Why Business Should
Support Early Childhood Education

Ready, Set, GO!

THE SPIRIT OF ENTERPRISE
U.S. CHAMBER OF COMMERCE

ICW
INSTITUTE FOR A COMPETITIVE WORKFORCE

MISSION

The Institute for a Competitive Workforce (ICW) is the non-profit, non-partisan, 501(c)3 affiliate of the U.S. Chamber of Commerce. ICW promotes the rigorous educational standards and effective job training systems needed to preserve the strength of America's greatest economic resource, its workforce. Through its events, publications, and policy initiatives—and drawing upon the Chamber's extensive network of 3 million members—ICW connects the best minds in American business with the most innovative thinkers in American education, helping them work together to ensure the nation's continued prosperity.

The U.S. Chamber of Commerce is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations.

Why Business Should Support Early Childhood Education

Since the end of the Sputnik era, our nation has lacked the urgency to make education a national priority—until now. Global competition for human talent and innovation, long-standing educational achievement gaps, low high school graduation rates, and the pending retirement of 77 million baby boomers have placed tremendous workforce pressures on American business. These pressures, if not checked, will jeopardize our national economic security and the viability of the American dream.

Because the business community understands the importance of having a world-class education system, the mission of the U.S. Chamber of Commerce's Institute for a Competitive Workforce (ICW) is to promote high educational standards and effective workforce training. Achieving a world-class system, however, begins with high-quality early learning opportunities for children from birth to age five. As a result, ICW has expanded its agenda with the launch of the Early Childhood Education Initiative.

The Early Childhood Education Initiative

Early childhood education has emerged as a critical issue for many Chamber members, with a growing number actively supporting early learning initiatives in their states. The Early Childhood Education Initiative will focus on early learning as an investment in workforce development. ICW, uniquely positioned to leverage the U.S. Chamber's business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations, received financial support from The Pew Charitable Trusts, PNC Bank, and Knowledge Universe for this initiative.

The Early Childhood Education Initiative focuses on early learning as an investment in workforce development by:

- Helping drive the national debate about early childhood education policies and programs.
- Providing information to the business community at the local, state, and national levels so that it can actively engage in advancing policies that support high-quality early childhood education programs.
- Developing an early childhood education business network to exchange best practices on policies, programs, and partnerships.

To initiate change, this multiyear effort will focus on policies that support high-quality, evidence-based early learning programs. Specifically, the initiative will:

- Collaborate with state and local chambers that are active or are interested in becoming active in the early childhood education arena.
- Identify model programs and public-private partnerships at the state and local levels.
- Develop an early learning tool kit for business leaders to help guide activities and communication.
- Identify and train business leaders that want to become active in the early childhood education arena.

Defining Early Childhood Education

Early childhood education is the healthy development and education of children from birth to age five. Environments and experiences in these early years are the most influential in the development of a child's brain. High-quality early childhood education programs should promote the whole child, paying equal attention to his or her cognitive (academic), social, and emotional development. According to Harvard University's Center on the Developing Child, effective programs employ highly skilled staff, maintain small class sizes and high adult-to-child ratios, utilize a language-rich environment, provide age-appropriate curricula and stimulating materials, provide a safe physical setting for children, nurture positive and warm staff-to-child interactions and relationships, and experience high and consistent levels of child participation.[1]

Early childhood education also recognizes that a child's first teachers are his or her parents. Comprehensive programs typically designed for low-income children often encompass strategies and family supports that

seek to maximize early learning, including a parent-as-partner philosophy, home visits, parent education programs, and health and developmental screenings. High-quality programs also work collaboratively with community organizations and social service agencies, as well as other service providers, to promote the healthy development of young children.

For the purposes of this report, "early childhood education" and "early learning" are synonymous and refer to programs serving children age five and younger. The term "early care" refers to programs for infants and toddlers, from birth to age two.

Prekindergarten (pre–K) programs are one component of the early learning spectrum that has received significant policy attention in recent years, with a number of states expanding access to state-funded pre–K programs. State-funded pre–K programs typically invest public funds in programs that provide three- and four-year-old children with the academic, social, and emotional skills necessary to succeed in kindergarten and beyond. While some organizations and state policies use the term "preschool" as a synonym for pre–K programs, others use preschool as a generic term to describe a variety of programs for children before they begin kindergarten regardless of their age.

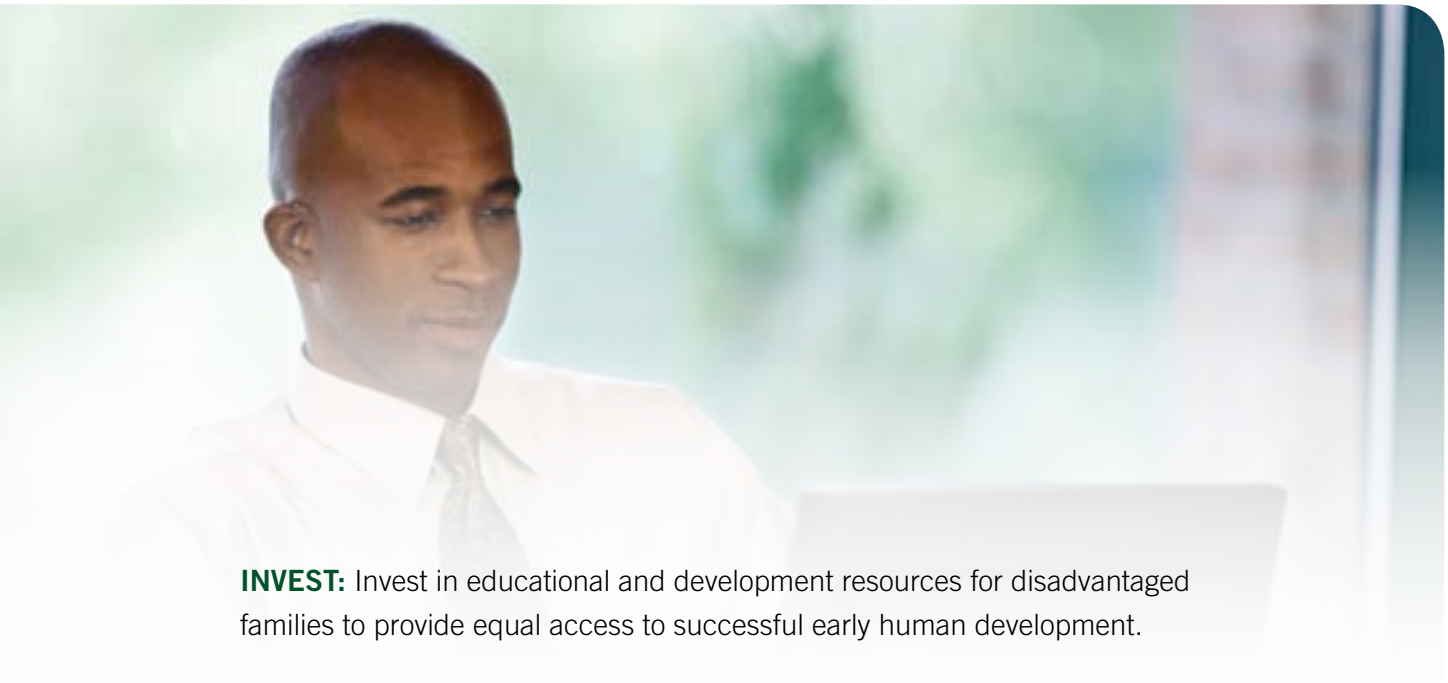
Early childhood education programs vary widely. Questions about how these programs are funded and who is eligible for them are explored in the Early Childhood Education Landscape section on page 12.

