EDUCATIONAL PRODUCTIVITY

A New Architecture Threading the Needle Among Learning, Employment and Economics

ERP INSTITUTE

MARCH 2022

Table of Contents

Produced by Educational Results Partnership (ERP)

Authors

James S. Lanich, Ph.D.
President and CEO, ERP

Marilyn Reznick
Chair of the Board of Directors, ERP,
Former Executive Director, AT&T Foundation

Alex Barrios
Senior Executive Vice President, ERP

Harry Holzer, Ph.D.
John LaFarge Jr. Professor of Public Policy, Georgetown University, and Nonresident Senior Fellow in Economic Studies, Brookings Institution

Contributors

Julian Alvarez III
Commissioner Representing Labor, Texas Workforce Commission

Sonia Baccus Hooks
Representing Los Angeles County Superintendent of Schools

Douglas Carnine, Ph.D.
Professor Emeritus, University of Oregon

The Honorable John Chiang
Co-Chair, California Forward, Former California State Treasurer

Zulmara Cline, Ph.D.
Statewide Director, California Academic Partnership Program (CAPP), The California State University

Richard Damelio, Ed.D.
State Administrator and Trustee (Ret.), Vallejo City Unified School District (VCUSD)

Vera "Jeanette" De La Cruz
Chief of Staff to the Labor Commissioner, Texas Workforce Commission

Penny Edgert, Ph.D.
Executive Director, Intersegmental Coordinating Committee (ICC) of the California Education Round Table (CERT)

Clyde Hunt III
Consultant, Bloomberg Associates

Parminder Jassal Ph.D.
CEO, Social Tech.ai

Daniel King, Ph.D.
Superintendent (Ret.), Pharr-San Juan Independent School District (PSJA)

Lenny Mendonca
Senior Partner Emeritus, McKinsey & Company, Board Member, ERP

Daniel Rockers, Ph.D.
Former Chair, California Psychological Association

Don Shalvey, Ed.D.
President and CEO, San Joaquin A+, Deputy Director (Ret.), Bill & Melinda Gates Foundation

Ken Sorey
Executive Director, National Laboratory for Education Transformation

Sharon Twitty
Executive Director, Alliance for Regional Collaboration to Heighten Educational Success (ARCHES)

Joel Vargas
Vice President, Jobs for the Future (JFF)

Traci Wickett
President and CEO, United Way of South Cameron County, Texas

Nicolas Zoffel, Ph.D.

ERP Board of Directors

About ERP

Educational Results Partnership (ERP) is a non-profit organization that applies data science to help improve student outcomes and career readiness throughout the educational system. Our goal is to ensure that more students enter the workforce with the skills today's global economy demands. In partnership with educators and employers, we are charting the pathways that lead to academic success and living-wage jobs. Our partners include hundreds of K-12 educational institutions across the country, the nation's largest higher education system, employer-led organizations and the foundations of former U.S. Presidents.

ERP has accumulated the nation's largest database on student achievement from kindergarten into the labor market. We use data science and predictive analytics to identify successful public education systems, practices, programs and policies that are delivering the best results for students. We are committed to closing equity gaps in education and the labor market. Our research centers on improving academic and workforce outcomes for all, including students of color, foster youth and students in high-poverty regions.

Executive Summary

Recovering the amount of educational and economic productivity lost during the pandemic presents a common challenge facing educators, employers, economists, workforce boards, policymakers and other stakeholders. If not mitigated, these losses will result in greater economic losses and increased risk to American national security.

This paper proposes developing a new architecture focused on educational productivity as a long-term solution. Educational productivity correlates what an individual has learned, their productive potential in the workforce and the economic value of what they know and how it can contribute to the economy. The goal of the new architecture is to improve the lives of all Americans by maximizing every person's productive potential and economic mobility.

Similar to how the nation's Social Security system was created to ensure economic security after the Great Depression, today's challenges present a similar opportunity for educational institutions, employers, workforce boards and other stakeholders to collaborate in new and different ways to solve a shared problem — improving the lives of all Americans in a post-pandemic world.

A new system designed to measure educational productivity would co-exist, collaborate and support existing educational, workforce and employment systems. In the educational productivity system:

- Learning will be translated into economic value terms so that individuals can better understand the relationship between what they have learned and its economic value.
- Productive potential would be understood, captured, measured and taxonomized to determine the best predictors of downstream economic success and the well-being of individuals and communities.
- Employers, workforce systems and economists would play a greater role to identify, define and quantify more accurately the relationship between learning, workforce preparation and economics.
- The desired system outcome is more opportunity, economic mobility and a more productive economy for all.

