

2024 LEAP Challenge



Project Host:

Education for Sharing



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Executive Summary

Introduction

Education for Sharing (E4S) is an international organization that forms **better global citizens** through innovative education. E4S is committed to providing meaningful experiences for all, using a unique methodology that harnesses the power of play, reflection and people's inherent ability to shape their own reality. Established 17 years ago in Mexico, E4S has worked with over **1.8 million beneficiaries** from the educational community across thirteen countries.

Since its foundation, E4S has developed ten educational programs directed to a wide array of ages with different objectives aligned to its mission. One of the newest is called **Grow for Sharing (G4S)** and is focused on early childhood.

G4S is an educational program that builds **global citizenship** from childhood through **play**, teaching values like fair play, empathy, and teamwork. Focused on children ages 3 to 6, it uses hands-on activities to develop **lifelong** skills such as curiosity, collaboration, and critical thinking, fostering confident, socially responsible individuals.

Organization's role & strength

Mission

E4S's mission is to form better global citizenship from childhood through the power of play. To achieve this, they incorporate core values of fair play, gender equality, tolerance, respect, empathy, responsibility, and teamwork into all aspects of their work. The objective is to change the way we look at education and youth development and, through local community efforts, drive systemic change.

Vision

To serve as a world reference in shaping global citizenship and cultivating a sense of agency starting from early childhood.

Need summary

The G4S team needed to understand which methods best instill positive behaviors and knowledge in preschoolers and **how to measure these impacts effectively from the child’s perspective**. They aimed to identify the most reliable assessments, like caregiver interviews or teacher evaluations, for comparable results.

Solution summary & next steps

Following a few discovery sessions with G4S and reviewing their organizational objectives, we suggested the following:

- Pre-deliverable: Visual representation of the G4S program
- Deliverable 1: Literature Guide
- Deliverable 2: Assessment for children
- Deliverable 3: Recommendations on MEAL Plan components
- Deliverable 4: Future-focused Roadmap

G4S Objectives	Pre-deliverable	Deliverable 1: Literature Guide	Deliverable 2: Assessment for Children	Deliverable 3: MEAL Plan recommendations	Deliverable 4: Future-focused Roadmap
Measurement of core aspects of program on children’s attitudes and behaviors related to collaboration	NA		✓		✓
Understanding existing literature/programs	NA	✓			✓
Linking current activities to the MEAL Dpro framework	NA			✓	✓

Table 1. How G4S objectives align with deliverables

Irrespective of the path G4S may choose to follow in the future, establishing a robust foundation of evidence is crucial to enable the organization and the program to thrive. As such, all deliverables are oriented towards growing their evidence base.

Pre-Deliverable

In order to get a better understanding about the program, we created a visual of how its different parts relate to each other:

