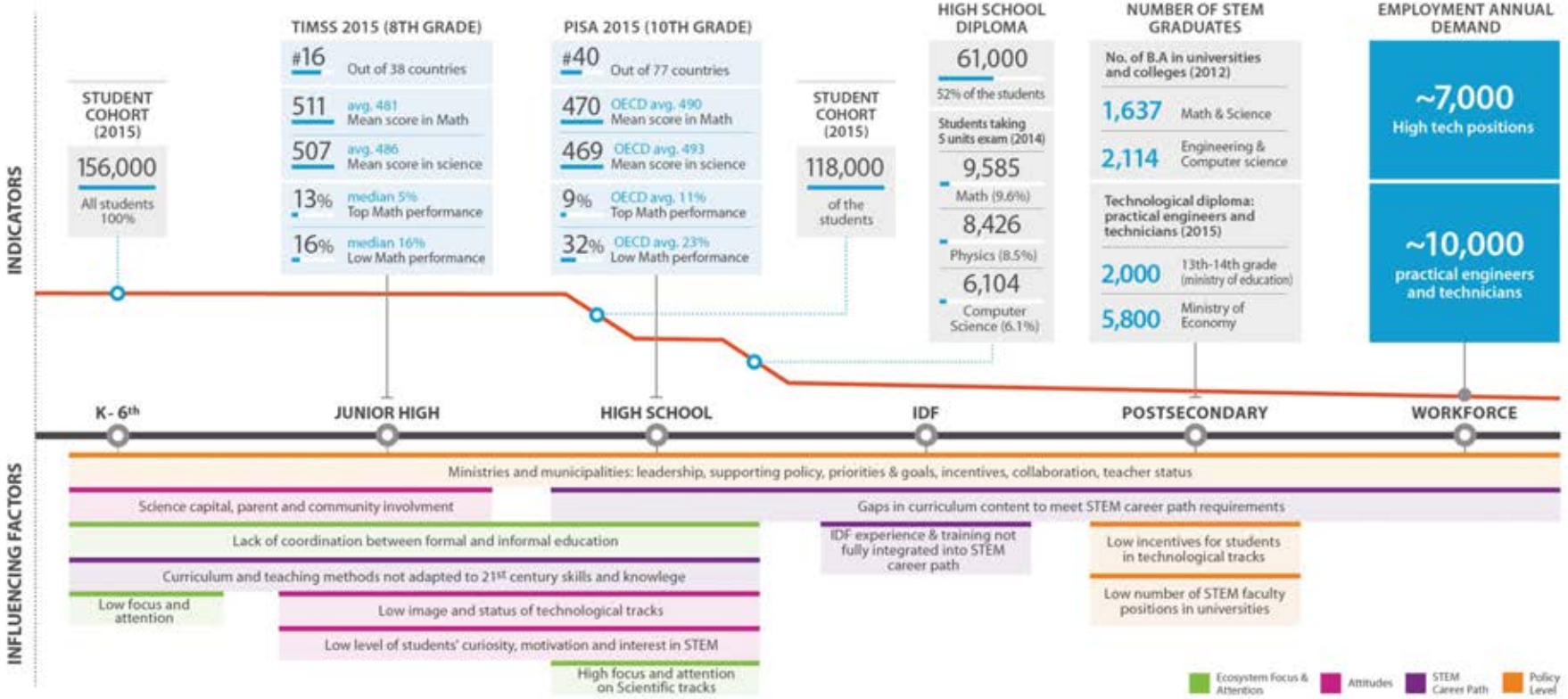
A New Architecture and not Kilos of Programs!

A new framework…

A new model…

A new way of making decisions and educating our youngsters!

The STEM Pipeline in Israel



BEYACHAD Stella and Yoel Carasso Family Foundation

Samueli FOUNDATION

SHEATUFIM STRATEGIES FOR SOCIAL IMPACT

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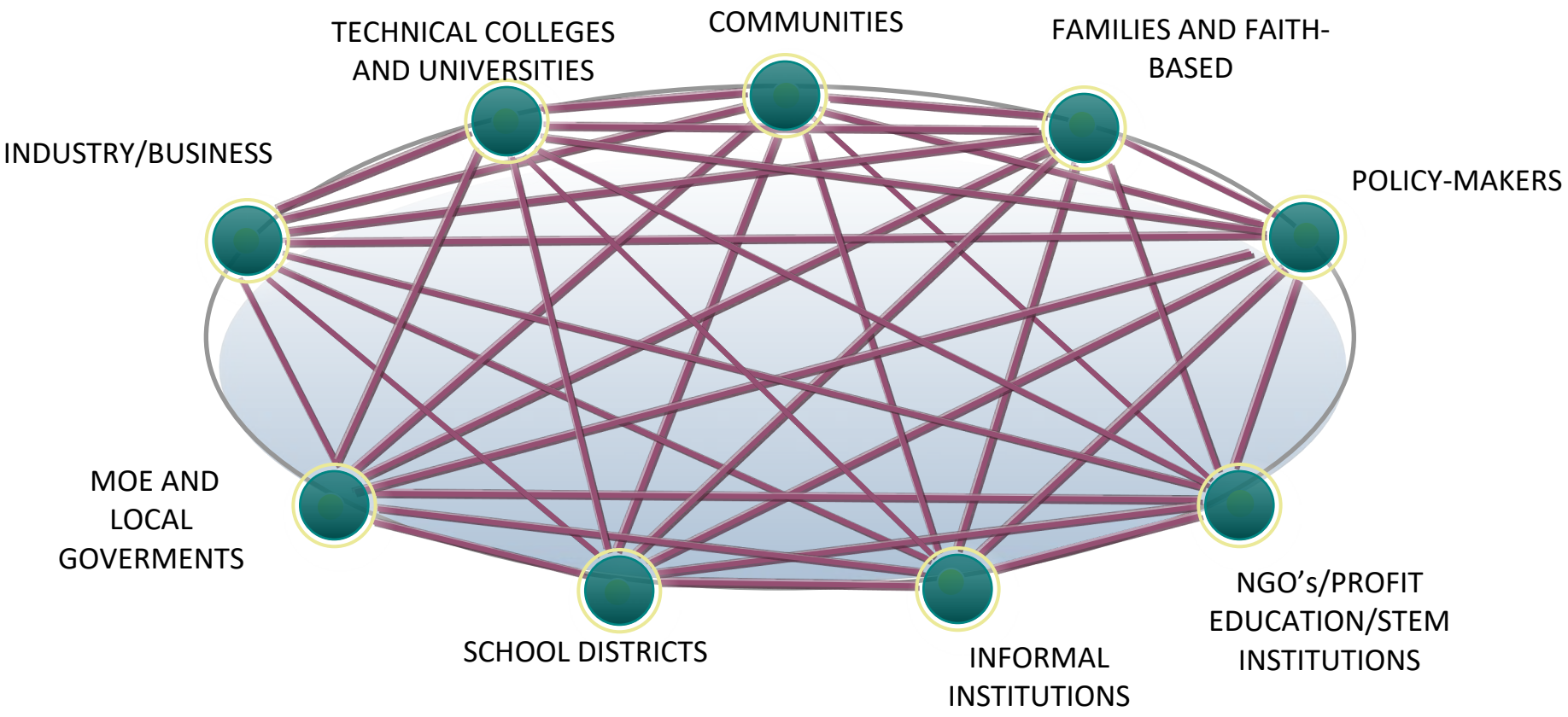
STEM LEARNING ECOSYSTEM