ERP is calling for immediate action by convening national experts to identify the valid and reliable metrics that accurately measure educational productivity at an individual and macro level. To develop these metrics, ERP proposes pulling together and analyzing existing information and data sources to:

- Identify the most relevant points and the valid and reliable predictors of downstream economic success at every stage in life from birth through career.
- Measure the broad economic value of learning at each point in an individual's life for both the individual and their contribution to the national economy.
- Measure the value of economic losses — for the individual and the economy — whenever a person falls behind in learning at any stage in life.

Introduction

There is mounting pressure to develop a recovery plan to address ongoing economic inequality that was exacerbated by the pandemic. This paper identifies ways that employers, educators, workforce boards, economists and other stakeholders can collaborate on a shared solution to our nation's growing economic problem through the formation and implementation of a new concept: educational productivity. *Educational productivity* is defined as linking education and career pathways to increase economic opportunity, strengthen the workforce and bolster U.S. competitiveness to protect national security.

> A moral imperative and national interest exist to help students recover learning lost during the pandemic.

While the primary purpose of education is the integral development of a person and the betterment of society, this paper calls on employers, education leaders, workforce systems, economists, policy influencers and others to work together to derive additional meaning from education data, in terms of economic value. It calls on the development of a common language, valid and reliable signals, and metrics that measure the relationship between learning at all stages in life and lifetime productive potential and earnings for individuals — and productivity of the U.S. economy. Likewise, it calls for the development of reliable metrics measuring how learning losses at all stages reduce both individual earnings and our regional/aggregate economic productivity and output.

A moral imperative and national interest exist to help students recover learning lost during the pandemic. The situation creates an opportunity to develop a cohesive strategy that economically benefits students, employers and the overall economy. Therefore, while this effort will start with the development of new metrics aligned to a north star defined by economic value, it has the potential to evolve into the creation of an entirely new system directly connecting individuals to helpful education and jobs that pay family-supporting wages in high-demand careers.

A Growing Economic Problem

COVID-19 has resulted in the loss of millions of lives, social disruption and economic hardships felt worldwide. For millions of Americans, the price has been paid in the loss of a loved one. For the rest of the nation, forthcoming economic losses of major proportions are looming over the horizon and could have significant consequences on quality of life and national security if not mitigated soon.

While this economic problem did not start with the pandemic, it was exacerbated. For decades, limited access to educational opportunities and career preparation for many Americans has hurt individuals' earnings over time and reduced upward mobility. It has also generated large economic losses for regions, states and the overall economy. If swift action is not taken to reverse this economic crisis, we will continue to see:

- Economic losses for regions, states and the entire nation due to a:
  - Decrease in economic productivity / annual GDP loss or minimal growth.
  - Reduction in the quality of product and customer experience.
  - Decrease in national security over time from the lack of innovation and competitiveness.
- Low employment and lifetime earnings, often below a "living wage."
- Low economic mobility and high inequality.
- Low levels of learning and educational attainment, particularly among disadvantaged populations and communities.

The Economic Cost of Learning Loss During the Pandemic

Greatly concerning is the compounded amount of learning students have lost during the pandemic, plus the millions of students that have left the education system altogether. Students falling behind in their learning not only impacts their academic progress, it also leads to continued economic losses, particularly for historically socioeconomically disadvantaged populations. A growing academic achievement gap was already a serious problem. Pandemic-related learning loss only widened this achievement gap and our growing economic problem. It is projected that learning loss will reduce youth's earnings over their lifetimes and negatively impact the overall economy every year as this cohort enters the workforce.[i] The cost of lost learning will translate into significant downstream economic losses and unrealized economic gains for both individuals and the broader economy.[ii]

The ability to measure student progress by conventional methods has also been weakened, making it harder to track how well academic institutions and their students are performing. For example, there is a lack of reliable statewide K-12 student assessment data. In California, the Department of Education cites that just 25% of students took statewide assessment tests during the pandemic. Texas also lost two years of reliable K-12 statewide assessment data. For almost 20 years, Educational Results Partnership has used these assessments to compile an annual list in both states of schools making measurable improvements in closing achievement gaps. For the first time ever, this year we were unable to do so because of the lack of comparative data. Across the board, leaders in the education sector from K-12 to postsecondary are operating without enough reliable data to assess student academic progress.