The Rationale

ICW firmly believes that investments in high-quality early learning programs for children from birth to age five yield high returns. In fact, research shows that for every dollar invested today, savings range from $2.50 to as much as $17 in the years ahead.

Arthur J. Rolnick, then-senior vice president of the Federal Reserve Bank of Minneapolis, and Robert Grunewald, associate economist, calculated an annual, inflation-adjusted rate of return of 16% for high-quality prekindergarten for disadvantaged three- and four- year olds.[2] These returns are based on long-term educational, social, and economic benefits, including increased earnings and tax revenues and decreased use of welfare and other social services, resulting in lower expenses for states and communities.

James Heckman is the Henry Schultz distinguished service professor of economics at the University of Chicago, a winner of the Nobel Prize in Economic Sciences, and an expert in the economics of human development. His groundbreaking work with a consortium of economists, developmental psychologists, sociologists, statisticians, and neuroscientists has proved that the quality of early childhood development heavily influences health, economic, and social outcomes for individuals and society at large. Heckman has proved that great economic gains can be had by investing in early childhood development for disadvantaged children. As a result of his research, he has developed a formula known as the Heckman Equation.



INVEST: Invest in educational and development resources for disadvantaged families to provide equal access to successful early human development.

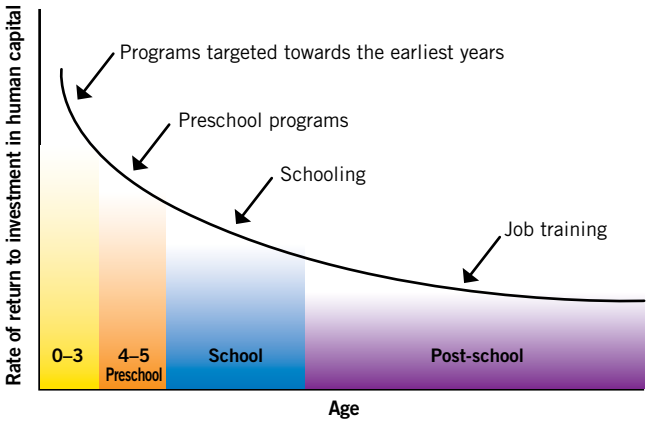
DEVELOP: Nurture early development of cognitive and social skills in children from birth to age five.

SUSTAIN: Sustain early development with effective education through to adulthood.

GAIN: Gain a more capable, productive, and valuable workforce that pays dividends to America for generations to come.

Dr. Heckman's research on the rates of return to human capital investment at different ages clearly shows that the earlier the intervention occurs, the greater its payoff. Investments made from birth to age five yield the highest return. The later the investments are made, the lower the return on investment.

Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages



The Rationale

Additionally, research tells us the following:

- **The first five years are the most critical in the development of a child's brain.** During these early years, children begin to develop their cognitive, social, emotional, and language skills and start to relate to and interact with the world around them. In fact, from birth to age three, children grow and learn at the most intense rate; these are the years when children are learning how to learn. The first five years represent the pivotal juncture of nurture and nature and how they shape the development of young minds. Heckman's research demonstrates that investments made in these early years yield the highest rates of return to society.

- **Achievement gaps develop well before children begin kindergarten.** Because school readiness and language development are key predictors of a child's academic success, they are the focus of early childhood education programs. Unfortunately, many children who do not participate in high-quality pre–K or early childhood programs are in general not fully prepared to begin school. In the United States, those most likely to begin kindergarten at an academic disadvantage are low-income and minority children. Research also tells us that students who begin school behind have a tendency to remain behind throughout their academic careers.

- **High-quality pre–K programs for three- and four-year-olds can have a significant impact on all children, but especially those from low-income families.** Research shows that quality early education programs have positive impacts on all children's cognitive and language development,

regardless of income level or program setting. For example, a study of the current pre–K program in Tulsa, Oklahoma found that children from families earning more than 185% of the federal poverty level made significant gains in early literacy skills.[3] This is important because middle-income children also experience educational challenges—during the 2005–2006 school year, more than half of all dropouts were from middle-income families, and 10% of all middle-income children age 16 to 19 have been retained in grade at least once.[4]

While pre–K for all may have the greatest total impact, the largest per-child impact is clearly on disadvantaged children. Longitudinal research on low-income children in high-quality pre–K programs also indicates that these children, compared with their peers who did not participate, exhibit stronger early reading and math skills and show significant gains in social and emotional skills, reduced grade retention, reduced placement in special education, increased likelihood of being in school at age 21, and increased likelihood of attending a four-year university.

- **Meaningful investments in quality early learning programs for younger children have lasting effects that can reduce costs later in life while enhancing economic growth.** Interventions early in life have a higher rate of return than later interventions. Longitudinal research has shown gains among program participants so significant that they have resulted in positive outcomes through adulthood. Specifically, program participants were less likely to be involved in criminal activity or be arrested; less likely to rely on social services such as welfare; less likely to have children out of wedlock; and more likely than nonparticipants to earn more, own a home, or own a second car.

