



جائزة خليفة التربوية
Khalifa Award for Education

Khalifa International Award for Early Learning

Professor Laura Justice

Abstract

The Khalifa International Award for Early Learning was awarded to Professor Laura Justice to recognize her 25-year program of scholarly research to develop, test, and scale interventions that improve print knowledge for young children in the years proceeding formal schooling. Print knowledge is a multi-dimensional early-literacy skill that reflects children’s emergent conceptual knowledge about the forms and functions of the written symbol systems used to represent oral language. Justice’s 25-year program of research has identified mechanisms and methods to improve children’s print knowledge in the years prior to formal reading instruction. These methods have been manualized and tested in rigorous controlled trials. Justice’s approach – termed *print referencing* or *print-focused read-alouds* – is now considered an essential early-literacy instructional practice in preschool and kindergarten settings. Adhering to an ‘open-science’ framework, all research-based materials used in Justice’s research are freely available and widely distributed at no cost (<https://star.ehe.osu.edu/>), enabling these tools to be reach a large variety of end-users at no cost. Researchers across the globe have tested Justice’s print referencing strategies in such settings as Australia, Canada, Mexico, and Taiwan, among others. Additionally, researchers worldwide have applied Justice’s approach to improving the early-literacy skills of marginalized and minoritized children, including those residing in low-income homes, and those with hearing loss, Rett syndrome, medical fragilities, language disabilities, and Down syndrome.

As a result, Justice and her colleagues’ research provides constituents across the world with empirically based tools to promote early-literacy development in young children and promote equitable access to scientific findings that elevate all children’s learning potential.



Improving Print Knowledge for Young Children: A 25-Year Program of Research

Laura Justice

This research paper highlights the 25-year program of scholarly research pursued by Professor Laura Justice, The Ohio State University, to develop, test, and scale interventions that improve print knowledge for young children in the years preceding formal schooling. Print knowledge is a multi-dimensional early-literacy skill that reflects children’s emergent conceptual knowledge about the forms and functions of the written symbol systems used to represent oral language (Bialystok & Luk, 2007a; Justice & Sofka, 2013).

Across all of the world’s written languages, children must develop the understanding, or insight, that print provides an “invariant representation” of oral language that is governed by specific rules and principles (Bialystok & Luk, 2007b). To this end, print knowledge is theorized as a universal cognitive prerequisite for learning to read (Bialystok, 1995; Bialystok & Luk, 2007b), which is supported empirically by meta-analyses consistently showing strong, positive relations between print knowledge as measured in preschool or kindergarten and reading skill in the later primary grades (Lonigan & Shanahan, 2009). For instance, across studies, children’s alphabet knowledge measured in kindergarten or earlier explains 25% and 23% of the variance in future decoding and reading comprehension, respectively (Lonigan & Shanahan, 2009). Often, children with limited print knowledge at school entry have substantially heightened susceptibility for reading disability (Murphy, Justice, O’Connell, Pentimonti, & Kaderavek, 2016).

Thus, identifying mechanisms to improve children’s print knowledge prior to formal reading instruction has long been of interest to researchers, educators, and policymakers (Burns, Griffin, & Snow, 1999)

Justice’s 25-year program of research has identified mechanisms and methods to improve children’s print knowledge in the years prior to formal reading instruction. These methods have been manualized and tested in rigorous controlled trials (e.g., Justice, Chen, Tambyraja, & Logan, 2018; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009; Justice, Logan, & Kaderavek, 2017; Justice, Skibbe, McGinty, Piasta, & Petrill, 2009). Justice’s approach – termed print referencing or print-focused read-alouds – is now considered an essential early-literacy instructional practice in preschool and kindergarten settings.

Adhering to an ‘open-science’ framework, all research-based materials used in Justice’s research are freely available and widely distributed at no cost (<https://star.ehe.osu.edu/>), enabling these tools to be reach a large variety of end-users at no cost. Researchers across the globe have tested Justice’s print referencing strategies in such settings as Australia (Neumann, Hood, & Neumann, 2009), Canada (Milburn et al., 2015), Mexico (Pratt, Justice, Perez, & Duran, 2015), Netherlands (van Dijken, 2022), Taiwan (Chang, Luo, & Wu, 2016), among others. Additionally, researchers worldwide have applied Justice’s approach to improving the early-literacy skills of marginalized and minoritized children, including those residing in low-income homes (Gettinger & Stoiber, 2014), those with hearing loss (Freeman & Werfel, 2013), Rett syndrome (Dennis, 2018), medical fragility (Benson-Goldberg & Erickson, 2021), language disabilities (Lovelace & Stewart, 2007a), and Down syndrome (van Bysterveldt, Gillon, & Moran, 2006).

