10 Essential Elements of Early Childhood Program Effectiveness

Arthur J. Reynolds, Director, Human Capital Research Collaborative
ajr@umn.edu; http://hcrc.umn.edu

Revised January 2021 (original in June 2006 for the Minnesota Department of Education)

Overarching Principle A. A Supportive and Enriching Organizational and Social Context for Learning is Foundational to Optimal Benefits and Sustained Gains. Elements of effectiveness in early childhood programs and broader learning systems achieve their most beneficial impacts within an organizational context that is well-supported by financial and human resources and continuously promotes a collaborative and inclusive climate among program and/or school leadership, staff, children and families, communities, and stakeholders. Within these enriched contexts, openness to change based on evidence and experience, a belief in shared ownership, and tailoring priorities and services to the unique needs of children and parents are evident. Eliminating persistent structural inequalities and barriers at the macro-ecological level, including multilevel poverty, discrimination and racism, segregation, and lack of access to high quality service systems are core goals.

Overarching Principle B. Gains are More Likely to be Initiated and Sustained as the Number of Essential Elements Present in Programs and Classrooms Increases. Although most theoretical models of learning and development support the proposition that gains are more likely to be sustained as the number of essential elements present in a program increases. At present, there is no hard and fast rule about the minimum threshold needed to achieve large gains in school readiness followed by sustained gains over time. The landmark early childhood programs included nearly 100% of the essential elements, exclusive of universal access. Recent studies in the Human Capital Research Collaborative have found that classrooms and programs in which at least 60-70% of the measured key or essential elements were the most likely to demonstrate strong short- and longer-term gains for children.

1. Provide universal access for all children. The positive effects of early education on school readiness and performance have been found across all levels of socioeconomic status. These impacts are sustained for high quality programs. Children at higher levels of risk, including family socioeconomic status and special needs, show the largest benefits. A universal access system, however, increases effectiveness at scale to achieve achievement proficiency.

2. Begin no later than age 4. In general, the earlier that educational enrichment begins, the larger the impact and the more likely those effects will be sustained. Within the first 4 years, the evidence of benefits and long-term effects is strongest for programs serving 3- and 4-year-olds. This principle element does not mean that later intervention cannot be effective, only that the evidence base favors earlier participation, especially for cost-effectiveness.

3. Sufficient intensity of learning experiences. The instructional content and activities of programs should be of sufficient length and intensity to address learning needs adequately. Such levels of intensity addresses the importance of focused time in each domain of learning. A teacher's organization and use of time does matter. Full-day programs spanning 9-12 months per year are especially beneficial.

4. Multifaceted and engaging learning experiences across domains. Instructional and learning activities cover the core domains of language and literacy, number skills, cognition, physical health, and socio-emotional and mental health. A balance of teacher- and child-directed activities are provided and are tailored to individual, family, community, and socio-cultural contexts. In addition to a balance of instruction, field trips and out-of-school experiences are high priorities. A diverse set of instructional activities, curricula, and learning experiences help to promote active and engaged learning.

5. Highly trained professionals and on-going professional development. Children taught by teachers who are well trained with a BA or higher are more likely to experience high quality programs. Teachers

and staff should have regular opportunities with sufficient time allocated to participate in professional development activities to keep current on best practices in the field. Compensation that is equivalent to or competitive with K-12 education is a critical component of this element. This includes classroom assistants as well.

6. Accountability system marked by shared leadership, clear learning standards, and monitoring for improvement. A clear leadership vision is established that is shared and inclusive of all staff. Programs should have well documented learning standards. There should be formal assessments of children's progress on well-validated indicators. Careful monitoring of program quality also is important, and this is for the purpose of program improvement. The use of evidence and teacher feedback is built in to this process. Formative evaluation also is central to a strong accountability system which separates this approach from an audit or summative evaluation.

7. Comprehensive family services. Programs that provide a full range of child education and family services are more responsive to children's needs and will be more likely to impact child development outcomes. Attention to children's education and social development, family needs, health and social services are important. Opportunities for parent involvement are especially important.

8. Small class sizes and low child to staff ratios. Early childhood class sizes of less than 18 and child to staff ratios under 9 to 1 are associated with greater learning gains. These should be lower for 3-year-olds, i.e., class sizes of less than 16 and ratios under 8 to 1.