- **A high-quality early childhood education can help break the cycle of poverty.** Early environments (i.e., cognitive and noncognitive stimulation) are a powerful predictor of success in adulthood. A wealth of brain research concludes that early experiences have a profound impact on cognitive, social, and emotional development. Providing young children with a strong start early on can help counteract disadvantaged environments.

The Early Childhood Education Landscape

The early learning landscape is complex. It involves a mix of public and private funding streams, a variety of program settings and requirements, and different eligible populations. In addition, it has grown more important as the proportion of children in families with both parents working has increased.

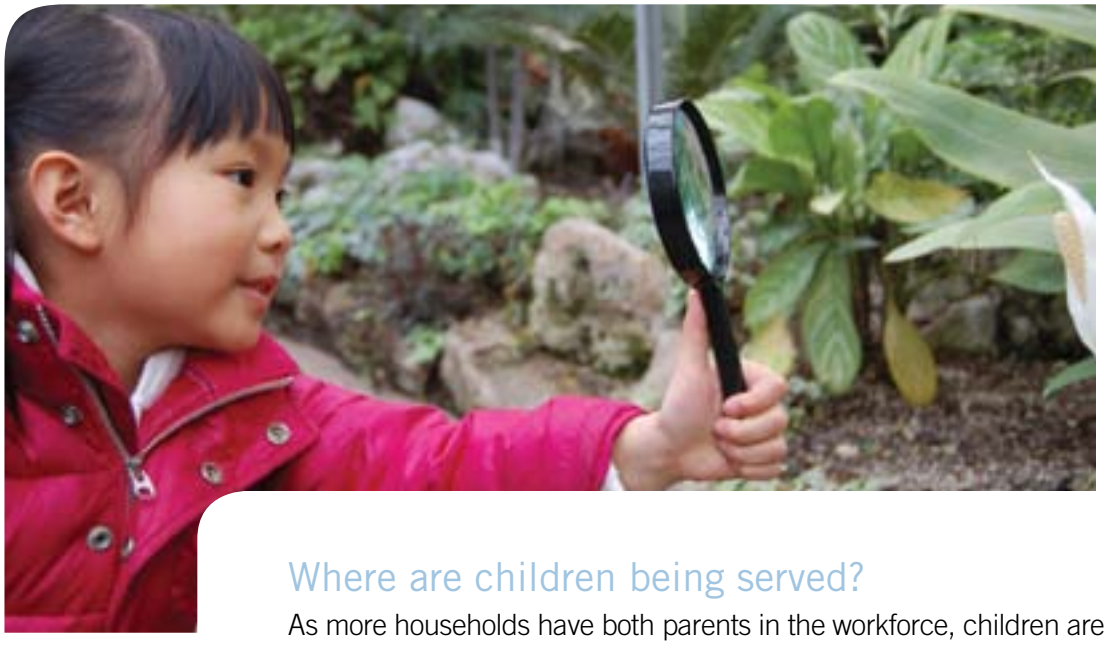
Participation in Out-of-Home Programs

The Shriver report[5] shed new light on the composition of the current workforce. The percentage of women in the workforce is nearing 50% and continues to grow. As women's labor force participation rates have increased, so has children's participation in out-of-home programs. Despite this trend, parental access to full-day, full-year programs is often a challenge, and not all programs provide a high-quality child development and early learning experience. Program quality and availability varies widely within each type of setting as well as across settings.

Today, there are approximately 20.3 million[6] children under age five across America, 45% of whom are minorities[7] and 21% of whom live below the poverty line.[8] Nearly 12 million are in some form of out-of-home care while their parents are at work, spending on average 36 hours per week in the care of someone other than a parent.[9] More than 1 million of these children are three- or four-year-olds who are enrolled in state-funded pre–K programs, or federal Head Start or special education programs.

Among families with children age six or younger, 77% have a parent who is in the labor force.[10] Nationally, about three-quarters of children from upper income families—but only half of children from low-income families—are enrolled in public or private pre–K.[11] Middle-income families are increasingly being squeezed by the cost of early education; the average family of four with two young children spends 29% of its monthly income on early education and care.[12]

The Early Childhood Education Landscape



Where are children being served?

As more households have both parents in the workforce, children are in out-of-home settings in large numbers. Programs are offered in a variety of settings, such as family child care homes, child care and early learning centers, and public schools. Children are often in multiple settings, depending on their ages and the needs of their parents, especially those who work and need safe, reliable, and stimulating experiences for their young children throughout the workday and work year. For example, a four-year-old may go to a pre–K program at a public school for 2.5 hours and spend the remainder of the day at home or in a program offered at a child care center. The combination of ages, schedules, public and private programs, and individual family needs can make the possibilities appear endless.

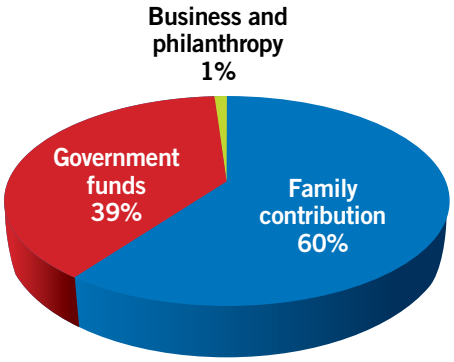
How are these programs funded?

For early childhood education as a whole, parents pay the bulk of the costs; however, a mix of federal and state funding is available to provide additional support for some eligible families. Programs that provide services are often supported through multiple funding streams that can include federal, state, and local public funds as well as private funds. Federal funds come primarily through the U.S. Department of Health and Human Services and include the Child Care Development Block Grant (CCDBG), Temporary Assistance for Needy Families (TANF), Head Start, and Early Head Start. Other funds

are provided through the U.S. Department of Education, including Title I of the Elementary and Secondary Education Act and the Individuals with Disabilities Education Act. Children enrolled in programs may be supported by multiple sources of funding, depending on their parents' income and employment status.