Pillars of a Thriving STEM Ecosystem

PARTNERSHIP

Cultivated diverse cross-sector partnerships among all STEM stakeholders

SYSTEM

Established architectural & infrastructure features including strong leadership and champion for sustainability of STEM for all as a system

TEACHING/ LEARNING

Aligned learning between in-school and out of school systems

MEASUREMENT

Measure STEM™ in place to ensure data-driven decision-making and longitudinal measurement of success

WORKFORCE

Created articulated university and career readiness pathways that are responsive to local employer demand and local/regional economic development

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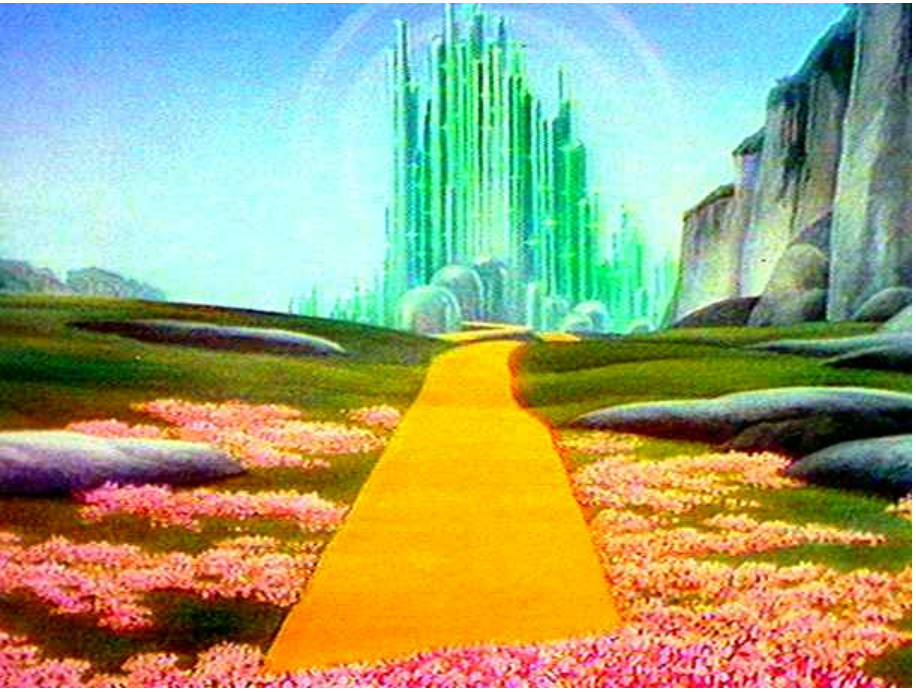

This **WAS** the path to a great job for your grandparents and parents!!!

This is the path to a great job!!!

WORKFORCE IS STEM

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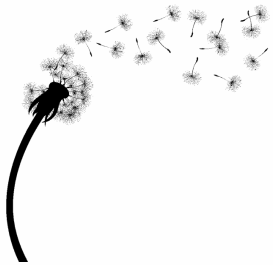
Pre-Design Prep

- Hire STEM Leader for Municipality/City/State
- Asset Mapping
- Data Collection/Analytics
- Design Team Determination
- Leadership Team/Steering Committee Determination



Design Studios…

#1: Innovation By Design™

- Aspirations/Goals/Common Agenda™
- Awareness of Held Beliefs
- Constraints
- Design Principles
- Design Features: Characteristics

2. Collaborative Investment By Design™

- Partnerships Created
- Protocols for Partnerships
- Investment Structures

#3. Leading and Learning By Design™

- STEM Learning Tours/Listening Tour
- Integrated Teaching and Learning: Formal and Informal Spaces (Interfaces)
- Workforce Interfaces
- Creation of Workgroups
- *Design Blue-Print* Designed

#4. Measure By Design™

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Be’er Sheva STEM Ecosystem Prototype