"Educators are concerned about the amount of learning lost and are making attempts to help students through various strategies that are focused on academic recovery. However, a valid and reliable system is needed to measure the downstream economic cost of lost learning and long-term strategies for mitigating those losses over time.

Course grades, another traditional measurement of student performance, have also declined across all student groups. During the pandemic the most disadvantaged students have fallen the furthest behind, which only widens the existing academic achievement gaps.[iii] Educators are concerned about the amount of learning lost and are making attempts to help students through various strategies that are focused on academic recovery. However, a valid and reliable system is needed to measure the downstream economic cost of lost learning and long-term strategies for mitigating those losses over time.

Academic and Economic Losses Put Employers and Everyone at Risk

For a variety of reasons during the pandemic, employers in many sectors are struggling to find workers with the right talent and skills necessary for success today and in the jobs of the future. The United States Chamber of Commerce is concerned that recent graduates are unprepared to succeed in the workforce, especially post-pandemic, as students have lost subject matter content and have spent less time in classrooms developing critical "soft skills" that employers increasingly need.[iv]

While post-pandemic academic recovery efforts are focused on getting students back on track in school, they are not designed or focused on mitigating the future workforce problem facing employers. Before the pandemic, many employers were already concerned that academic degrees were not strong predictors of employee performance and productivity. Degrees were beginning to be seen as somewhat of an arbitrary requirement to employment for many reasons. In fact, some major employers are no longer requiring four-year degrees but looking for certain skill sets or competencies when hiring.[v] The pandemic has only accelerated this belief and concern among employers. Learners are also increasingly questioning the return on investment of four-year degrees, as evidenced by college enrollment continuing to decline in the United States.[vi]

Faced with the need to hire workers to produce and provide essential goods and services to the nation and its people, large employers will likely continue to adapt their hiring strategies and practices to meet market demands and fulfill their fiduciary duty to shareholders. A much broader and cohesive recovery strategy, guided by valid and reliable data tied to an economic north star and maintaining the value of degrees and certificates in the employment sector, is also needed to address the nation's looming economic crisis.

A Shared Sense of Urgency

Recovering the amount of educational and economic productivity lost prior to and during the pandemic presents a common challenge facing educators, employers, workforce boards and economists alike. With the nation's economic future and national security hanging in the balance, pressure is mounting on leaders in these sectors to identify long-term solutions. Everyone will benefit if all stakeholders work together on a comprehensive solution to improve the economic mobility of all Americans.

> Known as educational productivity, this new concept focuses on the correlation between what an individual has learned, their productive potential in the workforce, and the economic value of what they know and how it can contribute to the economy.

The urgency to develop solutions creates an unprecedented opportunity for all sectors to collaborate on connecting learning and the economy in new and more productive ways. Most importantly, this collaboration can lead to a new architecture, threading the needle between what an individual learns and how that knowledge translates into economic value, signaled by the individual to the employer and the employer to the individual. The result increases earning potential for the individual and growth for the economy. Known as educational productivity, this new concept focuses on the correlation between what an individual has learned, their productive potential in the workforce and the economic value of what they know and how it can contribute to the economy.

America's employers and innovators are in a strong position to partner on the development of this new architecture. The economic fate of millions of young people who are currently in school today will be largely determined by how and who these employers will be hiring in the future, and which educational institutions can meet the needs of these learners.

A New Architecture for Economic Prosperity

The time is ripe for developing a new architecture as advances in data availability and analytics enable us to learn much more about the productive value of educational attainments and learning for all. For decades, ERP has used data, and most recently, data science and predictive analytics, to identify educational best practices. We started the process of developing a new architecture by convening a group of national thought leaders on this topic. Participants representing stakeholders ranging from early childhood, education, employers, economics, workforce systems and policy influencers met in Sacramento in October 2021 to begin sharing information and brainstorming. The following are major themes that emerged from the meeting:

- There is a need to develop a common language among learning, employment and economics.
- The current system design is not serving the best interest of most individuals or the nation. It does not reliably measure the productive potential of all individuals.
- Educational institutions at all levels are facing too many challenges and obstacles.
- There can be economic value in all forms of education (college, career technical education and skills-based training, etc.). All of them should be part of the new architecture.
- The urgent need for long-term solutions to the pandemic and the historical economic inequality preceding it, presents an opportunity for educators, employers and economists to finally come together around the development of common metrics that align to an economic north star.