9. Optimal duration and length. The number of years of preschool and the length of program services is positively associated with children's learning and development, especially if quality is high. Longer duration beyond or prior to preschool also strengthen learning gains.

10. Coordination and alignment with K-3 to provide a continuous P-3 system of supports. The extent to which the preschool program is integrated with kindergarten and the elementary grades leads to smoother transitions to school. Attention to coordination and the provision of services across ages can help sustain effects of preschool. To be most effective and consistent with evidence-based programs, a continuous and supportive preschool to 3rd grade system should include both structural enhancements (leadership, small classes) and integration of services (PD, instruction).

Resources and References

These are the sources of evidence in support of each element.

A. General References Supporting Many or All Elements

Cannon, J. S., Kilburn, M. R., Karoly, L. A., et al. (2017). *Investing early: Taking stock of outcomes and economic returns from early childhood programs.* Santa Monica, CA: RAND.

National Institute for Early Education Research. (2019). *The state of preschool 2018: State preschool yearbook*. New Brunswick, NJ: Graduate School of Education, Rutgers University.

Reynolds, A. J., & Temple, J. A. (Eds.). (2019). *Sustaining early childhood learning gains: Program, school, and family influences*. New York: Cambridge University Press.

Reynolds, A. J., Hayakawa, M., Candee, A., & Englund, M. M. (2016). *Child-Parent Center Preschool to 3rd Grade Program. Implementation manual*. Minneapolis: Human Capital Research Collaborative. http://cpcp3.org

Reynolds A. J, Ou, S., Mondi C. F.& Giovanelli A. (2019). Reducing poverty and inequality through preschool-to-third-grade prevention services. *American Psychologist*, 74(6):653-672.

Takanishi, R. (2016). *First things first! Creating the new American primary school*. NY: Teachers College Press.

Yoshikawa, H., Wuermli, A. J., Raikes, A., Kim, S., & Kabay, S. B. (2018). Toward high quality early childhood development programs at national scale: Directions for research in global contexts. *Social Policy Report, 31*(1). Society for Research in Child Development.

B. Overarching Principles of Organizational and Social Contexts for Enriched Learning Experiences and Cumulative Benefits of Key Elements

Takanishi, R. (2016). *First things first! Creating the new American primary school*. NY: Teachers College Press.

Comer, J. P. (1980). *School power: Implications of an intervention project*. New York: Free Press.

Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education* (Vol. 3, 2nd ed.). Oxford: Elsevier.

Reynolds, A. J., Hayakawa, M., Mondi, C., Ou, S., Candee, A., Englund, M. M., & Smerillo, N. (2017). Scaling and sustaining effective early childhood programs through school-family-university collaboration. Child Development, 88(5), 1453-1465.

Reynolds, A. J., & Temple, J. A. (Eds.). (2019). *Sustaining early childhood learning gains: Program, school, and family influences*. New York: Cambridge University Press.

Temple, J. A., & Reynolds, A. J. (2017). New developments in the economics of prevention: Social impact borrowing to finance cost-effective interventions. In M. Moshi & J. Romano (Eds.), Cambridge Handbook of International Prevention Science (pp. 43-62). New York and London: Cambridge University Press.

Zigler, E., & Styfco, S. (Eds.). (1993). *Head Start and beyond: A national plan for extended childhood intervention*. New Haven, CT: Yale University Press.

C. Essential Elements

1 Universal access

Daniel-Echols, M., Malofeeva, & Schweinhart, L. J. (2010). Lessons from the evaluation of the Great State Readiness Program (GSRP): A longitudinal evaluation. In A. J. Reynolds et al., (Eds), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 199-2013). New York: Cambridge.

Gormley, W. T., Phillips, D., & Anderson, S. (2018). The effects of Tulsa's Pre-K program on middle school student performance. *Journal of Policy Analysis and Management*, *37*(1), 63-87.

Hill, C. J., Gormley, W. T., & Adelstein, S. (2015). Do short-term effects of a high-quality preschool program persist? *Early Childhood Research Quarterly, 32*, 60-79.

Lynch, R. G. (2007). *Enriching children, enriching the nation: Public investment in high-quality prekindergarten*. Washington, DC: Economic Policy Institute.