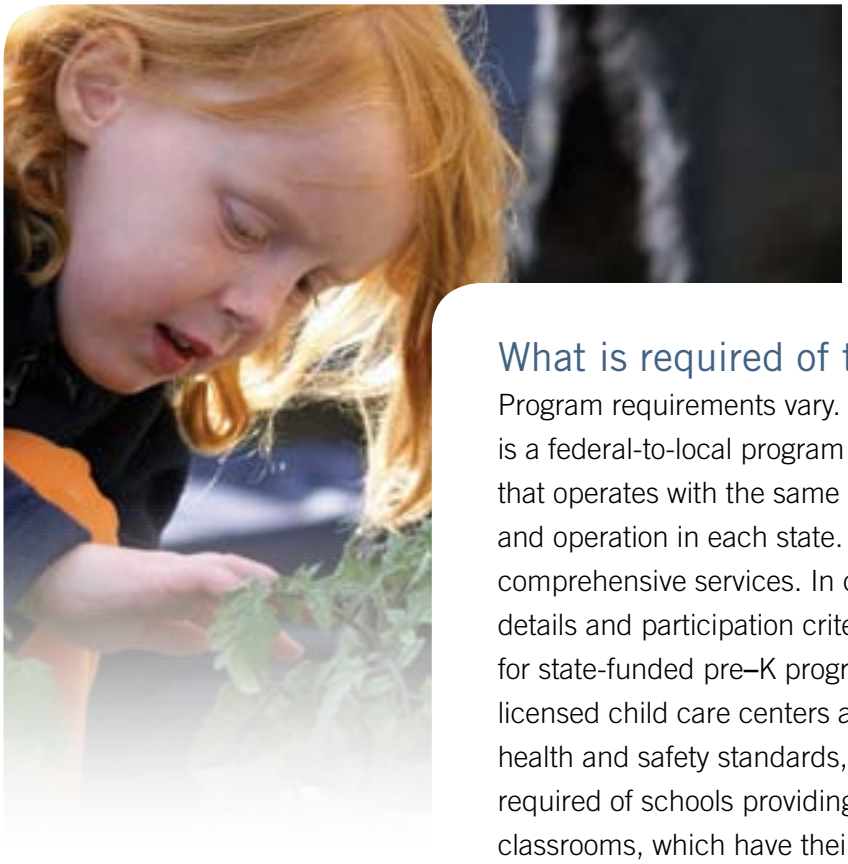
States provide matching amounts for federal child care funding, and 40 states have invested in state-funded pre–K programs. Financing for state pre–K initiatives can come from various sources, including the state's K–12 funding formula, general revenue, lottery or gaming funds, or tobacco or other "sin" tax dollars.[13] In recent years, states have significantly increased pre–K funding and the number of children being served.[14]

Nationally, families pay 60% of early care and learning costs for children under age five. Local, state, and federal governments pay 39% of the costs, while the private sector (businesses and philanthropies) pays the remaining 1%.[15]



Sources of early care and learning costs as percentages

The Early Childhood Education Landscape



What is required of the programs?

Program requirements vary. For instance, Head Start is a federal-to-local program for low-income children that operates with the same criteria for participation and operation in each state. It offers a variety of comprehensive services. In contrast, programmatic details and participation criteria vary from state to state for state-funded pre–K programs. States also require licensed child care centers and homes to meet minimum health and safety standards, which typically are not required of schools providing state-funded pre–K in their classrooms, which have their own regulations.

Program quality can vary widely across these sectors. High-quality early childhood education can be found in child care centers, family child care homes, Head Start programs, and public pre–K classrooms. Sadly, poor quality education exists in each of the programs as well. To encourage providers to offer the highest quality programs, nearly half of the states have begun to develop or implement Quality Rating and Improvement Systems (QRIS) that distinguish between providers who have met different quality standards, communicate these ratings to parents, and in the best cases provide supports for programs to reach and maintain high-quality levels. However, not all QRIS includes family child care, and most do not rate public school pre–K programs or Head Start grantees.

Who is eligible for these programs?

All programs are voluntary. Eight states (Florida, Georgia, Illinois, Iowa, Louisiana, Oklahoma, New York, and West Virginia) plus Washington, D.C., have committed to pre–K for all children. Some of the states have not yet put full funding in place, and initial resources generally target at-risk children. Thirty-two states offer pre–K only to at-risk children, using eligibility criteria such as parental income, homelessness or being an English language learner. Ten states do not provide state funding for pre–K.

All of the federal programs have eligibility requirements tied to income. Other programs may have additional requirements; for example, CCDBG and TANF require parents to be working or in an approved school or training program in order for their children to be eligible. Other factors may be taken into consideration for eligibility, such as a child's welfare status (e.g., foster care) or a parent's employment in the military or a first responder occupation (e.g., police or fire) for state-funded pre–K programs.

Promising Practices

Despite these complexities, early childhood education offers great promise and may be a rewarding area of influence for the business community. Every sector of society has a stake in the future of children and should be active partners in their success. To make critical improvements to our educational infrastructure, business must lend its experience and expertise—not just its money and goodwill. Several states, in collaboration with local and state chambers of commerce and businesses, have made great accomplishments.

Virginia

The Greater Richmond Chamber of Commerce is a pre–K leader. Businesses, policymakers, health and human services agencies, communities at large, and child advocates have been working together to promote quality early childhood development programs, both public and private. Regarding early childhood education as an economic security and workforce development issue, business leaders from Chesterfield, Hanover, Henrico, and Richmond work in partnership with Success By 6, a United Way early learning initiative, to achieve five goals:

- Increase Virginia's financial investments in the Virginia Preschool Initiative, Healthy Families, and the Children's Health Involving Parents of Virginia program.
- Invest in early childhood education programs by influencing policy, promoting the benefits of participation in preschool programs, or contributing money.
- Invest in the child care industry and provide incentives to create and improve quality child care programs.
- Support child care workforce development by investing in scholarships and provide incentives for child care workers to upgrade their education and reduce turnover through salary increases.
- Understand the child care needs of employees, including the availability and affordability of child care and how child care affects employees and the workplace.[16]