DESIGN YEAR…2018 - 2019

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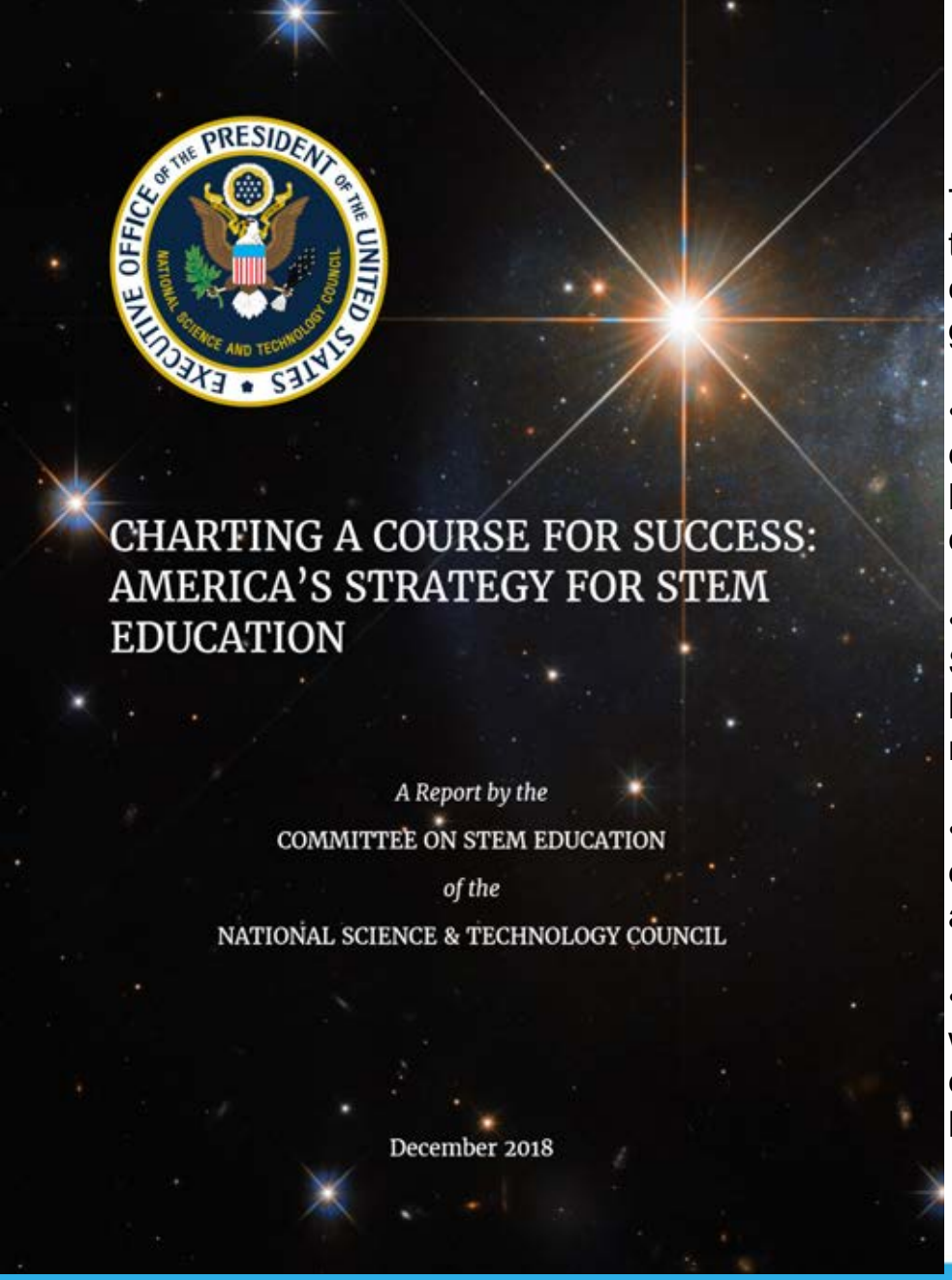

Pathways to Success

This Federal strategy for STEM education is built on the following four pathways representing a crosscutting set of approaches to achieving the three goals (each supported by a set of priority objectives):

• Develop and Enrich Strategic Partnerships to cultivate new or strengthen existing connections between educational entities and the broader communities they serve.

• Engage Students where Disciplines Converge using STEM as an interwoven and complex pursuit that blends disciplines and makes STEM learning meaningful and inspiring.

• Build Computational Literacy through STEM education heavily imbued with computational skills and accessed through digital means.

• Operate with Transparency and Accountability within Federal agencies implementing this plan, using evidence-based practices and assessments that can be emulated by other STEM stakeholders.

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WHAT IS A STEM ECOSYSTEM COMMUNITY OF PRACTICE?

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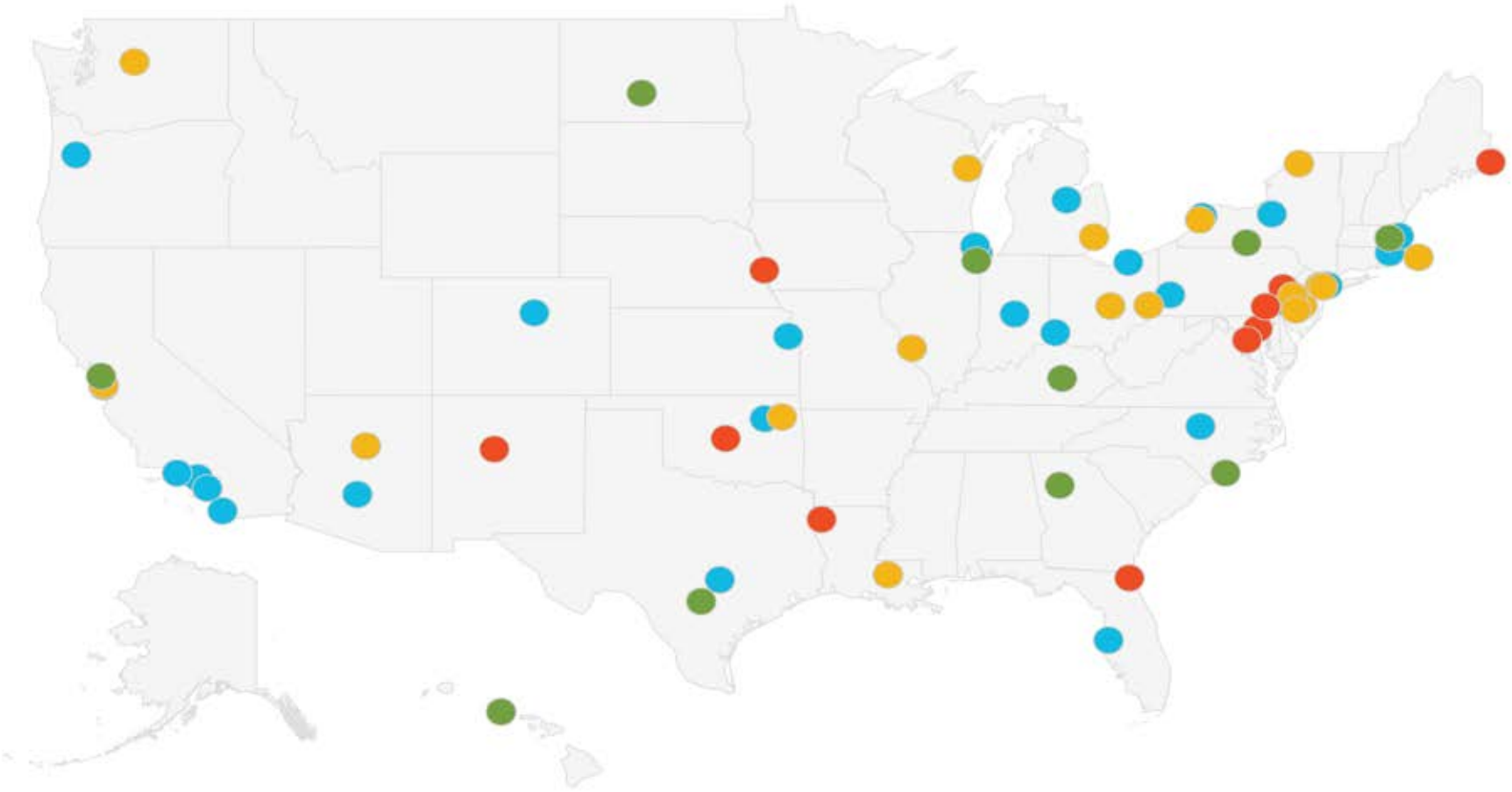
90 STEM ECOSYSTEMS TOGETHER AS ONE COMMUNITY OF PRACTICE