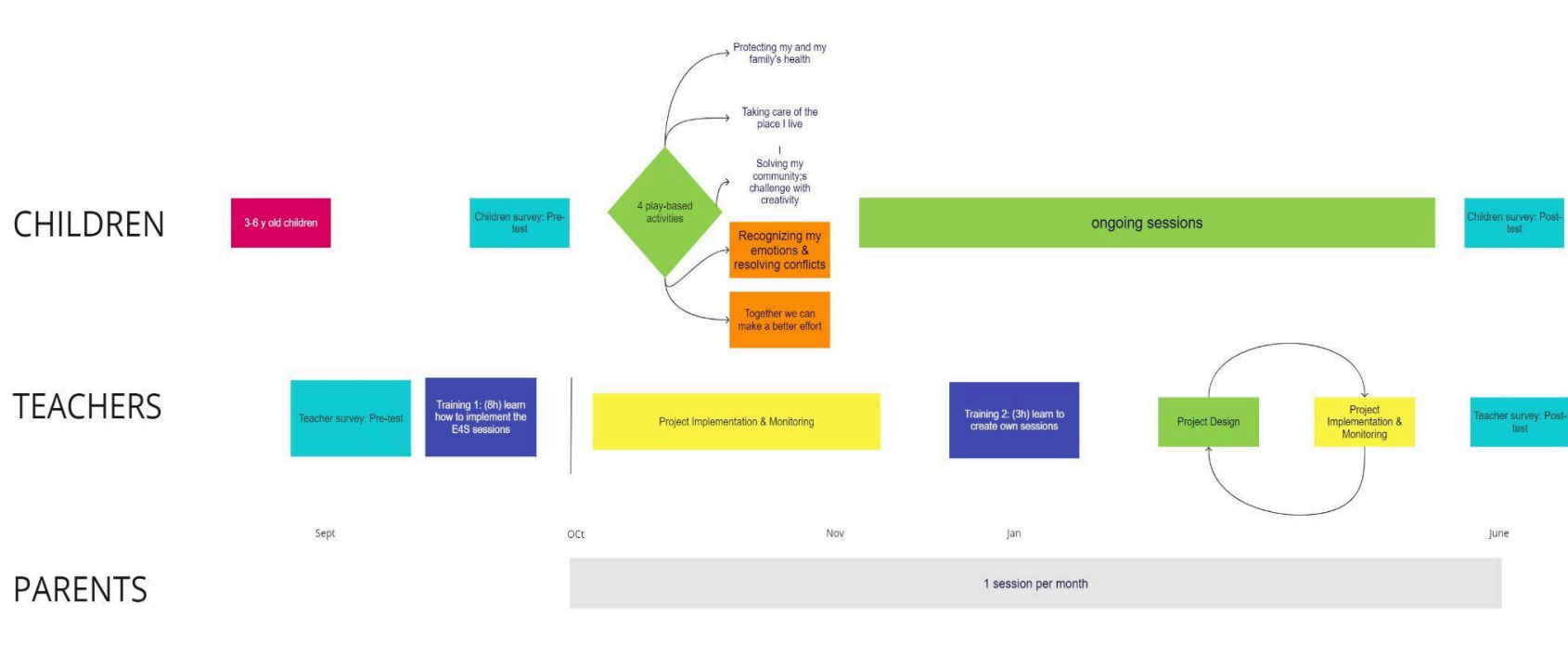


Figure 1. Diagram of the G4S program

The program is designed to have an impact on the lives of children, teachers, and parents. Different aspects of the program are designed for these stakeholders. Thus, the figure displays a separate row for each. 3-6 year-old children take a pre- and a post-program test. They then get exposed to 20 different types of play-based activities relating to the five different themes that E4S has (protecting me and my family's health, taking care of the place I live, solving my community's challenge with creativity, recognizing my emotions and resolving conflicts, and together we can make a better effort). Teachers also take a pre- and post-test and undertake a full-day training to learn how to implement the program. They then implement some activities before attending another training in which they create their own activities, thus, contributing to the overall library of activities available to everyone. The project design and implementation are creating a closed-loop process. Parents are educated via monthly training sessions.

Deliverable 1- Literature Guide

Introduction

This literature guide aims to provide useful resources to the G4S team in various areas of research. To this end, the referenced articles are structured by content with a short overall summary and short notes on what can be learned from each resource. Our goal here is not to provide a comprehensive overview of the literature in this area, but rather to highlight some key readings that could be drawn upon in future G4S endeavors and as support for current programming and evaluation efforts.

The importance of early childhood education

The first years of life are a period of rapid development and particularly developmental plasticity. Young children are highly receptive to influences from their environment, both positive and negative. Therefore, in terms of economic investment, early interventions are more cost effective than coping with potentially negative consequences (Barnett & Nores, 2012; Rakesh et al., 2024; Shonkoff & Richmond, 2009). Research supports the importance of early childhood education for sustainability (ESD).



Studies show that teaching sustainability to young children can effectively instill environmentally conscious behaviors and habits (Buil et al., 2019; Hedefalk et al., 2015). Yet, Hedefalk (2015) points out that teaching children environmental facts alone does not necessarily inspire them to act for sustainability. Instead, approaches that encourage critical thinking about the links between society and environmental issues—like in the G4S program—may be more effective for promoting sustainable change.

----- Key Readings -----

Barnett, W. S., & Nores, M. (2012). [*Investing in Early Childhood Education: A Global Perspective*](#). National Institute for Early Education Research.

Report providing details on the importance of investing in early childhood education, especially from an economic and societal

perspective. Mainly focussing on the U.S. but with implications that apply globally.

Buil, P., Roger-Loppacher, O., & Tintoré, M. (2019). [Creating the habit of recycling in early childhood: a sustainable practice in Spain](#). *Sustainability*, 11(22), 6393.

Early childhood education on sustainability, including recycling, can help instill environmentally conscious behaviors as lifelong habits.

Centre for Education Statistics and Evaluation. (2018). [A review of the effects of early childhood education](#). NSW Government, Department of Education.

Good overview of why early childhood education is important, and international findings on the effectiveness of programs.

Davis, J., & Elliott, S. (Eds.). (2024). [Young Children and the Environment: Early Education for Sustainability \(3rd ed.\)](#). Cambridge University Press; Cambridge Core.

Book with a focus on early childhood education for sustainability containing both, scientific background and practical ideas. Also includes case studies which provide an international perspective on the topic.

Hartwig, E. (2020). [Orientaciones programáticas sobre la importancia de la calidad de la educación para la primera infancia en América Latina y el Caribe](#). Fondo de las Naciones Unidas para la Infancia (UNICEF).