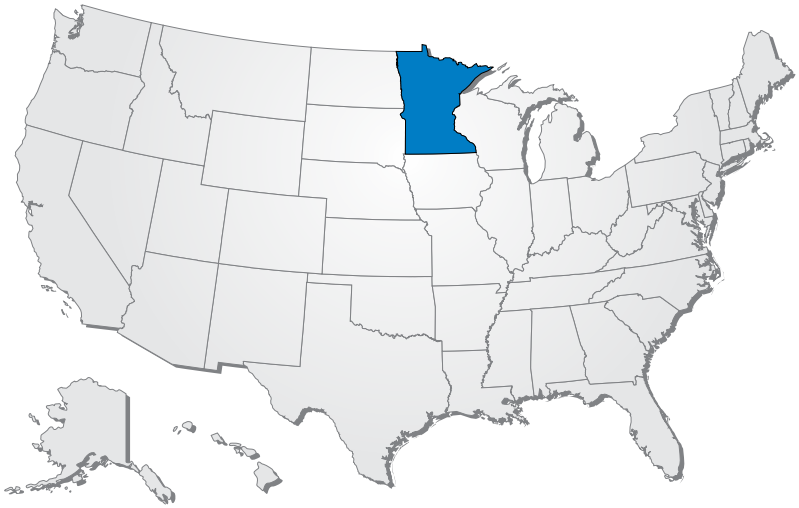
The success of the partnership among these entities has culminated in the development of a rigorous regional plan outlining a comprehensive, high-quality early childhood education system built on best practices and public-private partnerships. This plan provides a template for other chambers interested in mobilizing the business community around preschool.

Promising Practices

North Carolina

North Carolina and its business community have a history of strong support for pre–K programs. In 1993, Gov. Jim Hunt created the Division of Child Development to manage and coordinate North Carolina's early childhood education and child care services. Smart Start, a public-private early childhood education initiative begun in 1993, provides early childhood funding to programs in each of the state's counties. With significant annual state and private contributions, the initiative has grown into a nationally recognized model noted for its sustainability, quality, structure, and breadth.[17] Smart Start funds are distributed through local partnerships and are used to improve quality and expand access and services for children from birth to age five and their families.

Hunt's successor, Gov. Mike Easley, initiated More at Four in 2001, a pre–K program funded by the state's lottery. Together, More at Four and Smart Start serve a large number of the state's disadvantaged four-year-olds. Because early childhood education is such a critical issue for the state, local chambers have joined the effort to promote it and garner additional public support. The Durham Chamber of Commerce, for example, has incorporated early childhood education into its economic development agenda.



Minnesota

Minnesota's business community has taken an active lead in the state's investments in early learning. In 2003, business leaders launched Minnesota Business for Early Learning (MnBEL) to raise awareness about early childhood education, to identify and promote best practices in the workplace, and to impact public policy.[18] Today, MnBEL is a 200-member organization composed of high-level business executives from more than 100 companies and organizations across the state. MnBEL also works collaboratively with other business organizations, including the Minnesota Chamber of Commerce and a number of local chambers throughout the greater Minnesota area.

In 2005, MnBEL established the Minnesota Early Learning Foundation (MELF) to explore effective and cost-efficient ways to provide quality early learning services to children and engage families in the process. Based on research findings,[19] MELF launched two initiatives: Innovation Projects and Comprehensive Scalable Community Projects. MELF's standout project is the St. Paul Early Childhood Scholarship Program. This initiative pilots the market-based scholarship model developed by Art Rolnick and Rob Grunewald of the Federal Reserve Bank of Minneapolis in collaboration with the office of the mayor of the city of Saint Paul, the Federal Reserve Bank, and the Minnesota departments of Human Services and Education.[20] The Scholarship Program mentors parents and assists them in selecting high-quality programs for their children and provides two-year scholarships to low-income families of three- to five-year-olds to pay for these programs. As the first pilot of this model, the St. Paul Childhood Scholarship Program has gained national attention.

Promising Practices

California

In 2005, the Los Angeles Area Chamber of Commerce became the first organization to endorse a state ballot initiative to make pre–K programs available to every four-year-old in the state. Although the chamber had previously opposed similar measures and funding mechanisms to support voluntary pre–K programs, its board of directors decided that pre–K programs are a necessary investment in children, the workforce, and the state's education system overall. Although voters failed to pass the 2006 initiative, the Los Angeles chamber's position represented a shift in the business community's support for early learning public policy.

Washington State

The Greater Seattle Chamber of Commerce, with a major commitment to educational excellence, supports the Business Partnership for Early Learning (BPEL). BPEL is a coalition of area business leaders dedicated to closing the school readiness gap by investing in early learning for two- and three-year-olds. The Parent-Child Home Program works with low-income and minority parents and families who do not speak English as their primary language to address school readiness.

The program provides two years of home visits (two visits each week for 23 weeks), provides mentoring and coaching to parents, gives gifts of educational toys and books, and focuses on preliteracy skill development. Plan and Learn Groups, the second component of the BPEL program, offer families the opportunity to participate in informal weekly play-and-learn groups to enhance the development of children's noncognitive skills. Assessment data reveal that families who participate for the full two-year period show positive and significant gains in behaviors that are consistent with long-term outcomes.[21]

Conclusion

Early childhood education is not only a smart investment with positive returns, but it is the right thing to do. Our nation cannot afford the cost of inaction. In decades past, the United States proudly claimed premier international status as home to the best and brightest. Today's U.S. rankings, however, prove that we have a long way to go to reach the top of the list again.

With current early childhood education resource levels, too many kindergarteners will continue to begin school ill-prepared, language skills and achievement scores in math and reading will likely remain at mediocre levels, costs for interventions during the K–12 years and after will continue to rise, high school graduation rates and postsecondary degree completion rates will likely remain unchanged, and businesses will lack the necessary workforce to fill the jobs of the future.

The research is clear. Early learning opportunities for children from birth to age five have great impact on a child's development and build a strong foundation for learning and success later in life. Other countries know what we are just figuring out. High-quality pre–K programs can have a significant short- and long-term impact on children and society. Early learning interventions, followed by other high-quality learning experiences, maximize the benefits of early childhood programs. ICW believes that all children can benefit from early learning. This is why ICW recommends the following:

- Supporting and directing the expansion of high-quality programs to serve young children's development and learning, including state-funded pre–K delivered in a variety of settings such as schools, child care centers and homes, and Head Start agencies, with public funding targeted to low-income children first.
- Hiring qualified and effective early childhood educators with the knowledge and skills necessary to teach young children.
- Developing mixed provider delivery systems that support parental choice and take advantage of public, private, and nonprofit providers and their various settings.