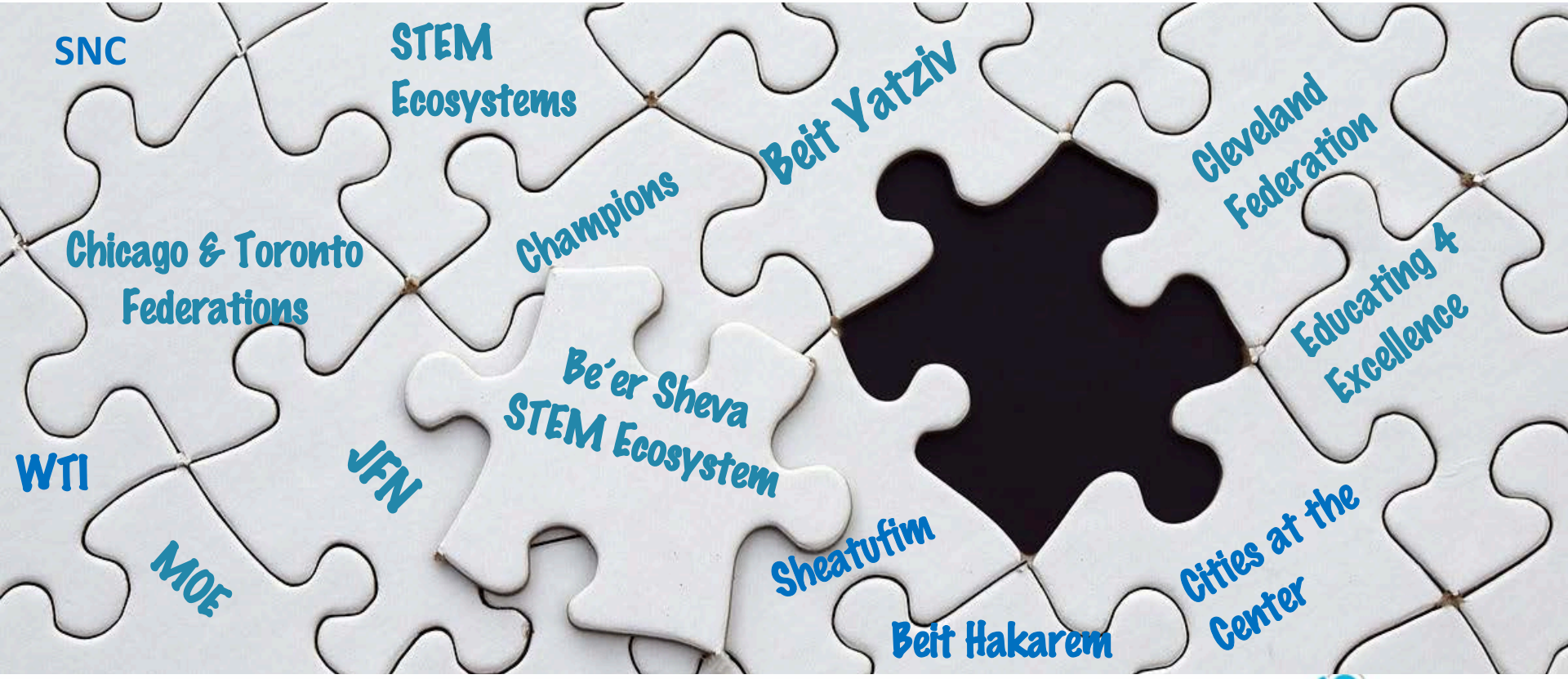
Learning, Sharing and Implementing TOGETHER



Design Principles for Measure STEM:

- Value a coherent and adaptive Measurement approach to know what works, why it works, and how to adapt new knowledge for each STEM Learning Ecosystem as well as the Community of Practice;
- Create and promote a suite of formative and summative tools that respond to the vision/mission and aspiration of Measure STEM and reconcile to the Logic Model and Theory of Action of the SLECoP;
- Collaborate with OECD and other global groups charged with measuring and managing the value proposition of SLECoPs globally;
- Set in place and advance the role of measurement in STEM globally, according to the globally accepted principles of measurement science and instrument traceability to unit standards;
- Ensure that all SLECoPs and their members understand the role of measurement, the use of measurement tools in managing and improving outcomes, and the advantages of measurement as a predictive analytic for the next decade.

Israel STEM Ecosystems
Community of Practice



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ISRAEL STEM ECOSYSTEMS COMMUNITY OF PRACTICE INAUGURAL MEETING

COUNCIL FOR A BEAUTIFUL ISRAEL
TEL AVIV
NOVEMBER 21, 2019
8:30AM - 1600

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The Role of the Community Colleges in USA

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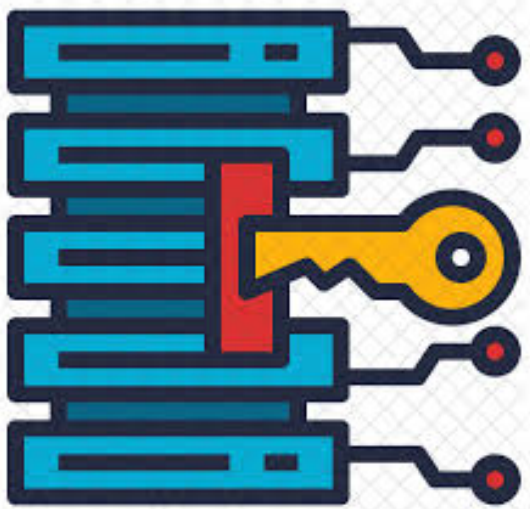
EQUITY

ACCESS



OPPORTUNITY

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Role of the USA Community Colleges…

…while in High School

Create startup

Pathways with Multiple On and Off Ramps to Life-time of Innovative Work

Articulation Agreements with Universities and Colleges for BA, Associates Degrees and Certifications

Business and Entrepreneurship

Computer and Information Technologies: Pathways and Industry Innovations

Advance Manufacturing, Digital Fabrication and Welding

Pathways to Skills and Certifications with Real Labor Market Value and Stackable

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AACC FAST FACTS 2019

TOTAL 1,051

NUMBER & TYPE OF COLLEGES (2019)[1]

Public	Tribal	Independent
941	35	75

DEGREES AND CERTIFICATES AWARDED (2016-2017)[4]

ASSOCIATE DEGREES 839,855

CERTIFICATES 549,149

BACCALAUREATE DEGREES 23,216

Bachelor's degrees awarded by 130 public and 53 independent colleges [*1, *6]

HEADCOUNT ENROLLMENT (FALL 2017)[3]