Reynolds, A. J. (2018). Increase access to high-quality State PreK in Minnesota. *Saint Paul Pioneer Press*. April 26 Commentary.

Reynolds, A. J. (2018). All children deserve highly effective early education. *MinnPost.* March 2 Commentary/Community Voices.

Schweinhart, L. J., Xiang, Z., Daniel-Echols, M., Browning, K. & Wakabayashi, T. (2012). *Michigan Great Start Readiness Program evaluation 2012: High school graduation and grade retention findings*. Technical report prepared for Michigan Department of Education. https://www.michigan.gov/documents/mde/GSRP_Evaluation_397470_7.pdf

Zigler, E., Gilliam, W. S., & Jones, S. M. (2006). *A vision for universal preschool education.* New York: Cambridge University Press.

2 Timing and entry age by 4 years old

Infurna, C. J., & Montes, G. (2020). Two years vs. one: The relationship between dosage of programming and kindergarten readiness. *International Electronic Journal of Elementary Education*, *13*(2), 255-261.

McCoy, D. C., Yoshikawa, H., Ziol-Guest, K. M., et al. (2017). Impacts of early childhood education on medium and long-term education outcomes. *Educational Researcher*, *46*(8), 474-487.

Ou, S., & Reynolds AJ. Preschool education and school completion. In R. E. Tremblay RE, M. Boivin, & R. DeV. Peters (Eds.). *Encyclopedia on Early Childhood Development* [online]. 2020. http://www.child-encyclopedia.com/school-success/according-experts/preschool-education-and-school-completion.

Reynolds, A. J., & Temple, J. A. (2008). Cost-effective early childhood development programs from preschool to third grade. *Annual Review of Clinical Psychology*, *3*, 109-139.

Reynolds, A. J., Temple, J. A., Ou, S., Arteaga, I. A. & White, B. A. (2011). School-based early childhood education and age-28 well-being: Effects by timing, dosage, and subgroups. *Science 333*(6040), 360-364.

Reynolds AJ. Temple JA., Ou S, Robertson DL, Mersky JP, Topitzes JW & Niles MD. Effects of a school-based, early childhood intervention on adult health and well-being: A 19-year follow-up of low-income families. *Archives of Pediatrics & Adolescent Medicine*. 2007;*161(8), 730-739.*

Schweinhart, L. J., Barnes, H. V., & Weikart, D. P. (1993). *Significant benefits: The High/Scope Perry Preschool study through age 27*. Ypsilanti, MI: High/Scope.

3 Intensity and format

Bogard, K., & Takanishi, R. (2005). PK-3: An aligned and coordinated approach to education for children 3 to 8 years old. *Social Policy Report*, XIX, No. III. Washington: Society for Research in Child Development.

Bowman, B. T., Donovan, M. S., & Burns, M. S. (Eds.). (2001). *Eager to learn: Educating our preschoolers*. Washington, DC: National Academies Press. National Research Council.

Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist*, *53(*2), 109-120.

Reynolds, A. J., Richardson, B., Hayakawa, C. M., et al.. (2014). Association of a full-day vs part-day preschool intervention with school readiness, attendance, and parent involvement. *Journal of the American Medical Association, 312*(20):2126-34.

Stipek, D., & Byler, P. (2004). The early childhood classroom observation measure. *Early Childhood Research Quarterly*, *19*(3), 375–397.

Wasik, B. A., & Snell, E. K. (2019). Synthesis of preschool dosage. In A. Reynolds & J. Temple (Eds.), *Sustaining early learning gains: Program, family, and school influences*. New York: Cambridge University Press.

4 Multifaceted learning experiences across domains

Consortium for Longitudinal Studies. (1983). *As the twig is bent…lasting effects of preschool programs*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Graue, E., Clements, M. A., Reynolds, A. J., & Niles, M. D. (2004). More than Teacher Directed or Child Initiated: Preschool Curriculum Type, Parent Involvement, and Children's Outcomes in the Child-Parent Centers. *Education Policy Analysis Archives*, *12*(72). http://epaa.asu.edu/epaa/v12n72/

Lerkkanen, M.-K., Kiuru, N., Pakarinen, E., Poikkeus, A.-M., Rasku-Puttonen, H., Siekkinen, M., & Nurmi, J.-E. (2016). Child-centered versus teacher-directed teaching practices: Associations with the development of academic skills in the first grade at school. *Early Childhood Research Quarterly*, *36*, 145–156. https://doi.org/10.1016/j.ecresq.2015.12.023