Report by UNICEF in Spanish highlighting the importance of high-quality early childhood education, the current status in Latin America and the Caribbean, and future directions.

Hedefalk, M., Almqvist, J., & Östman, L. (2015). [Education for sustainable development in early childhood education: A review of the research literature](#). *Environmental Education Research*, 21(7), 975-990.

Research shows that education for sustainable development in early childhood can instill environmentally conscious behaviors as lifelong habits.

Hughes, F. (2023). [Early Childhood Educators' Professional Learning for Sustainability Through Action Research in Australian Immersive Nature Play Programmes](#). *Educational Research for Social Change*, 12(1), 69–82.

Australian report on the importance of sustainability in education and how educators perceive its relation to play in nature.

Rakesh, D., McLaughlin, K. A., Sheridan, M., Humphreys, K. L., & Rosen, M. L. (2024). [Environmental contributions to cognitive development: The role of cognitive stimulation.](#) *Developmental Review*, 73, 101135.

Literature review on the impact of environmental influences on children's cognitive and neural development.

Shonkoff, J. P., & Richmond, J. B. (2009). Investment in Early Childhood Development Lays the Foundation for a Prosperous and Sustainable Society. *Encyclopedia on Early Childhood Development*.

Summary on why early childhood education/intervention is crucial, with a focus on brain development.

The power of learning through play

While it can be difficult to establish clear causality between play and developmental outcomes—in large part because true "controls" that involve no play are rare or non-existent—researchers have persuasively argued that play plays a major role in child development and learning across cultural contexts (Hirsch-Pasek et al., 2008; Whitebread, 2012; Yogman et al., 2018).

Different forms of play probably serve different functions in child development. **Exploratory play**, for instance, helps children learn about the physical properties of the objects they engage with or the more general physical laws within which they operate (Legare, 2012; Schulz & Bonawitz, 2007). Also, through exploratory play, children become familiar with new concepts, forming cognitive representations that scaffold learning; for instance, regular exposure to numerical information may support number representation and manipulation (Doebel & Lillard, 2023). **Pretend play** might serve in enhancing emotion regulation, social understanding, and executive functions (e.g., children have to remember roles and inhibit out-of-character behavior; (Diamond & Lee, 2011; Lillard, 2017). Executive functions, such as focusing, filtering distractions, managing information, and controlling impulses, are foundational skills for learning and academic achievement (McClelland et al., 2007).



Apart from cognitive and social-emotional development, play is suggested to contribute to children's psychosocial well-being, particularly for those facing adversity. For children in poverty, play is crucial for reaching their highest potential, as it helps overcome socio-economic obstacles that may impede healthy social-emotional development (Milteer et

al, 2012; Ginsburg, 2007). It provides a safe space for self-expression and connection, allowing children to develop resiliency, cooperation, and negotiation skills (Milteer et al., 2012).

The importance of play has a long tradition in some pedagogies, and play-based learning approaches are increasingly recommended to policy makers (Hirsh-Pasek & Hadani, 2020). Current research demonstrates that play-based learning can foster both holistic and academic skills in children (Parker et al., 2022; Taylor & Boyer, 2020; TeGrootenhuis, 2021). It actively engages children, offers meaningful, iterative, and socially interactive experiences, and fosters joy, all of which enhance children's motivation (Liu et al., 2017; Sawyer, 2017). **Play interventions** have shown positive impacts on children's physical activity, social engagement, and emotional wellbeing (Lee et al., 2020). Interactive play with adults serves as a form of affirming responsiveness, contributing to emotional health and social maturity (Barish, 2020). In hospital settings, short play interventions have been linked to reductions in anxiety and stress (Al-Yateem & Rossiter, 2017; Potasz et al., 2013).



----- Key Readings -----

Barish, K. (2020). [The role of play in contemporary child psychotherapy: A developmental perspective](#). *Journal of Infant, Child, and Adolescent Psychotherapy*, 19(2), 148-158.

Perspective paper summarizing literature on the importance of play for various developmental domains and the role of play in child therapy.

Diamond, A., & Lee, K. (2011). [Interventions Shown to Aid Executive Function Development in Children 4 to 12 Years Old](#). *Science*, 333(6045), 959–964.

Scientific review of interventions and programs that support the development of executive functions in children. It explicitly mentions pretend play when talking about one specific program (the Tools of the Mind program).

Doebel, S., & Lillard, A. S. (2023). [How does play foster development? A new executive function perspective](#). *Developmental Review*, 67, 101064.

Perspective paper that discusses how play might foster development, suggesting that play provides children with the practice and knowledge they need for developing culture-specific executive function skills.