Estimated change Fall 2017 - Fall 2018: -3.2% [#6]

CREDIT

58% 7.0M

NON CREDIT[3]

42% 5.0M

TOTAL: 12M

CREDIT BY ATTENDANCE[2]

FULL TIME 2.6M 37%

Total 7M

PART TIME 4.4M 63%

GENDER[2]

DEMOGRAPHICS OF STUDENTS ENROLLED FOR CREDIT[2]

HISPANIC	25%
BLACK	13%
WHITE	46%
ASIAN/PACIFIC ISLANDER	6%
NATIVE AMERICAN	1%
2 OR MORE RACES	3%
OTHER/UNKNOWN	4%
NONRESIDENT ALIEN	2%

OTHER SIGNIFICANT DEMOGRAPHICS[5]

First generation to attend college	29%
Single parents	15%
Non-U.S. citizens	9%
Veterans	5%
Students with disabilities	12%
Students with prior bachelor's degree	8%

VFA Voluntary Framework of Accountability

A BETTER MEASURE OF SUCCESS

Fall 2010 Cohort

VFA metrics are a better measure of community college student success than traditional IPEDS metrics.

VFA 59% vs. IPEDS 25%

VFA measures:
- All entering students
- 6 years to complete
- 9 separate outcomes

Traditional IPEDS measures:
- First time, Full time
- 3 years to complete
- Only graduates

AGE[5]

AVERAGE:28
MEDIAN:24

54% <22

38% 22-39

9% 40+

March 2019

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AVERAGE ANNUAL TUITION AND FEES (2017-2018)[7]

$3,660 Community Colleges (public, in district)

$10,230 4-Year Colleges (public, in state)

PUBLIC COMMUNITY COLLEGES WITH ON-CAMPUS HOUSING[10]

REPRESENTATION OF COMMUNITY COLLEGE STUDENTS AMONG UNDERGRADUATES (FALL 2017)[7]

41%	40%	56%	52%	42%	39%
All U.S. undergraduates	First-time freshmen	Native Americans	Hispanics	Blacks	Asian/Pacific Islanders

MEDIAN EARNING OF FULL-TIME EMPLOYEES BY EDUCATIONAL ATTAINMENT[11]

Less than High School Diploma
$26,200

High School
$36,000

Associate Degree
$42,600

Bachelor's Degree
$60,100

% OF FEDERAL AID RECEIVED BY COMMUNITY COLLEGE (2016-2017)[6]

COMMUNITY COLLEGE REVENUES BY SOURCE (2016-17)[9]

Tuition	$16,919,744,855	27.8%
Federal	$6,890,649,604	11.3%
State	$19,962,607,648	32.8%
Local	$12,143,496,648	19.9%
Other	$5,032,734,883	8.3%
Total	$60,949,233,638	100%

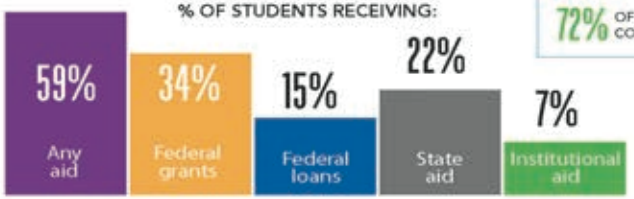
EMPLOYMENT STATUS (2015-16)

62% OF ALL FULL-TIME STUDENTS AT COMMUNITY COLLEGES WORK (21% full-time; 41% part-time)

72% OF ALL PART-TIME STUDENTS AT COMMUNITY COLLEGES WORK (38% full-time; 34% part-time)

STUDENT FINANCIAL AID (2016-2017)[5]

% OF STUDENTS RECEIVING:



% OF STUDENTS APPLYING (2015-2016)[5]

Any aid 73%
Federal aid 62%

SOURCE:
[1]AACC membership database, January 2019. Represents regionally accredited primarily associate degree granting colleges.
[2]NCES (2018). IPEDS Fall 2017 Enrollment Survey [AACC analysis].
[3]AACC membership database, 2018 [AACC analysis].
[4]NSC (2018). Estimates provided on NSC (2018) Term Enrollment Estimates: Fall 2018.
[5]NCES (2016). 2015-16 National Postsecondary Student Aid Study (NPSAS:16) [AACC analysis].
[6]College Board. (2018). Trends in Student Aid: 2018.
[7]College Board. (2018). Trends in College Pricing: 2018.
[8]NCES (2018). IPEDS 2017 Completion Survey [AACC analysis].
[9]NCES (2018). IPEDS 2016-17 Finance Survey Files [AACC analysis].
[10]NCES. (2018). IPEDS 2017 Institutional Characteristics Survey File [AACC analysis].
[11]Bureau of Labor Statistics (2018). Career Outlook: More Education, Lower Unemployment, Higher Earning.

AMERICAN ASSOCIATION OF COMMUNITY COLLEGES
One Dupont Circle, NW, Suite 700
Washington, DC 20036
www.aacc.nche.edu

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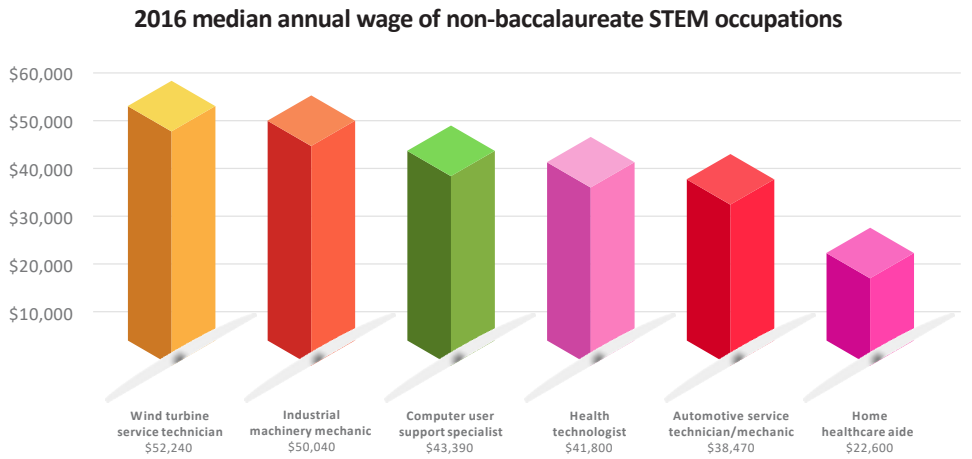
The STEM Advantage…

VOL. **6** / ISSUE **10** *August 2018*

The STEM advantage

The annual median earnings of STEM jobs is 29 percent higher than non-STEM related occupations.