As a result, Justice and her colleagues’ research provides constituents across the world with empirically based tools to promote early-literacy development in young children and promote equitable access to scientific findings that elevate all children’s learning potential.

Background

For children to learn to read, they must develop fundamental, prerequisite knowledge about the forms and functions of print, referred to as print knowledge. This is considered a cognitive universal foundational to reading development across any of the world's written languages. For instance, to begin the task of learning to decode words, children must learn that written symbols stand for spoken sounds and that written symbols (i.e., letters and words) are governed by a unique rule system. However, only over the last decades have researchers come to acknowledge the importance of print knowledge to reading development, and to develop practices to promote print knowledge in the years prior to formal schooling. Justice's program of research, in particular, has been fundamental to shaping this relatively new body of research by pinpointing mechanisms through which children develop print knowledge, identifying populations of children vulnerable for lags in print knowledge due to opportunity gaps or developmental concerns, and developing practices that fundamentally improve young children's print knowledge. In a 25-year program of research, Justice and her collaborators systematically identified early trajectories and profiles of print-knowledge development (Cabell et al., 2010; L. Justice et al., 2015; Pentimonti, Justice, & Kaderavek, 2014); developed assessments for reliably and validly measuring print-knowledge development (Bowles, Skibbe, & Justice, 2011; Shayne B. Piasta, Petscher, & Justice, 2012); isolated adult shared-reading behaviors that significantly improved young children's print knowledge (Justice & Lankford, 2002; Justice, Pullen, & Pence, 2008; Shayne B Piasta, Justice, McGinty, & Kaderavek, 2012); and conducted efficacy and effectiveness studies using randomized trial designs to assess causal effects of adult shared reading behaviors on short-term print-knowledge development (L. M. Justice, J. Chen, S. Tambyraja, & J. Logan, 2018; Justice & Ezell, 2000; Justice, Kaderavek, et al., 2009; L M Justice, Jessica Logan, & Joan N Kaderavek, 2017; Justice, Logan, Kaderavek, & Dynia, 2015; Justice, McGinty, Piasta, Kaderavek, & Fan, 2010). Much of this research has focused on marginalized populations of children, including those with disabilities and those residing in poverty.

Background

Perhaps the most important finding of Justice's research was identifying the causal relations between print knowledge and future reading achievement using causally interpretable research designs and longitudinal methods; that is, Justice and her team showed that improving preschool-aged children's print knowledge significantly improved their reading achievement in the longer-term (Piasta et al., 2012), thus identifying a mechanism for reducing reading disabilities, including among children experiencing risk.

Justice's research focused on developing and testing interventions to promote children's print knowledge as a route to improved reading achievement has been continually funded with awards exceeding \$13,000,000 from federal agencies over two decades (National Institutes of Health, Institute of Education Sciences).

Endorsing an 'open-science' paradigm, Justice has ensured that all research-developed intervention materials are available free at cost to all end-users, thus guaranteeing that her research tools can achieve at-scale use at no or little cost (<https://star.ehe.osu.edu/>). As noted previously, practitioners, policymakers, and fellow researchers around the globe have built upon Justice's research to scale early-literacy promotion strategies that improve reading outcomes for children, often from minoritized and marginalized populations. For instance, scholars have tested or refined these practices in Australia, Canada, the Netherlands, Mexico, and Taiwan, among others.

Innovativeness

Long-standing assessments of educational achievement among schoolchildren across the globe show that many struggle with reading at even basic levels (e.g., National Assessment of Educational Progress [NAEP], 2022). Often, there is a markedly disproportionate representation of children who are poor and who are ethnic or racial minorities among those who struggle. For instance, in the United States, 83% and 79% of fourth graders who are African American and Hispanic, respectively, do not achieve proficient reading (NAEP, 2022). Researchers, policymakers, and practitioners recognize that no one solution will solve this complicated problem, as reading development, reading instruction, and reading disability are complex, multidimensional constructs. Nonetheless, there is consensus across these constituencies that evidence-based educational interventions must utilize preemptive moves through primary prevention.