Ginsburg, K. R., & Committee on Psychosocial Aspects of Child and Family Health. (2007). [The importance of play in promoting healthy child development and maintaining strong parent-child bonds](#). *Pediatrics*, 119(1), 182-191.

Play is essential for healthy child development and maintaining strong parent-child bonds.

Hirsh-Pasek, K., & Hadani, H. S. (2020). [A new path to education reform: Playful learning promotes 21st-century skills in schools and beyond](#). *Policy 2020 Brookings*.

Brookings report containing recommendations on how and what children need to learn to thrive in the 21st century.

Hirsh-Pasek, K., Michnick Golinkoff, R., Berk, L. E., & Singer, D. (2008). [A Mandate for Playful Learning in Preschool: Presenting the Evidence](#). Oxford University Press.

Book arguing that learning in preschool should be playful and take social development into account, rather than being principally or solely focused on academic learning.

Lee, R. L. T., Lane, S., Brown, G., Leung, C., Kwok, S. W. H., & Chan, S. W. C. (2020). [Systematic review of the impact of unstructured play interventions to improve young children's physical, social, and emotional wellbeing](#). *Nursing & Health Sciences*, 22(2), 184-196.

Systematic review investigating the effectiveness of play interventions on children's physical activity level, social engagement and emotional wellbeing. The reviewed studies report positive impacts across domains.

Legare, C. H. (2012). [Exploring Explanation: Explaining Inconsistent Evidence Informs Exploratory, Hypothesis-Testing Behavior in Young Children](#). *Child Development*, 83(1), 173-185.

Original research article demonstrating that children use exploratory play behavior to find explanations for inconsistencies, underlining the role of play in child learning.

Liu, C., Solis, S. L., Jensen, H., Hopkins, E., Neale, D., Zosh, J., Hirsh-Pasek, K., & Whitebread, D. (2017). [Neuroscience and learning through play: A review of the evidence](#). *The LEGO Foundation*.

White paper by the LEGO foundation summarizing evidence from neuroscience that is related to the five characteristics of playful learning: joyful, meaningful, actively engaging, iterative and socially interactive. This evidence emphasizes why playful learning works.

Lillard, A. S. (2017). [Why Do the Children \(Pretend\) Play?](#) *Trends in Cognitive Sciences*, 21(11), 826-834.

Opinion paper by a well-known developmental psychologist discussing potential functions of pretend play in humans. She concludes that it might serve similar

functions as in animal play fighting: support developing social behavior and emotion regulation.

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). [Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills](#). *Developmental Psychology*, 43(4), 947–959.

Original research article suggesting that behavioral regulation is linked to academic skills (emergent literacy, vocabulary, and math skills).

Milteer, R. M., Ginsburg, K. R., Council on Communications and Media Committee on Psychosocial Aspects of Child and Family Health, Mulligan, D. A., Ameenuddin, N., Brown, A., ... & Swanson, W. S. (2012). [The importance of play in promoting healthy child development and maintaining strong parent-child bond: Focus on children in poverty](#). *Pediatrics*, 129(1), e204-e213.

A clinical report highlights that play is vital for child development and parent-child bonding but notes that children in poverty often miss out. This is due to limited access to programs and parental constraints like lack of time and energy.

Parker, R., Thomsen, B. S., & Berry, A. (2022). [Learning Through Play at School – A Framework for Policy and Practice](#). *Frontiers in Education*, 7, 751801.

This article summarizes international research findings on the effects of learning through play. The authors present four key challenges and how they might be addressed.

Sawyer, J. (2017). [I think I can: Preschoolers' private speech and motivation in playful versus non-playful contexts](#). *Early Childhood Research Quarterly*, 38, 84–96.

Original research article investigating children's private speech in a playful vs. non-playful setting. In a playful setting, children's private speech was associated with higher levels of motivation.

Schulz, L. E., & Bonawitz, E. B. (2007). [Serious fun: Preschoolers engage in more exploratory play when evidence is confounded](#). *Developmental Psychology*, 43(4), 1045–1050.

Original research article demonstrating that children use exploratory play behavior when they encounter confounded evidence that does not allow for causal inference (compared to unconfounded evidence).

Taylor, M. E., & Boyer, W. (2020). [Play-Based Learning: Evidence-Based Research to Improve Children's Learning Experiences in the Kindergarten Classroom](#). *Early Childhood Education Journal*, 48(2), 127–133.

Scientific article summarizing what play-based learning is, which types of play exist, which social and academic benefits may result from play-based learning, and how educators can facilitate play-based learning.

TeGrootenhuis, B. (2021). [The Value of Play-Based Learning in Early Childhood Classrooms](#).