Source: *Education Week*, STEM Education Opening Gateways to Learning & Careers,"Is STEM oversold as a path to better jobs?" and "Which STEM jobs are in demand and pay well?," May 2018. Data retrieved on May 22, 2018.

Science, technology, engineering and math (STEM) jobs are projected to grow, on average, between 9 percent and 11 percent from 2014 to 2024, compared to a 6.5 percent growth for non-STEM jobs. In general, STEM occupations that require either baccalaureate or sub-baccalaureate credentials tend to pay, on average, 29 percent more than other disciplines, according to the U.S. Department of Commerce. Some non-baccalaureate STEM occupations (*see graph above*) require a postsecondary education, but less than a bachelor's degree. These jobs typically yield higher median annual earnings. For example, individuals with a postsecondary certificate working in health technologies earned an annual median salary of $41,800 in 2016, while industrial machinery mechanics earned $50,040. The education and workforce supply pipeline for STEM is slow and lags behind demand — even though many occupations such as healthcare pay good wages. According to Georgetown University research, early achievement gaps in science and math particularly affect students who don't earn a high school diploma or matriculate into a STEM discipline. Additionally, students of color have even lower STEM educational outcomes than their white student counterparts. Community colleges are contributing to a STEM pipeline and overall higher education STEM outcomes.

For more information, contact Kent Phillippe, associate vice president for research and student success at the American Association of Community Colleges, at (202) 416-4505 or kphillippe@aacc.nche.edu, or Rahel Tekle, AACC research associate, at (202) 416-4508 or rtekle@aacc.nche.edu.

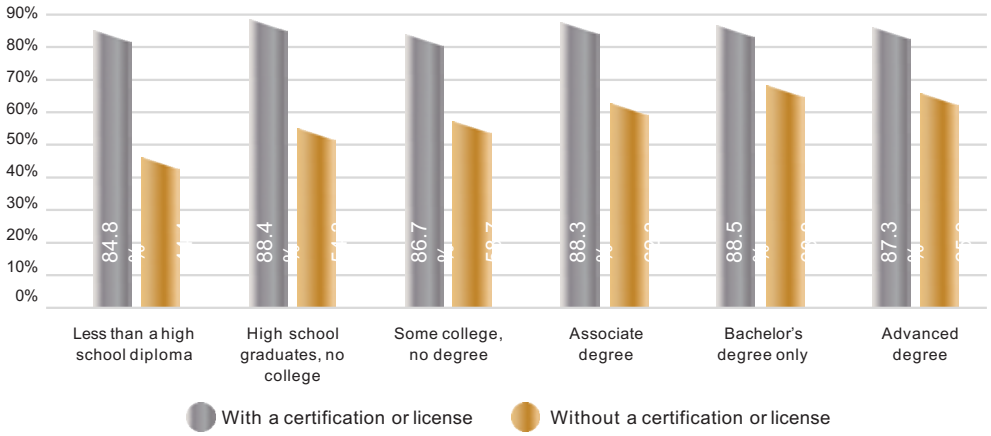
The Value of Certifications and Licenses…

VOL. **7** / ISSUE **22** *December 2019*

The value of certifications and licenses

Individuals with a certification or professional license have higher labor market participation rates.

Labor force participation rates of people 25 years and older by professional certification and licensing status and education attainment: 2018



Source: Bureau of Labor Statistics, "Professional Certifications and Occupational Licenses: Evidence From the Current Population Survey," June 2019.

AMERICAN ASSOCIATION OF COMMUNITY COLLEGES

Professional certifications and licenses have been important in promoting employment pipelines for individuals, especially in occupations such as healthcare, law and project management. The Bureau of Labor Statistics used Current Population Survey (CPS) data to examine labor market participation in the U.S. by education attainment and whether the individual had a professional certification or license. In 2018, there were more than 43 million people in the U.S. with a professional certification or license. Certification or license status was less important as education attainment levels increased (except for holding an advanced degree). The gap between those with and without a certification or license was 40.4 percentage points (84.8 percent compared to 44.4 percent) for individuals whose highest educational attainment was less than a high school degree, while the gap for associate degree completers was 26 percentage points (88.3 percent compared to 62.3 percent).

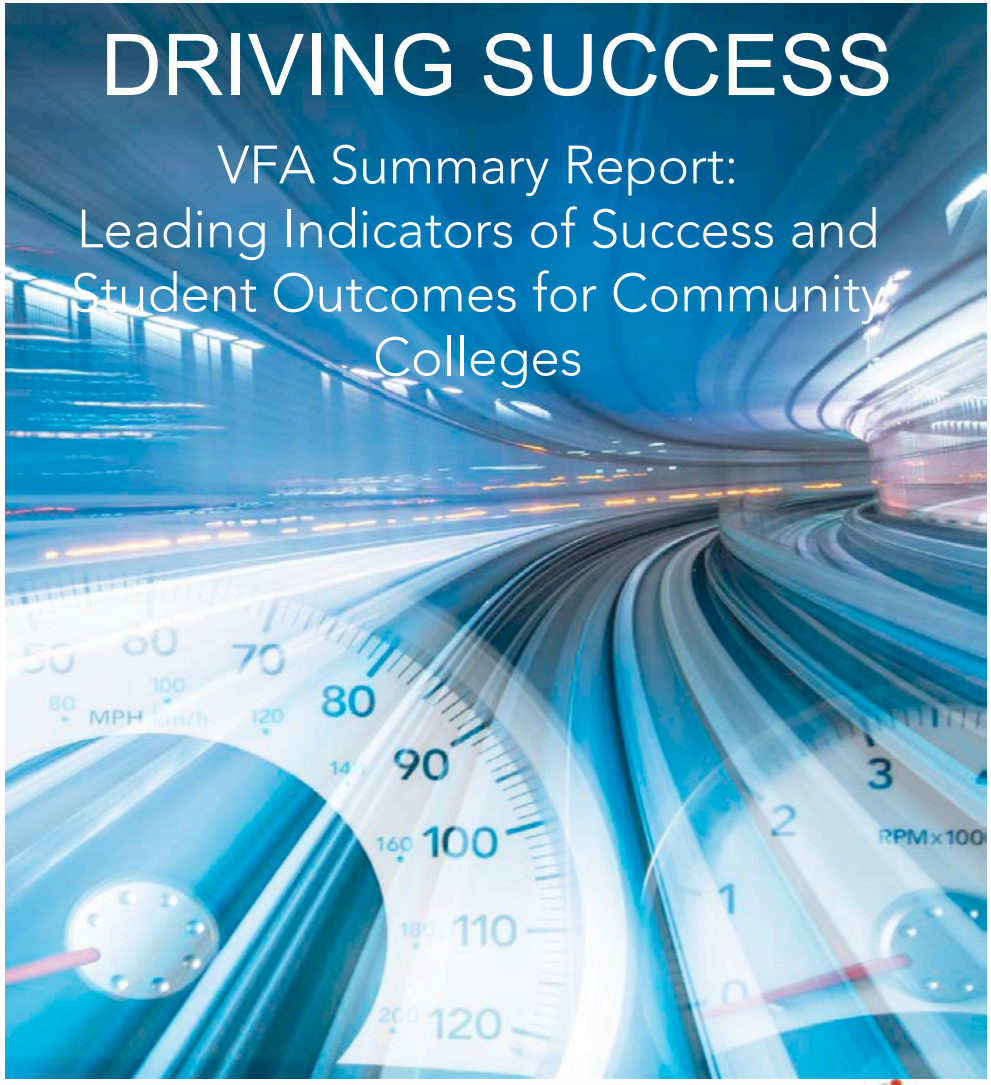
For more information, contact Kent Phillippe, associate vice president for research and student success at the American Association of Community Colleges, at 202-416-4505 or kphillippe@aacc.nche.edu, or Rahel Tekle, AACC's research associate, at 202-416-4508 or rtekle@aacc.nche.edu.