- Integrating early learning and care systems for children from birth to age five.
- Making best use of existing resources by coordinating local, state, and federal efforts.
- Developing seamless transitions from the early childhood education system to the K–12 system to create a continuum of lifelong learning.
- Increasing the availability of high-quality, full-day, and/or year-round programs that support working parents where needed.
- Collecting data and conducting the research needed to identify best practices, assess system performance, and report these results to the general public.

In addition to these eight recommendations, ICW has compiled a list of action items to encourage greater business involvement in early childhood education. These actions outline state- and business-level activities in which business leaders may choose to engage. More information on action items, as well as a summary of the economic evidence behind investments in early childhood education can be found at **www.uschamber.com/icw** or **www.PartnershipforSuccess.org**.

Education in America: The Straight Facts

- There is not a single state where 50% or more of the children are proficient in reading or math. Only one-fifth of low-income and minority fourth and eighth graders are proficient in reading and math.[22]
- Only 70% of ninth graders graduate from high school within four years. Among blacks and Hispanics, this number decreases to just half.[23]
- Out of 30 industrialized nations, U.S. 15-year-olds rank 25th in math and 21st in science.[24]
- Seventy percent of U.S. eighth graders read below a proficient level.[25]
- Twenty percent of U.S. workers are functionally illiterate and innumerate.[26]

For more national statistics and international comparisons, see Appendix B.

Take Action

Six Actions a Businessperson Can Take

1. **Connect with your state early childhood advisory council.** The more you know about the goals and programs in your state, the easier it is for you to be a good partner.
2. **Familiarize yourself with the benefits of high-quality early learning programs.** Understanding the benefits of these programs and telling others about them will help create communities of children who are ready for school.
3. **Visit a high-quality early learning site.** Knowing what a high-quality program looks like and how it runs can help you be a better advocate and understand what it means to give young children a strong start.
4. **Adopt policies in your business that supports working parents.** When possible, implement programs and policies that help your employees become better informed and more engaged in their children's learning and development.
5. **Educate employees on the value of early childhood education.** Whether or not children from birth to age five are at home, they need the social, emotional, cognitive, and physical preparation that will help them be ready for kindergarten.
6. **Convey to policymakers your support for public investment in early education.** As someone who does not have a vested interest in the early childhood education field, business leaders make powerful messengers in support of public investment for effective programs. Communicate the evidence behind early education in a variety of forums—public meetings, personal communications, and through the media.

Six Actions the Business Community Can Take

1. **Support a mixed provider delivery system.** Whether early childhood programs are delivered by public, private, or nonprofit providers, communities should ensure that quality programs are available and convenient for the families who need them.
2. **Encourage early learning system and K–12 alignment.** Too often, children are in programs that do not adequately prepare them for success in kindergarten. Encouraging better alignment between early learning programs and kindergarten will help children learn to the best of their ability.
3. **Promote early learning policies as part of the economic development agenda.** Several studies have shown the return on investment that early learning programs can bring to communities. From the number of people employed to the supports provided to working parents to the long-term benefits for children who attend high-quality programs, early learning policies should be considered with the economic development plans.
4. **Encourage the inclusion of early childhood data in the statewide longitudinal data system.** As a nation, we need more information about which programs work, who benefits, and where we need new and better solutions. Tying early childhood data to statewide longitudinal data systems will help provide the information that policymakers and parents need.
5. **Encourage your state to adopt a Quality Rating Information System (QRIS).** Many states have worked to implement QRIS to distinguish between high-quality programs and programs that need improvement. Rating systems are one way to achieve transparency and accountability so that parents and policymakers know which programs meet quality standards.
6. **Encourage business organizations and networks to adopt a policy position in support of public investments for effective, high quality early education programs.** Many chambers have included such a statement in their public policy agenda. Ensure that your chamber, as well as other business networks such as Rotary, Kiwanis, and others, adopts this priority and follow up with policy makers.

Appendix A

The Critical Research on Early Learning

Over the past four decades, a tremendous library of scientific research on early learning has been assembled. Rigorous longitudinal studies have assessed the effects of high-quality pre–K programs on program participants. These studies identify the short- and long-term individual and societal benefits of quality pre–K programs and have been instrumental in calculating early childhood education return on investments. Additionally, brain research on the development of young children has documented the vast capacity for learning during the early years and underscores the importance of early learning opportunities for school readiness. Following is a review of pertinent brain research, as well as synopses of the three most highly regarded scientific research studies conducted on early learning programs.

Brain Research

Research in neuroscience, molecular biology, genetics, developmental psychology, and child development has taught scientists a great deal about neural circuitry, genetics, and the effects of early experiences on brain architecture. This research also documents the interdependence of cognitive, social, and emotional capacities. James Heckman, Nobel Laureate in Economic Sciences from the University of Chicago, has analyzed and synthesized research findings from well-documented studies conducted on both humans and animals. He concluded that "early learning begets later learning, and skill begets skill." In other words, knowledge and skill build upon themselves; the stronger the foundation, the greater the later attainment. Heckman explained the science behind his conclusions as follows.

Neural circuits, which influence our cognitive capacities, exist in a hierarchy and have sensitive periods during which they are most elastic and responsive to experiences. Lower level circuits, which perform more basic functions, close before higher level circuits and are most sensitive during the early (juvenile) years. Higher level circuits depend on quality information from lower level circuits to perform their tasks. Consequently, there is a progression or ordering of the sensitive periods. As a result, research suggests a causal relationship between early environments and experiences and both cognitive and noncognitive outcomes.

It is through these sensitive periods that neural circuits mature. Experiences during the sensitive periods activate the circuits and have the ability to change their architecture, chemistry, and gene expression and can impact the behaviors they influence. These changes then affect the ways that neural circuits process and respond to information. "Early mastery of a range of cognitive, social, and emotional competencies makes learning at later ages more efficient and therefore easier and more likely to continue."[27]

According to Dr. Jack Shonkoff, professor of child health and development and director of Harvard University's Center on the Developing Child, "Nurturing and responsive interactions build healthy brain architecture that provides a strong foundation for later learning, behavior, and health."[28] Shonkoff further explains that toxic stress, defined as extreme poverty in conjunction with continuous family chaos, physical or emotional abuse, chronic neglect, severe maternal depression, substance abuse, or family or community violence, interferes with the maturation of healthy neural circuits and affects the brain's architecture.[29] This, in turn, affects the brain's stress management systems. Both Heckman and Shonkoff conclude that these "impoverished early environments" have a negative influence on susceptible neural circuits during their sensitive periods and therefore reduce capacity.