Master's thesis summarizing literature on learning through play, including its historic background and potential social and academic benefits.

Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S. L., Hopkins, E., Hirsh-Pasek, K., & Zosh, J. (2017). [The role of play in children's development: A review of the evidence](#). *The LEGO Foundation*.

White paper by the LEGO Foundation focusing on different types of play, such as play with objects or pretend play, and which functions they might serve in child development.

Yogman, M., Garner, A., Hutchinson, J., Hirsh-Pasek, K., Golinkoff, R. M., Baum, R., ... & COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH. (2018). [The power of play: A pediatric role in enhancing development in young children](#). *Pediatrics*, 142(3).

Clinical report summarizing the development of play, effects and benefits of play, challenges, and implications for preschool education.

Zosh, J. M., Hassinger-Das, B., & Laurie, M. (2022). [Learning Through Play and the Development of Holistic Skills Across Childhood](#). *The LEGO Foundation*.

White paper by the LEGO Foundation considering how play might serve the development of holistic skills, specifically cognitive, social, emotional, physical, and creative skills.

Zosh, J. M., Hopkins, E. J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. (2017). [Learning through play: A review of the evidence](#). *The LEGO Foundation*.

White paper by the LEGO Foundation emphasizing the importance of learning through play in the 21st century with a focus on the characteristics of playful learning experiences (joyful, meaningful, actively engaging, iterative, socially interactive).

Sustainability education in the early years

Overview of skills

UNESCO defined overarching competencies that are relevant to all Sustainable Development Goals (SDGs), that is, competencies that are crucial to advance sustainability. These encompass systems thinking, anticipatory, normative, strategic, collaboration, critical thinking, self-awareness, and integrated problem-solving competency (UNESCO, 2017, 2018).

Systems thinking competency	The ability to recognize and understand relationships, to analyze complex systems, to perceive the ways in which systems are embedded within different domains and different scales, and to deal with uncertainty
Anticipatory competency	The ability to understand and evaluate multiple futures – possible, probable and desirable – and to create one’s own visions for the future, to apply the precautionary principle, to assess the consequences of actions, and to deal with risks and changes
Normative competency	The ability to understand and reflect on the norms and values that underlie one’s actions and to negotiate sustainability values, principles, goals and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions
Strategic competency	The ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield
Collaboration competency	The ability to learn from others; understand and respect the needs, perspectives and actions of others (empathy); understand, relate to and be sensitive to others (empathic leadership), deal with conflicts in a group; and facilitate collaborative and participatory problem-solving
Critical thinking competency	The ability to question norms, practices and opinions; reflect on own one’s values, perceptions and actions; and take a position in the sustainability discourse
Self-awareness competency	The ability to reflect on one’s own role in the local community and (global) society, continually evaluate and further motivate one’s actions, and deal with one’s feelings and desires
Integrated problem-solving competency	The overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solutions that promote sustainable development – integrating the above-mentioned competencies

Table 2. Definitions of key competencies to advance sustainability as presented by UNESCO (2018)

These competencies largely overlap with 21st century skills, including the four Cs (collaboration, communication, critical thinking, creativity) so that the terms are sometimes used interchangeably (González-Salamanca et al., 2020; Kennedy & Sundberg, 2020). Independent of whether one focuses on 21st century skills or key competencies for sustainability, collaboration constitutes a central competency and will be the focus of the following sections.

----- Key Readings -----

González-Salamanca, J. C., Agudelo, O. L., & Salinas, J. (2020). [Key Competences, Education for Sustainable Development and Strategies for the Development of 21st Century Skills. A Systematic Literature Review](https://doi.org/10.3390/su122410366). *Sustainability*, 12(24), 10366. <https://doi.org/10.3390/su122410366>

Systematic review investigating how 21st century skills are incorporated into school curricula, raising challenges such as the development of appropriate assessment of these skills.

Kennedy, T. J., & Sundberg, C. W. (2020). 21st Century Skills. In B. Akpan & T. J. Kennedy (Eds.), *Science Education in Theory and Practice: An Introductory Guide to Learning Theory* (pp. 479–496). Springer International Publishing.

Book chapter providing an overview of 21st century skills and highlighting the importance of evaluating their implementation in the classroom as well as assessing increase in these skills in students.

UNESCO. (2017). [Education for Sustainable Development Goals: Learning objectives. UNESCO.](#)

Guide for education professionals that identifies learning objectives and suggests topics and learning activities for the different Sustainable Development Goals. It includes implementation methods at different levels.

UNESCO. (2018). [Issues and trends in education for sustainable development](#). UNESCO.

UNESCO publication that provides an overview of Education for Sustainable Development and its challenges in policy and practice.