Similar to how the nation's Social Security system was created as part of the New Deal, employers, educators, workforce boards, economists and other stakeholders have an opportunity to work together and develop a new architecture focused on educational productivity. Such a system would advance individuals' productive potential based on what they have learned and the economic value of that learning. However, separate from an academic degree, certificate or credential, the goal of this new system is to enable every American to reach their productive potential at every stage of life by making sufficient public investments, with evidence-based practices and appropriate accountability, to produce opportunity and upward mobility for all individuals and maximum economic productivity for the U.S. overall. Moreover, this system is focused on translating learning into earnings, as learning at all stages in life determines lifetime productive potential and earnings for individuals — and productivity of the U.S. economy. Meanwhile, educational losses at all stages of life reduce individual earnings and regional and aggregate economic productivity and output.

How an Educational Productivity System Is New, Different and Would Co-Exist with Our Traditional Systems

Traditional Education System:

Schooling, and its associated performance metrics determined by standardized tests and grades, are designed for measuring and tracking academic progress and achievement toward completion of high school and/or a postsecondary degree, credential, certificate or other award. These are valuable metrics for helping educators assess students' academic performance and needed interventions as they work toward completion in an academic trajectory. However, these academic performance metrics are not designed to predict performance or productivity in the workforce. Nor should they, as educational institutions were not designed to prepare workers for employment; they are designed to help students develop as humans and learn fundamentals for the betterment of society. In our traditional system, employers do not play a great role in developing the academic curriculum. The curriculum is designed and implemented by, educators and academic professionals in alignment with standards for measuring academic progress and human development.

Educational Productivity System:

The educational productivity system will co-exist and partner, not compete with, the traditional education system. It seeks to derive meaning from academic performance and other related data on learning through the lens of how these sources can contribute to the development of valid and reliable predictors of workplace effectiveness, productivity, and overall economic value. In an educational productivity system:

- Employers, workforce systems and economists will play a greater role at all stages to identify, define and quantify more accurately the relationship between learning, workforce preparation and economics.
- Productive potential of students is understood, captured, measured and taxonomized to determine relationship to economic value.
- Learning will be translated into economic value terms. In the later stages of system development this information may eventually be communicated to both the learner and employers, so that bilateral signals can be exchanged between the two more effectively than resumes, degrees or certificates.
- The end goal is more opportunity, economic mobility and a more productive economy for all.

To be clear, nothing proposed here undercuts the broader value of education. The human value of education must continue being the primary

objective of educational institutions as it improves an individual's awareness and understanding of the physical and social worlds around us and broadens and deepens our appreciation of humanities, the arts and diversity of thought. Education is fundamental in strengthening our civic virtues and exposing us to diverse populations, cultures and thinking. ERP would oppose any attempts to reduce education to only its economic and vocational dimensions. We believe that cultivating the appreciation for life-long learning will uniquely position everyone to adjust to economic fluctuations and allow for better understanding of the world regardless of educational attainment. We merely propose a new architecture that uses available data to determine the economic value of learning at all stages of life to better inform policy, practice and public awareness.

How Would a System Architected for Educational Productivity Work?

The first stage of the new system development would initially focus on identifying valid and reliable metrics to measure educational productivity at an individual and macro level. The new system would pull from existing information and data sources to:

- Identify the most relevant points in every person's life-cycle: 0-3, pre-K, elementary and secondary, postsecondary/higher education, lifelong learning and career.
- Measure broad economic value of learning at each point in the life-cycle (and their cumulative effects) — for each individual and for their contribution to the U.S. economy.
- Measure value of economic losses — for individual and the U.S. economy — whenever a student falls behind in learning or drops out of school at each point in life or becomes justice-involved.
- Inform the development of strategies to mitigate losses to both educational and economic potential.

The desired results are better opportunity, less inequality, more economic mobility for all and a more productive economy. While initially the focus would be on the identification and development of educational productivity metrics, this work can evolve over time into a new system that employers and individuals could use to two-way signal the economic value of what they know and how much they can earn in the employment sector.

Challenges to Address

One major challenge that needs addressing is that at present, we have limited ability to measure the economic value of learning. Currently, degrees, credentials, licenses and certificates are the signals derived from education that employers use to correlate what individuals know and can do. Over time, better information and signals about what individuals know can enable employers to rely less on degrees and more on actual competencies — thus lowering economic inequality between college graduates and everyone else. Individuals can also be empowered by better understanding their own skills/aptitudes and the potential economic value to them of various secondary and postsecondary options.