Primary prevention focuses on preventing reading difficulties from emerging in the first place, thereby reducing the need for more intensive, expensive, and time-consuming secondary and tertiary educational interventions. A unique paradigm shift increasingly emphasizes preschool education as the context in which solutions to pressing problems concerning reading achievement are most likely to have effect. Research shows the preschool years to be a critical period during which young children develop skills, knowledge, and interests in the code-based aspects of written and spoken language, referred to as print knowledge. Reliable, valid, and sensitive indicators of print knowledge are increasingly used in preschool education programs to identify and assist children whose emergent literacy growth trajectory shows vulnerability for later reading difficulties.

Innovativeness

Importantly, Justice's 25-year program of research has developed and tested practices for improving children's print knowledge based on initial laboratory work and small-scale efficacy studies, then moving to larger-scale randomized trials with longitudinal follow-up. This body of work is thus unique in that it represents a 25-year program of systematic research that initially improved fundamental scientific knowledge of print-knowledge development, to include among marginalized populations of children and then isolated practices that significantly improved children's print knowledge. Subsequently, Justice and her team developed and tested manualized approaches for teachers and parents and evaluated these practices in causally interpretable research designs (Justice et al., 2018; Justice & Ezell, 2000; Justice, Kaderavek, et al., 2009; Justice et al., 2010, 2015, 2017). In this regard, Justice's research systematically moved from the 'lab to the field' to develop a sustainable and scalable early-learning practice.

Also unique is Justice's reliance on 'open-science' principles to ensure that all manualized practices are freely available to end-users, coupled with extensive training materials to support implementation. Then-Governor John Kasich (state of Ohio) provided Justice and her team a \$1,000,000 grant to translate their research activities into professional development and implementation tools for at-scale translation to the field at large; these materials are disseminated at no cost to end-users around the world. This allows scientific findings to be readily scaled at no/little cost to benefit children globally.

Importance

This body of work is important in that no other sustained body of work has systematically improved understanding of print-knowledge development and identified and manualized practices to enhance this important aspect of early child development. There is no other early-literacy practice that is fully manualized and freely available that has been tested in rigorous randomized trials with longitudinal follow-up design to show positive, significant impacts on children's future research achievement (Piastra et al., 2012). Consequently, researchers around the globe have built on Justice and colleagues' work to apply these practices in new settings (e.g., Australia, Taiwan, Europe) and with new populations of children (e.g., children with Rett syndrome, Down syndrome).

Justice's program of research addresses the problem of global illiteracy, which often has its origins in young children's earliest experiences in homes and other care settings. Often, children experience opportunity gaps in their access to interactions and experiences that foster development of print knowledge, which is considered a universal cognitive prerequisite for reading achievement (Bialystok & Luk, 2007a). Identification of usable, low-cost, empirically validated practices for improving young children's print knowledge provides early-learning professionals with a key means to enhance children's short-term literacy development and longer-term reading achievement. Given the importance of spoken and written literacy to 21st century employment, improved understanding of early-literacy development and effective educational strategies is strikingly important.

Importance

An additional issue of importance is ensuring that effective early-learning strategies are developed and evaluated across diverse global contexts and with historically marginalized and minoritized learners. At its genesis, Justice's research focused on young children with developmental disabilities (Ezell, Justice, & Parsons, 2000), given their vulnerability to under-achievement in reading and heightened risk for reading disabilities. Justice's program has consistently focused on children residing in poverty and/or who exhibit disabilities. Importantly, scholars across the globe have sought to build a generalizable science of print referencing as a means to improve children's print knowledge that includes diverse contexts and populations of children, as cited previously.