Collaboration as a key competency

Humans collaborate in species-unique ways. Starting from birth they are sensitive to social interactions and around their first birthday move from dyadic to triadic interactions, that is, they include objects in their interactions with each other, opening space for joint attention. From a scientific point of view, true collaboration starts when **two interaction partners have a common goal and coordinate their roles to achieve this goal** (including planning their actions, helping the other to fulfil their role; Tomasello & Hamann, 2012). Already at the age of 18-24 months, toddlers engage in such collaboration with others. While nonhuman primates also engage in cooperative activities, it is less clear to which extent they are aware of their respective roles and the joint goal (as opposed to individual goals). In the years that follow, children gain an understanding of social norms that govern social behavior (e.g., fairness, generosity, and trustworthiness) which likely influences their collaboration with others.

Apart from this relatively narrow view on collaboration, it can be conceptualized in a broader way, including other types of prosocial behavior, such as helping or sharing (Burns et al., 2024). Also, as mentioned above, it can include social-emotional skills such as empathy or be defined in the context of school- or job-related group work, emphasizing its wide applicability and importance as 21st century skill. For instance, UNESCO highlights that collaboration is needed for complex problem solving and decision making, which are central to sustainable development (UNESCO, 2018).

----- Key Readings -----

Burns, S., Yu, E., Brathwaite, L., Masum, M., White, L., Dhuey, E., & Perlman, M. (2024). [Improving young children's peer collaboration in early educational settings: A systematic review](#). *Review of Education*, 12(2), e3484.

Systematic review summarizing studies on how peer collaboration might be increased through interventions in children aged zero to six years.

Tomasello, M., & Hamann, K. (2012). [The 37th Sir Frederick Bartlett Lecture: Collaboration in Young Children](#). *Quarterly Journal of Experimental Psychology*, 65(1), 1–12.

Theoretical article reflecting upon the evolution and ontogeny of human collaboration by integrating various research findings.

Collaboration and play-based learning

Research suggests that having children engage in various tasks together, such as collaborative storytelling, drawing, building, or maze tasks fosters their collaboration skills (Burns et al., 2024). Play contexts offer children a high degree of control over what they do and what they want to achieve as well as how they interact, therefore providing ample room for children to learn how to communicate and cooperate with each other. Research suggests that such contexts might be more effective in developing children's collaboration skills than more structured settings by promoting more complex problem-solving, observational learning, and positive joint communication (Mackley et al., 2022; Ramani, 2012). Play-based pedagogy and group work can enhance collaborative abilities in early-grade learners, though teacher training may be necessary to implement these approaches effectively (Ekeh, 2023). Collaborative interactions, in turn—characterized by shared goals and high levels of negotiation—can have powerful effects on student learning, both for high- and low-achieving students, when certain criteria are met (Andrews & Rapp, 2015). These findings highlight the importance of incorporating play-based elements into early childhood education to foster collaboration skills, with potential benefits extending to subsequent cooperative activities.

----- Key Readings -----

Andrews, J. J., & Rapp, D. N. (2015). [Benefits, costs, and challenges of collaboration for learning and memory](#). *Translational Issues in Psychological Science*, 1(2), 182–191.

Review discussing the benefits and costs of collaborative learning from an educational and cognitive psychological perspective. Includes also practical implications for the optimization of learning benefits in collaborative activities.

Ekeh, M. C. (2023). [Developing Early Graders' Collaborative Skills through Group-Work, Play-Based Pedagogy](#). *International Journal of Learning, Teaching and Educational Research*, 22(4), 160–177.

Qualitative study suggesting that teachers' knowledge of play-based pedagogy is an important factor in the development of children's collaboration skills.

Mackley, H., Edwards, S., Mclean, K., & Cinelli, R. (2022). [Building collaborative competencies through play with outdoor loose parts materials in primary school](#). *Cambridge Journal of Education*, 52(4), 431–451.

Qualitative study reporting that providing loose parts materials for primary students' outdoor play may support shared understanding during play, a precursor for collaborative skills.

Ramani, G. B. (2012). [Influence of a playful, child-directed context on preschool children’s peer cooperation](#). *Merrill-Palmer Quarterly*, 58(2), 159–190.

Experimental study comparing children’s activities and interactions in a structured, adult-driven versus a less structured, child-driven building task. Children cooperated and interacted more in the child-driven, more playful context.

Existing sustainability interventions and evaluation

Studies suggest that attitudes toward the environment formed in early childhood can influence behavior throughout life. This does not primarily include targeted education but rather the connection children form to nature when they have the opportunity for regular outdoor activities. Early and longer-lasting exposure to nature is likely to be more effective (Barrable & Booth, 2020; Wells & Lekies, 2006).