Based on scientific research on the formation and development of the brain, Heckman, Shonkoff, and others firmly agree that early childhood education is likely more efficient and less costly than interventions later in life.

Rigorous Research Studies of Prekindergarten Participants

The High/Scope Perry Preschool Program, in operation from 1962 to 1967, provided high-quality pre–K programs to low-income three- and four-year olds in Ypsilanti, Michigan. The program offered 2.5 hours of prekindergarten each weekday for two academic school years, 1.5 hours of weekly home visits, meetings with parents, a small student-to-teacher ratio of 7:1, and high-quality teachers with training in early childhood development and special education.[30] Program participants have been tracked for more than 40 years, and the longitudinal data indicate that the program contributed significantly to their educational performance, economic productivity, and social responsibility.

Appendix A

Compared with a similar group of nonparticipating children who were randomly assigned into the control group, High/Scope Perry participants exhibited these characteristics:

- Higher scores on intelligence and language tests through age seven[31]
- Higher academic achievement scores at age 14[32]
- Fewer overall arrests and fewer drug-related arrests
- Higher monthly earnings
- Greater home ownership
- Greater ownership of a second car
- Less use of welfare assistance or other social services
- Higher graduation or GED attainment rates
- Longer marriages
- Fewer births out of wedlock[33]

The average program cost per participant was $15,166 (in year 2000 dollars), while the individual net benefits have been calculated at $243,722, a benefit-cost ratio of 17:1. The net benefits break down as follows:[34]

- Participants: 25% (primarily in the form of increased earnings)
- General public: 75%
  - Crime savings: 66%
  - Increased tax revenue: 5%
  - Education savings: 3%
  - Welfare savings: 1%

The Chicago Child-Parent Centers (CPC) are federally funded interventions for low-income minority children from high-poverty neighborhoods in Chicago. Created in 1967 and still in existence today, CPC offers a pre–K program, a kindergarten program, and at select sites an early elementary school program up to grade three. The pre–K program provides part-day services to three- and four-year olds for the academic school calendar, focuses on early reading and math skills, maintains a child-teacher ratio of 17:2, employs teachers with a bachelor's degree and certification in early childhood

education, pays teachers the equivalent of K–12 salaries, and makes a parent-resource teacher and school-community representative available at each location to provide referral services to families and conduct home visits.

The Chicago Longitudinal Study, which followed program participants through age 24, found that participants in the pre–K program for three- and four- year olds accomplished the following:

- Achieved higher reading and math scores through grade nine
- Academically outperformed nonparticipants
- Were less likely to be held back in school
- Were less likely to be placed in special education
- Experienced lower rates of official juvenile arrests

The longer a child participated in a CPC program, the greater his or her academic achievement. Children who participated for more than four years "yielded significantly higher math achievement, life skills competence, and lower rates of grade retention and special education placement."[35] The study also shows that male participants benefited in the areas of achievement and educational attainment, while female participants benefited more from participation in follow-on programs in reading and math. Additionally, children in the highest poverty neighborhoods benefited more than children in lower poverty neighborhoods in school achievement and educational attainment.

The benefit-cost ratio of this program was determined to be 7.14:1. The average program cost per participant is $6,692, while the average net benefit to participants is calculated at $41,067 (in 1998 dollars). The net benefits break down as follows:[36]

- Participants: 46% (primarily in the form of increased earnings)
- General public: 54%
  - Crime savings: 28%
  - Increased tax revenue: 15%
  - Education savings: 9%
  - Welfare savings: 1.6%

Appendix A

The Carolina Abecedarian Project[37] in Chapel Hill, North Carolina, offered high-quality child care and pre–K programs to low-income children from birth to age five. The program provided full-day (10-hour) services each weekday for 50 weeks a year, instituted a child-teacher ratio of 3:1 for infants and toddlers and 6:1 for pre–K and kindergarten-aged children, focused on language development, and offered medical and nutrition services to participants.[38] The study found that students in the program age 18 months through program completion scored significantly higher on intelligence tests than children who did not receive this care. Program participants were followed through age 21. Major findings include higher reading and math scores, higher intelligence test scores, enhanced language skills, lower grade retention rates, lower special education rates, and higher postsecondary education enrollment rates. Further, program participants were significantly more likely than nonparticipants to still be in school at age 21 (40% and 20%, respectively) and significantly more likely to have ever attended a four-year college (35% and 14%, respectively).[39]

The benefit-cost ratio of this program is calculated to be 2.5:1. The average cost per participant over a five-year period is $65,476, while the average net benefits are calculated at $94,802 (in 2002 dollars). The net benefits break down as follows:[40]

- Participants: 94%
- General public and the government: 6%

Current Studies In addition to these long-term studies, a variety of new reports have found that current state-funded pre–K programs are having an impact. For example, an evaluation of the New Mexico program from 2006 to 2008 found significant benefits in the areas of early language literacy, and math, with an estimated $5 return in New Mexico for every dollar invested by the state—an 18% return.[41] A study of New Jersey's Abbott Preschool Program found significant academic gains, as well as a 30% less grade retention in first grade among children who attended one year and up to 50% less for those who attended at both ages 3 and 4.[42]

Addressing the Critics

Although the research on these long-term studies is thorough, some critics question its applicability to current publicly funded programs or the ability to replicate results given current levels of funding. The Perry, Abecedarian, and CPC programs are known for being programs of the highest quality. They were well funded, employed highly credentialed and well-compensated teachers, maintained small student-teacher ratios, established meaningful relationships with parents, and provided health services and other supports to families.

While today's high-quality programs may not have the resources afforded to the Perry, Abecedarian, and CPC programs, many highly effective pre–K programs are positively impacting students today. Many serve as models and are being replicated or scaled up. There is growing evidence that state-funded programs are producing results. Although it will take time to ensure that every program is of the highest quality, there is no reason to lower our pre–K program expectations.