Key results from this report include:

Half of the colleges had 52.7% or more of their students who started in the fall of 2011 earn a credential by 2017, transfer to another institution by fall of 2017, or be still enrolled in their sixth academic year

• White students had higher median rates than did Hispanic or African American students. Median success rates for African American students tended to be lower than White or Hispanic students except for transfer rates, where African American students had the highest median transfer rate relative to White or Hispanic students.

• Data suggest a relationship between the leading indicators collected in the VFA and 6-year outcomes collected in the VFA. Colleges with higher rates on the leading indicators tended to have higher rates on 6-year outcomes.



Voluntary Framework of Accountability = VFA

The Israeli Technical Colleges…Annotated List

- Academic College of Tel Aviv-Yafo
- Afeka College of Engineering, Tel Aviv
- Ashkelon Academic College
- Bezalel Academy of Art and Design, Jerusalem
- Carmel Academic Center, Haifa (Closed)
- Center for Academic Studies, Or Yehuda
- College of Management Academic Studies (COMAS)
- Dan Academic Center, Petah Tikva
- Hadassah Academic College, Jerusalem
- Haredi College of Jerusalem (Closed)
- Holon Institute of Technology
- Interdisciplinary Center Herzliya (IDC), Herzliya
- Jerusalem Academy of Music and Dance
- Jerusalem College of Engineering
- Jerusalem College of Technology
- Kinneret Academic College
- Lander Institute, Jerusalem
- Max Stern Academic College of Emek Yezreel
- Mivhar College, Bnei Brak
- Neri Bloomfeld School of Design and Education, Haifa
- Netanya Academic College
- Ono Academic College, Kiryat Ono
- ORT Braude College of Engineering, Karmiel
- Peres Academic Center, Rehovot
- Ruppin Academic Center
- Sapir Academic College
- Sami Shamoon College of Engineering, Beersheba and Ashdod
- Sha'arei Mishpat College, Hod HaSharon
- Shalem College, Jerusalem
- Shenkar College of Engineering and Design, Ramat Gan
- Tel-Hai Academic College
- Western Galilee College, Acre
- Yehuda Regional College, Kiryat Arba[1]
- Zefat Academic College, Safed