Systematic studies on interventions to increase sustainability/environmental education in children are limited to date, with most of them focusing on teachers and children (Güler Yıldız et al., 2021). However, the existing interventions that have been evaluated show promising results: The most frequently reported outcomes related to increases in environmental literacy, cognitive development, and social-emotional development. Other positive outcomes related to physical development and language and literacy development. In terms of pedagogical approaches, the majority of interventions emphasized the effectiveness of play-based, nature-rich approaches including movement and social interaction (Ardoin & Bowers, 2020; Bascopé et al., 2019).

----- Key Readings -----

Ardoin, N. M., & Bowers, A. W. (2020). [Early childhood environmental education: A systematic review of the research literature](#). *Educational Research Review*, 31, 100353.

Systematic review considering 66 studies across a time span of 25 years that investigated early childhood environmental education programs.

Barrable, A., & Booth, D. (2020). [Increasing Nature Connection in Children: A Mini Review of Interventions](#). *Frontiers in Psychology*, 11, 492.

Mini review reporting on studies that investigated interventions to increase nature connection in children. Also provides some recommendations for future research and practice.

Bascopé, M., Perasso, P., & Reiss, K. (2019). [Systematic Review of Education for Sustainable Development at an Early Stage: Cornerstones and Pedagogical Approaches for Teacher Professional Development](#). *Sustainability*, 11(3), 719.

Systematic review investigating early education for sustainable development with a focus on suitable pedagogical approaches. Also considers the role of teacher professional development and citizenship education.

Güler Yıldız, T., Öztürk, N., İlhan İyi, T., Aşkar, N., Banko Bal, Ç., Karabekmez, S., & Höl, Ş. (2021). [Education for sustainability in early childhood education: A systematic review](#). *Environmental Education Research*, 27(6), 796–820.

Systematic review of articles published from 2008 to 2020 on early childhood education for sustainability, analyzing the research methods used and the focus of the content.

Siraj-Blatchford, J., Mogharreban, C., & Park, E. (Eds.). (2016). [International Research on Education for Sustainable Development in Early Childhood](#) (Vol. 14). Springer International Publishing.

Book providing a collection on education for sustainable development in various countries across the world (e.g., Chile, USA, Korea, Kenya).

Wells, N. M., & Lekies, K. S. (2006). [Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism](#). *Children, Youth and Environments*, 16(1), 1–24. [ht](#)

Large-scale study with interviews of adults reporting on their childhood nature experiences and their adult attitudes and behaviors towards the environment.

The current situation in Mexico

Estimating how Mexico fares in terms of sustainability education is not an easy endeavor. Ardoin and Bowers (2020) report in their review no study on interventions for sustainability in Latin America. Consequently, the current knowledge base for sustainability education in Latin America is limited or even nonexistent. Considered more broadly, there are interventions targeting social skills in children (Amador Buenabad, 2020), which constitute one important part in sustainability education. In terms of collaboration, it has been reported that Mexican children nowadays engage less in cooperative play than 50 years ago (Garcia et al., 2021). However, in a comparison within the US, children of Mexican heritage showed more sophisticated collaboration than other children (Alcalá et al., 2018). According to the National Survey of Health and Nutrition (Ensanut) 2018-2019, the majority of parents engage in activities that foster their children's development, such as reading books, playing, or singing (Shamah-Levy et al., 2020).

----- Key Readings -----

Alcalá, L., Rogoff, B., & López Fraire, A. (2018). [Sophisticated collaboration is common among Mexican-heritage US children](#). *Proceedings of the National Academy of Sciences*, 115(45), 11377–11384.

Quantitative study comparing cooperation behavior of Mexican-heritage versus European-American siblings. Cooperation among Mexican-heritage siblings was higher in the experimental task and as reported through mothers, hinting at family socialization practices as an important factor.

Amador Buenabad, N. G., Sánchez Ramos, R., Schwartz, S., Gutiérrez López, M. L., Díaz Juárez, A. D., Ortiz Gallegos, A. B., González Ortega, T. G., Vázquez Pérez, L., Medina-Mora Icaza, M. E., Domenech Rodríguez, M. M., & Villatoro Velázquez, J. A. (2020). [Cluster Randomized Trial of a Multicomponent School-Based Program in Mexico to Prevent Behavioral Problems and Develop Social Skills in Children](#). *Child & Youth Care Forum*, 49(3), 343–364.

Experimental study comparing the effects of different types of school-based interventions on children's social behavior and parents parenting behavior in Mexico.