Reynolds, A. J., Hayakawa, M., Candee, A., & Englund, M. M. (2016). *Child-Parent Center Preschool to 3rd Grade Program. Implementation manual*. Minneapolis: Human Capital Research Collaborative. http://cpcp3.org

Vaisarova, J., & Reynolds, A. J. (2020). *Is more child-initiated always better? Exploring relations between child-initiated instruction and preschoolers' school readiness*. Submitted for publication. 2020. Minneapolis: Human Capital Research Collaborative.

Weisberg, D. S., Hirsh-Pasek, K., & Golinkoff, R. M. (2013). Guided play: Where curricular goals meet a playful pedagogy. *Mind, Brain, and Education, 7*(2), 104–112. https://doi.org/10.1111/mbe.12015

Yoshikawa, H., Wuermli, A. J., Raikes, A., Kim, S., & Kabay, S. B. (2018). Toward high quality early childhood development programs at national scale: Directions for research in global contexts. *Social Policy Report, 31*(1). Society for Research in Child Development.

5 Highly trained professional and on-going PD

Allen, L., & Kelly, B. B. (Eds.). (2015). *Transforming the workforce for children birth through age 8*. Washington, DC: National Academies Press. National Research Council.

Bill & Melinda Gates Foundation. (2015). *Early learning: High-quality Pre-Kindergarten*. Seattle: Author.

Manning, M., Garvis, S., Fleming, C., & Wong, G. T. W. (2017). The relationship between teacher qualification and the quality of the early education and care environment. *Campbell Systematic Reviews.*

Takanishi, R. (2016). *First things first! Creating the new American primary school*. NY: Teachers College Press.

6 Strong accountability system

Bill & Melinda Gates Foundation. (2015). *Early learning: High-quality Pre-Kindergarten*. Seattle: Author.

Bogard, K., & Takanishi, R. (2005). PK-3: An aligned and coordinated approach to education for children 3 to 8 years old. *Social Policy Report*, XIX, No. III. Washington: Society for Research in Child Development.

Bowman, B. T., Donovan, M. S., & Burns, M. S. (Eds.). (2001). *Eager to learn: Educating our preschoolers*. Washington, DC: National Academies Press. National Research Council.

Reynolds, A. J. (2019). The power of P-3 school reform. *Phi Delta Kappan*, 100(6), 27-33.

Reynolds, A. J., Vaisarova, J., Richardson, B., Lee, S., Smerillo, N., & Bowman, B. *Aligned Curriculum and Collaborative Leadership: Evidence from the Midwest Child-Parent Center Expansion.* 2018. Minneapolis, MN: Human Capital Research Collaborative. http://hcrc.umn.edu.

Takanishi, R. (2016). *First things first! Creating the new American primary school*. NY: Teachers College Press.

Zigler, E., Gilliam, W. S., & Jones, S. M. (2006). *A vision for universal preschool education.* New York: Cambridge University Press.

7 Comprehensive Family Services

Eckenrode, J., Campa, M. I., et al. (2017). The prevention of child maltreatment through the Nurse Family Partnership Program: Mediating effects in a long-term follow-up study. *Child Maltreatment, 22*(2), 92-99.

Reynolds, A. J., Ou, S., Mondi, C., & Hayakawa, M. (2017) Processes of early interventions to adult well-being. *Child Development*, 88(2), 378-387.

Varshney, N., Lee, S., Reynolds, AJ, & Temple, JA. Does early childhood education enhance parental school involvement in 2nd grade? Evidence from the Midwest Child-Parent Center Program. *Children and Youth Services Review*, 2020; *117*, https://doi.org/10.1016/j.childyouth.2020.105317

Zigler, E., Pfannenstiel, J. C., & Seitz, V. (2008). The Parents as Teachers Program and school success: A replication and extension. *The Journal of Primary Prevention, 29*(2), 103-120.

8 Small classes and low ratios

Aos, S., et al. (2004). *Benefits and costs of prevention and early intervention programs for youth*. Olympia, WA: Washington State Institute for Public Policy. (http://www.wsipp.wa.gov/rptfiles/04-07-3901.pdf).