To highlight the global relevance of Justice and her team's research, they are the only scholars to date who have sought to improve knowledge of print-knowledge development and intervention among young children in Mexico, to include indigenous Mayan children. They have documented print-knowledge in pre-industrial communities, a complement to research typically focused on WEIRD samples of White, Educated, Industrialized, Rich, and Democratic. She and her team have described print-knowledge in samples of Mayan children (Bengochea, Justice, & Hijlkema, 2017); environmental supports for development of print knowledge in indigenous Mayan communities (Dynea, Purtell, Justice, Pratt, & Hijlkema, 2020); and parent use of print referencing during home-reading sessions among Spanish-speaking Mexican families (Pratt et al., 2015). Such work is impactful to global efforts to promote literacy among preschool-aged children, in an effort to improve educational attainment and literacy for a global citizenship.

Rigor

Justice’s program of research focused on print-knowledge development and interventions has employed a variety of rigorous research methodologies as aligned to specific research aims. For instance, her team was one of the first to use eye-gaze methodology to understand children’s visual attention to print during shared reading sessions. Her work has included cluster analysis and latent profile analysis, item-response theory, dose-response analyses, implementation-science methods, longitudinal methods, and randomized clinical trials. In all of her work, Justice and her team adhere to the highest standards in education reporting, thus assuring that these studies can be replicable. In addition, many of the tools used in Justice’s work – including assessment and intervention tools – are freely available, thus further promoting replicability.

To this end, replicability studies find that Justice’s initial findings of the significant improvements in print knowledge through use of print references consistently confirm impacts of this practice (Gettinger & Stoiber, 2014; Lovelace & Stewart, 2007b; van Bysterveldt et al., 2006). Studies from Justice’s program of research have appeared in international top-tier journals employing rigorous reporting standards, including (among others) Child Development; Developmental Psychology; Reading Research Quarterly; Journal of Speech, Language, and Hearing Research; Exceptional Children; and Journal of Autism and Developmental Disabilities. In 2010, Justice and her team received the Editor’s Award (article of highest merit) for “Print-focused read-alouds in preschool classrooms: Intervention effectiveness and moderators of child outcomes” published in the journal Language, Speech, and Hearing Services in Schools, a publication of the American Speech, Language, and Hearing Association.

Rigor

A unique aspect of this program of research is its adherence to programmatic science that moved from lab-based and descriptive studies focused on improving understanding of print knowledge and how it develops in young children, to feasibility and pilot work to test intervention practices, to causally interpretable longitudinal studies involving larger populations of interest. In this regard, this program of work is an exemplary in its progression from discovery to hypothesis-testing to scale-up. More recently, Justice and her team have employed methods from implementation science to evaluate approaches to improving caregivers' use of print-focused read-alouds with their young children. Reporting that subgroups of caregivers face challenges in implementing this practice with desired fidelity, Justice and her team used a factorial-design experiment to test whether behavior-change techniques could improve caregiver fidelity.

Finding that provision of encouraging texts and small monetary awards improved caregiver fidelity and mediate impacts of print-focused read-alouds on children's print-knowledge development, Justice and her team recently received a \$3,800,000 grant from the National Institutes of Health to conduct a field trial to start August 1, 2023. In the planned study, 320 caregivers with 4-year-old children with developmental language disorder will receive incentives or encouragements to implement print-focused read-alouds with their children for a 15-week period. The study is designed to test behavior-change techniques of encouragements and incentives on caregiver implementation and children's literacy trajectories to two-years' post-intervention. This evolving line of research seeks to improve the uptake of this literacy-promoting practice among caregivers who face barriers in its implementation, and is an innovative new approach to integrating implementation science into educational evaluations.

Impact

Print-focused read-alouds that employ explicit references to print as a means to promote early print knowledge is now considered an ‘essential’ practice in early-literacy instruction in preschool and kindergarten settings (e.g., Michigan Association of Intermediate School Administrators, 2016).

A considerable volume of professional-development tools and intervention materials that can be used for educators worldwide are freely available (<https://crane.osu.edu/our-work/star/>), representing the protocols of implementation used in Justice’s work. These have been downloaded thousands of times by practitioners across the world, and adapted into a variety of international contexts and subgroups of children.

In this regard, this program of research has had widespread impacts on the development, evaluation, and implementation of an empirically based educational practice that can be used at-scale with very low cost. In so doing, this scientific effort can be used widely to improve young children’s print knowledge, a key foundation of reading skill, as a scientifically based approach to improve reading achievement globally.

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