The measures of foundational learning on many dimensions, including social-emotional skills, critical thinking and occupational tasks can be improved. Existing measures (like grades, test scores and credentials) do so imperfectly and lead to unnecessary inequality. Determining the economic value of such learning would require additional data that link learning measures to productivity and earnings. If such data existed, we would be able to better correlate the relationship between learning, workforce preparedness and economic productivity to determine what individuals can do to improve their economic mobility. The good news is advances in data availability and data science will enable us to make progress on this front as we work on the new architecture.

> The good news is advances in data availability and data science will enable us to make progress on this front as we work on the new architecture.

As this is developed, the focus should be on better individual information and individual empowerment. Individuals should be able to match their learning options and choices available to them with the opportunities best suited to their interests and which can help them achieve upward mobility. Such an approach would result in less inequality as there would be multiple paths available to help an individual connect their learning directly to a high-wage job.

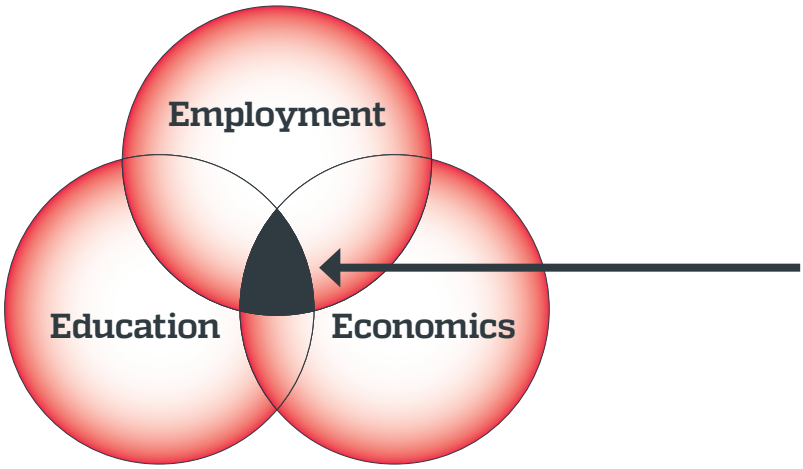
Actionable Next Steps

The first step is facilitating a common language and metrics from data sources of overlapping interest to educational institutions, employers and economists (see diagram). There is little direct connection between what an individual learns and employers in search of that knowledge and the micro and macro-economic value of connecting these two. Learners need the ability to better signal to employers what they know and can do, and employers need more valid and reliable signals from potential employees than what can be communicated in a resume, degree or certificate.

> The first step is facilitating a common language and metrics from data sources of overlapping interest to educational institutions, employers, and economists (see diagram).

Once overlapping data sources of interest to all three sectors and a common language have been developed, appropriate content experts will be convened to identify and develop a set of valid and reliable output metrics that align to workplace productivity and economic value and impact. Using data and predictive analytics, we can map skills and identify what type of learning is most related to downstream economic value and to which occupations/jobs/sectors that learning is most applicable.

A starting point in the development of educational productivity metrics will be to evaluate from an economic value perspective, the existing research on the value of early childhood experiences (0-3), Pre-K (Bartik),[vii] educational interventions and training programs (e.g., Head Start, Success for All, Career Academies, etc.), high school completion/dropout prevention (Levin, Rouse),[viii] certificates and degrees (2-year, 4-year, graduate) in different fields (Baum and Holzer),[ix,x] and



Educational Productivity Metrics/Common Language

industry recognized credentials issued by the U.S. Department of Labor through registered Apprenticeship programs and third-party certifications of value. Measuring the impact of new pathway models such as early college high schools and innovative platforms like Unmudl Skills-to-Jobs Marketplace (unmudl.com), which is connecting learners and employment and promoting lifelong learning; and creating economic value metrics for work-based learning, paid apprenticeships and internships, are also practical steps. Finally, utilizing knowledge gathered from centralized data compiling efforts such as the work being done by the Open Skills Network to create a national open skills infrastructure would yield valuable information.

Learning and skills should be developmentally appropriate. In younger individuals, learning is general as more solid foundational skills are developed. In older individuals, learning is more specific and tailored to have value in more specific types of occupations and industries. Employer demand and value of specific skills may vary over time and across regions in a dynamic economy. However, ensuring individuals have solid foundational skills will enable individuals to adapt to changes with newer learning. Short-term and long-term alignment metrics between education and economy are needed for individual and overall economic success, and to measure the cumulative economic value of such learning.