Aos, S., Miller, M., & Mayfield, J. (2007). *Benefits and costs of K-12 education policies: Evidence-based effects of class size reductions and full-day kindergarten*. Olympia: Washington State Institute for Public Policy.

Englund, M. M., White, B., Reynolds, A. J., Schweinhart, L. J. Campbell, F. A. (2014). Health outcomes of early childhood interventions: A 3-study analysis. In A. J. Reynolds, A. J. Rolnick, & J. A. Temple (Eds.), *Health and education in early childhood*: Predictors, interventions, and policies (pp. 257-292). New York: Cambridge University Press.

Reynolds, A. J., Richardson, B. A., & Lee, S. (2020). Preschool and kindergarten impacts of the Midwest Child-Parent Centers in the Saint Paul Public Schools. *Developmental Psychology*. Forthcoming.

Reynolds, AJ, Vaisarova, J., Richardson, BA, & Lee, S. (2018). *Effective learning experiences in preschool and school readiness: Evidence from the Midwest Child-Parent Center Expansion*. 2018. Minneapolis: Human Capital Research Collaborative, University of Minnesota.

9 Duration and length

Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist*, *53(*2), 109-120.

Reynolds A. J, Ou, S., Mondi C. F.& Giovanelli A. (2019). Reducing poverty and inequality through preschool-to-third-grade prevention services. *American Psychologist*, 74(6):653-672.

Takanishi, R. (2016). *First things first! Creating the new American primary school*. NY: Teachers College Press.

Wasik, B. A., & Snell, E. K. (2019). Synthesis of preschool dosage. In A. Reynolds & J. Temple (Eds.), *Sustaining early learning gains: Program, family, and school influences*. New York: Cambridge University Press.

Zigler, E., Gilliam, W. S., & Jones, S. M. (2006). *A vision for universal preschool education.* New York: Cambridge University Press.

10 Coordination and Alignment for a P-3 system

Bogard, K., & Takanishi, R. (2005). PK-3: An aligned and coordinated approach to education for children 3 to 8 years old. *Social Policy Report*, XIX, No. III. Washington: Society for Research in Child Development.

Early Learning Network. (2020). *Bridging the gap: Easing the transition from Pre-K to Kindergarten*. Policy Brief, Fall 2020. Lincoln: University of Nebraska. https://earlylearningnetwork.unl.edu/wp-content/uploads/2020/11/201105-Policy-Brief-PreK-K-Transition.pdf

Jackson, C. K., Johnson, R. C., & Persico, C. (2020). The Effects of School Spending on Educational & Economic Outcomes: Evidence from School Finance Reforms. *Quarterly Journal of Economics*, *15*(4).

Johnson, R. C., & Jackson, C. K. (2019). Reducing Inequality Through Dynamic Complementarity: Evidence from Head Start and Public School Spending. *American Economic Journal: Economic Policy*, *11*(4), 1-40.

Manship, K., Farber, J., Smith, C., & Drummond, K. (2016, December). *Case studies of schools implementing early elementary strategies: Preschool through third grade alignment and differentiated*

instruction. Washington, DC: U. S. Department of Education, Office of Planning, Evaluation and Policy Development (Prepared by American Institutes for Research, Washington, DC).

Reynolds, A. J., Magnuson, K. & Ou, S. (2010). PK-3 programs and practices: A review of research. *Children and Youth Services Review, 32*(8), 1121-1131.

Reynolds, A. J., Richardson, B. A., & Lee, S. (2020). Preschool and kindergarten impacts of the Midwest Child-Parent Centers in the Saint Paul Public Schools. *Developmental Psychology*. Forthcoming.

Seitz, V., Apfel, N. H., Rosenbaum, L. K., & Zigler, E. (1983). Long-term effects of projects Head Start and Follow Through: The New Haven Project. In Consortium for Longitudinal Studies (Ed.). *As the twig is bent: Lasting effects of preschool programs* (pp. 299-332). Hillsdale, NJ: LEA.

Zellman, G. L., & Kilburn, M. R. (2015). *Final report on the Hawai'i P-3 evaluation*. Santa Monica: RAND.

Zigler, E., & Styfco, S. (Eds.). (1993). *Head Start and beyond: A national plan for extended childhood intervention*. New Haven, CT: Yale University Press.