השחקנים

סטודנטים

מה"ט
המכון הממשלתי להכשרה מכנולוגית

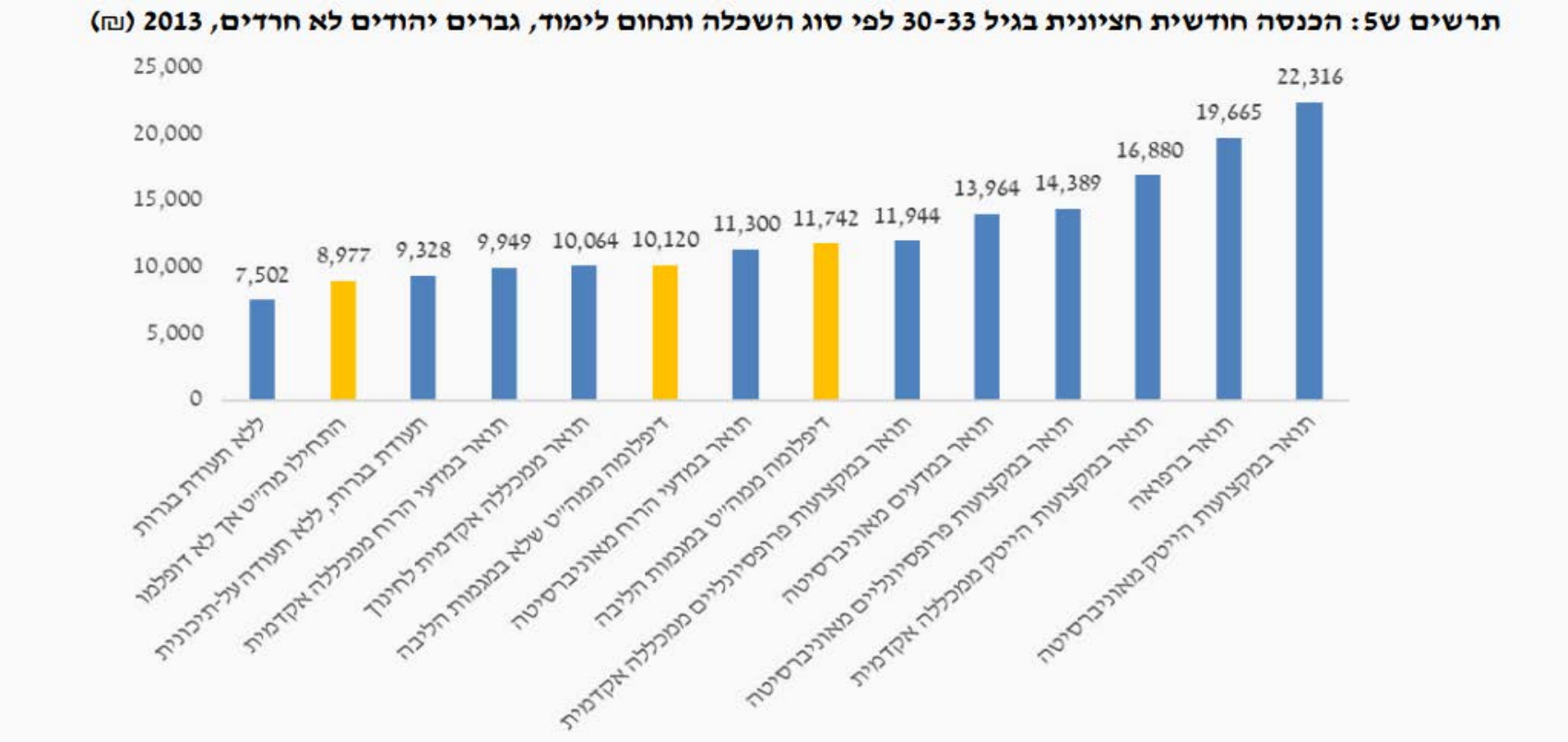
מעסיקים

מכללות

משרד העבודה הרווחה והשירותים החברתיים
חוסן חברתי לישראל

מה"ט

תרומה למשק - תרומה להעלאת הפריון



משרד העבודה הרווחה
והשירותים החברתיים
חוסן חברתי לישראל

מה"ט

תרומה לפרט – קידום מוביליות חברתית

לוח 1: נתוני רקע לגבי קבוצות ההשכלה השונות

	שיעור נבחנים ב-5 יח' מתמטיקה**	שיעור נבחנים ב- 5 יח' אנגלית**	השכלת אב ממוצעת (שנים)	הכנסת אב חודשית ממוצעת (₪)
ללא תעודת בגרות	0%	5%	11.3	7,970
תעודת בגרות, ללא תעודה על-תיכונית	12%	46%	12.5	11,807
התחילו מה"ט אך לא דופלמו	**1%**	**10%**	**11.6**	**8,794**
דיפלומה ממה"ט שלא במגמות הליבה*	**2%**	**15%**	**12.0**	**10,164**
דיפלומה ממה"ט במגמות הליבה*	**2%**	**9%**	**11.8**	**8,848**
תואר ממכללה אקדמית לחינוך	15%	43%	14.0	13,261
תואר במקצועות הייטק ממכללה אקדמית	23%	45%	13.0	12,373
תואר במקצועות פרופסיונליים ממכללה אקדמית	10%	45%	13.0	15,142
תואר במדעי הרוח ממכללה אקדמית	7%	50%	13.2	15,581
תואר במקצועות הייטק מאוניברסיטה	69%	82%	14.3	17,230
תואר במקצועות פרופסיונליים מאוניברסיטה	38%	76%	14.1	17,055
תואר במדעי הרוח מאוניברסיטה	14%	56%	13.4	13,410
תואר במדעים מאוניברסיטה	41%	81%	14.3	16,098
תואר ברפואה	74%	90%	16.2	23,199

מקור: למ"ס, בסיס נתונים מנהליים

משרד העבודה הרווחה והשירותים החברתיים
חוסן חברתי לישראל

מה"ט

The New World Order…What does Israel look like in ten years?

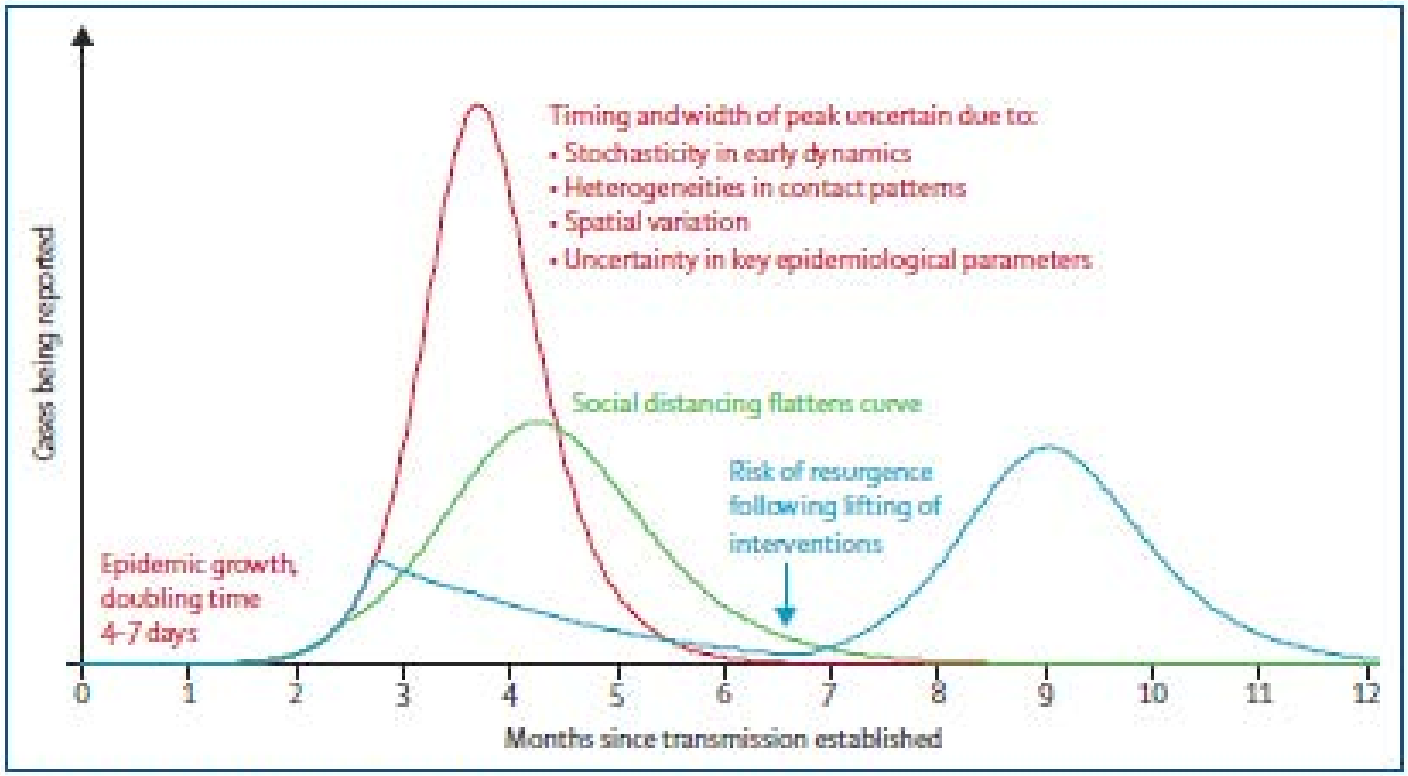


Figure: Illustrative simulations of a transmission model of COVID-19
A baseline simulation with case isolation only (red); a simulation with social distancing in place throughout the epidemic, flattening the curve (green), and a simulation with more effective social distancing in place for a limited period only, typically followed by a resurgent epidemic when social distancing is halted (blue). These are not quantitative predictions but robust qualitative illustrations for a range of model choices.