Potential Educational Productivity Metrics

Input (Data)	Output (Signals)	Economic Impact (Macro and Individual)
Birth/pediatrics/early-life brain development (neurons matter)	Early verbal and social and emotional skills	Economic value to be evaluated and determined
Early childhood learning	Process, numerical, verbal and social and emotional skills	Economic value to be evaluated and determined
Primary learning	Critical thinking, problem-solving, communication process, reading, math and social and emotional skills at each grade	Economic value to be evaluated and determined
Secondary learning	Critical thinking, problem-solving, communication, process, English/math and social and emotional skills, plus other fields (science, history); high school completion; choice of appropriate pathways (academic only versus CTE)	Economic value of high school completion versus dropping out; the economic value of general and specific skills, including CTE to be evaluated and determined
Postsecondary learning	General and specific skills attained; credits earned and credentials attained	Economic value of credits/credentials and general/specific skills learned to be evaluated and determined
Learning associated with out-of-school experiences (internships, apprenticeships, on-the-job training) — can be lifelong	Skills attained; credentials earned	Economic value of internships and apprenticeships, based on skills attained and credentials earned

Conclusion

Educators, employers, workforce systems, economists and other stakeholders have an opportunity to collaborate in new and different ways to aid educational and economic recovery from the pandemic and improve the lives of all Americans. The development of a new architecture and metrics for educational productivity can lead to defining the value of learning in economic terms that individuals can understand and use to promote their own economic mobility. It could have potential to create an entirely new and supportive parallel system that could better match individuals and what they know with what employers need through the development of more valid and reliable metrics and signals. Greater collaboration, productivity and efficiency in promoting economic mobility for individuals and a stronger workforce for employers, will lead to maximum economic prosperity for all Americans, greater economic competitiveness in the world and national security.

“The development of a new architecture and metrics for educational productivity can lead to defining the value of learning in economic terms that individuals can understand and use to promote their own economic mobility.

Endnotes

[i] Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2021, July 27). *COVID-19 and education: The lingering effects of unfinished learning*. McKinsey & Company. https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-the-lingering-effects-of-unfinished-learning

[ii] Auguste, B. G., Hancock, B., & Laboissiere, M. (2009, June 1). *The economic cost of the US education gap*. McKinsey & Company. https://www.mckinsey.com/industries/education/our-insights/the-economic-cost-of-the-us-education-gap?cid=eml-web

[iii] United States Department of Education Office for Civil Rights. (2021, June). *Education in a Pandemic: The Disparate Impacts of COVID-19 on America's Students*. https://www2.ed.gov/about/offices/list/ocr/docs/20210608-impacts-of-covid19.pdf

[iv] Oldham, C. (2021, May 3). *Learning Loss and the Soft Skills Sacrifice*. U.S. Chamber of Commerce Foundation. https://www.uschamberfoundation.org/blog/post/learning-loss-and-soft-skills-sacrifice

[v] Carapezza, K. (2021, April 29). *No College, No Problem. Some Employers Drop Degree Requirements To Diversify Staffs. National Public Radio*. https://www.npr.org/2021/04/29/990274681/no-college-no-problem-some-employers-drop-degree-requirements-to-diversify-staff

[vi] Nadworny, E. (2022, January 13). *More than 1 million fewer students are in college. Here's how that impacts the economy*. National Public Radio. https://www.npr.org/2022/01/13/1072529477/more-than-1-million-fewer-students-are-in-college-the-lowest-enrollment-numbers

[vii] Bartik, T. J., & Borst, S. K. (2014). *From Preschool to Prosperity: The Economic Payoff to Early Childhood Education (We Focus)*. W.E. Upjohn Institute. https://doi.org/10.17848/9780880994835

[viii] Levin, H. M. (1972, February). *The Costs to the Nation of Inadequate Education. A Report Prepared for the Select Committee on Equal Educational Opportunity of the United States Senate*. (No. ED064437). Congress of the U.S., Washington, DC. Senate Select Committee on Equal Educational Opportunity. https://eric.ed.gov/?id=ED064437

[ix] Baum, S., Holzer, H., & Luetmer, G. (2020, December). *Should the Federal Government Fund Short-Term Postsecondary Certificate Programs?* Urban Institute. https://www.urban.org/research/publication/should-federal-government-fund-short-term-postsecondary-certificate-programs

[x] Holzer, H. J., & Baum, S. (2017). *Making College Work: Pathways to Success for Disadvantaged Students* (Illustrated ed.). Brookings Institution Press.

ERP INSTITUTE

edresults.org/institute