Some critics are also skeptical of the benefits of pre–K because of a misconception that some academic gains fade-out by third grade. What is actually happening in these studies is not that children are losing their skills, but that some children who didn't go to pre–K appear to catch up in terms of knowledge that can be measured. This may be due to those children receiving intensive (and expensive) remedial programs. On the other hand, the comparison children may have been different from the children in pre–K programs in terms of family income, education, or other factors that help them catch up. Also, while the IQ advantage that pre–K participants have over their peers can fade, the advantage they gain in specific academic skills in reading and math and in social and emotional development do not. Those skills are an even greater determinant of final outcomes, such as graduation, employment, and lawful behavior, than academic knowledge.[43] Another study in the United Kingdom, which offers pre–K to all children, found that benefits of high-quality programs last beyond kindergarten.[44]

There is some evidence that children who do not participate in pre–K programs can catch up, but it is unclear why. Research is under way to discover whether intensive (and expensive) remedial programs or family income and education are the reason. Additionally, the concept of fade-out neglects to take into account the quality of elementary schools that pre–K program participants attend. It is highly possible that fade-out is more closely associated with elementary school quality than with early childhood education quality, thus making the case for elementary school improvement and the alignment of early childhood education with the early elementary grades.

Appendix B

The Straight Facts

To put the early childhood education debate into perspective, the following statistics give an idea of where the country stands on measures of school readiness, academic and personal success, well-being, and workforce readiness and participation. These statistics provide the big picture of education in America and highlight the skills gap among students. While the K–12 and postsecondary education systems need significant improvement to better serve all students, starting with high-quality early learning and pre–K programs can help build a strong foundation for learning and long-term success. However, great strides in program expansion and quality improvements are necessary if we are to ensure that every child has the opportunity to participate in highly effective early learning programs.

National Employer Statistics

- Ninety percent of the fastest-growing jobs in America require some postsecondary education.
- Forty percent of high school graduates cannot read at an eighth grade level.[45]
- Twenty percent of U.S. workers are functionally illiterate and innumerate.[46]

International Comparisons

- U.S. 15-year-olds rank 25th out of 30 industrialized nations in math.[47]
- U.S. 15-year-olds rank 21st out of 30 industrialized nations in science.[48]
- The United States ranks 20th out of 28 Organisation for Economic Co-operation and Development (OECD) countries in high school graduation rates.[49]
- The United States ranks 15th of 27 OECD countries in college graduation.[50]
- The United States ranks 2nd out of 27 countries in the percentage of students (more than 40%) who enter college and leave without earning a degree. Fewer than 60% of U.S. students complete their undergraduate education.[51]

K–12 Academic Proficiency

- There is not a single state where 50% or more of the children are proficient in reading or math.
- Only 20%, of low-income and minority fourth and eighth graders are proficient in reading and math.
- Only 32% of fourth graders and 29% of eighth graders are proficient in reading.[52]
- Only 39% of fourth graders and 31% of eighth graders are proficient in math.[53]
- Average per pupil spending for K–12 education is $8,973 (adjusted for regional cost differences).[54]

High School Graduation, College Readiness, and College Completion

- Only 70% of ninth graders graduate from high school within four years.[55]
- Only half of Hispanic and black ninth graders graduate from high school within four years.[56]
- An estimated 53% of all college students take at least one remedial English or math course during their college experience.[57]
- More than half (54%) of college freshman graduate with a bachelor's degree in six years.[58]

Child Well-being

- A total of 4.2 million children under age five, or 21% of all children in the United States, live below the poverty line.[59]
- Low-income children hear 3 million words a year, middle-income children hear 6 million, and upper income children hear 11 million.[60]
- Thirty-five percent of children in single-parent homes have a mother who is a high school dropout.[61]
- A 2007 UNICEF report found that the United States is in the bottom third of rankings in many of the six dimensions of child well-being (i.e. material well-being, health and safety, educational well-being, family and peer relationships, behaviors and risks, and subjective well-being).[62]
- For children who move three or more times between the ages of four and seven, the probability of their high school graduation decreases 13% below the baseline average of 82%.[63]
- Mothers with less schooling provide less cognitive and emotional stimulation to their children.[64]

Early Learning Workforce

- It is estimated that only 30% of the nearly 400,000 early learning teachers and administrators in the United States have a bachelor's degree in any field. And few teachers have a teaching credential, expertise, or specialized training in early care and education[66]
- The Child Development Associate (CDA) National Credentialing Program supports training and professional development for the early childhood workforce and produces 15,000 new CDA credentialed teachers annually. The Council for Professional Recognition administers the CDA credentialing program. More information is available at http://www.cdacouncil.org/ab_his.htm.
- One-third (1,349) of the institutions of higher education that offer an associate's, bachelor's, master's, or doctoral degree in any field offer an early childhood teacher preparation degree.[67]
- Pre–K teachers earn an average of $21,000 annually, compared with elementary school teachers who earn an average of $42,000 annually.[68]

Appendix B

Pre–K Funding[69]

- Nationally, states spend an average of $4,061 per child enrolled in pre–K programs.
- State spending on pre–K programs ranges from $1,686 per pupil in Maine to $10,989 per pupil in New Jersey (these amounts exclude local spending).
- Nationally, Head Start expenditures (which cover comprehensive services for participants) average $7,909 per pupil.
- Nationally, families pay 60% of early care and learning costs for children under age five; local, state, and federal governments pay 39% of the costs; the private sector (businesses and philanthropies) pays the remaining 1%.[70]

Early Learning Return on Investment

- Disadvantaged children are associated with a higher pre–K program rate of return than their more advantaged peers.
- Pre–K program benefit-cost ratios have been calculated to range from 2.5:1 to the best case scenario of 17:1.[71]
- Arthur J. Rolnick, then-senior vice president, and Robert Grunewald, associate economist, of the Federal Reserve Bank of Minneapolis calculated an annual, inflation-adjusted rate of return of 16% for pre–K programs.[72]
- James Heckman, Nobel Laureate in Economic Sciences, finds that "the returns to human capital investments are greatest for the young for two reasons:(1) skill begets skill, and (2) younger persons have a longer horizon over which to recoup the fruits of their investments."[73]
- Interventions later in life, including job training, adult literacy, prisoner rehabilitation, and education programs for disadvantaged adults (although beneficial), yield low economic returns compared to early interventions, such as pre–K programs.[74]
- The performance of children benefiting from early interventions is better than that of children who benefited from later interventions, according to multiple studies.[75]

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