Garcia, C., Greenfield, P. M., Navarro-Hernández, A. M., Colorado-García, J., & Vidaña-Rivera, T. M. (2021). [Cooperative play and globalized social change: Mexican children are less cooperative in 2017 than in 1967](#). *Current Research in Ecological and Social Psychology*, 2, 100003.

Quasi-experimental design comparing Mexican children's behavior in a cooperation board game between 1967 and 2017. The results indicate an increase in competition and a decrease in cooperation.

Shamah-Levy T., Vielma-Orozco E., Heredia-Hernández O., Romero-Martínez M., Mojica-Cuevas J., Cuevas-Nasu L., Santaella-Castell J.A., Rivera-Dommarco J. (2020). [Encuesta Nacional de Salud y Nutrición 2018-19: Resultados Nacionales. Instituto Nacional de Salud Pública.](#) Cuernavaca, México.

Report summarizing the results of the national survey of health and nutrition in Mexico from 2018-2019. Also includes information on how parents interact with their children to support their development.

Sotomayor, Alberto (2024). [México: segundo informe de progreso de políticas de primera infancia.](#) Diálogo Interamericano, Primera Edición.

The report is the second delivery from a collective effort in Mexico to monitor and evaluate the progression in the policies, actions, institutional change and system change for Early Childhood. It includes the challenges and observations relevant to the ecosystem of stakeholders: budgeting and intersectionality; quality in ECD services; and ECD measurement.

Beltrán, Ixchel (2024). [La deuda pendiente: Acceso a los derechos. Análisis de la pobreza multidimensional en primera infancia, México 2018-2022.](#)

The report contains valuable information regarding poverty in early childhood in different dimensions: education lag, lack of access to health, social security, quality nutrition, households and basic services. The report provides main findings for each of the 32 states in Mexico with recommendations and downloadable databases from the research.

Comisión para América Latina y el Caribe y Fondo de las Naciones Unidas para la Infancia (CEPAL-UNICEF) (2012). [Pobreza infantil en pueblos indígenas y afrodescendientes de América Latina.](#) Naciones Unidas, Santiago de Chile.

This publication presents the situation of inequity that indigenous and afro descendent children face in the region. The Commission for Latin America and the Caribbean (CEPAL) and UNICEF assess poverty and inequity in multiple dimensions for a broader understanding of the meaning of being a child in 17 different countries. The study centers on livelihoods, access to water, sanitation and education.

Comisión Nacional de los Derechos Humanos (CNDH). (2020). [Informe Especial sobre el Estado que guarda el derecho a la educación de niñas, niños y adolescentes con discapacidad en México.](#)

The special report from the National Commission on Human Rights includes a historical review regarding the evolution of the right to education within the scope of inclusion. It includes an analysis from the international and national legal framework with data collected from the states, a qualitative study about learning centers.

Importance of appropriate assessment and evaluation

It is well-established that collecting data on the current status of children’s education and also assessing the effects of interventions is a highly important step in fostering child development and learning. However, data collection should not be about collecting as much information as possible (Custer et al., 2018). Data collection should be planned carefully and involve questions such as:

- 1) Which information needs to be collected and why?
- 2) How and from whom should the data be collected?
- 3) When should the data be collected?

The first question involves considerations ranging from the needs of the stakeholders for whom the data is collected to how the construct of interest should be defined (Custer et al., 2018; Wilson et al., 2012). The topic of alignment between stakeholders’ needs and data collection and communication is part of Deliverable 3. First ideas regarding the conceptualization of collaboration have been described above. Questions 2) and 3) will be addressed in Deliverables 2 and 4.

The next section (Deliverable 2) focuses on a child-oriented assessment that can be implemented to establish the impact of the G4S programming on children’s attitudes and behaviors. This section focuses on the assessment on one of the stakeholder categories—children. Complementary assessments will be administered with families and teachers. These same considerations outlined here (#1 - 3) apply across stakeholder categories when designing assessment and evaluation strategies.

----- Key Readings -----

Custer, S., King, E. M., Atinc, T. M., Read, L., & Sethi, T. (2018). [*Toward data-driven education systems. Insights into using information to measure results and manage change.*](#)

This article discusses the importance of knowing which data is wanted and needed by decision-makers, that is, the aimed use of data should define its collection.

Eddy, J. M., Dishion, T. J., & Stoolmiller, M. (1998). [The Analysis of Intervention Change in Children and Families: Methodological and Conceptual Issues Embedded in Intervention Studies.](#) *Journal of Abnormal Child Psychology*, 26(1), 53–69.

Coming from the area of therapy, this article provides important considerations and challenges in evaluating interventions.

Wilson, M., Bejar, I., Scalise, K., Templin, J., Wiliam, D., & Irribarra, D. T. (2012). [Perspectives on methodological issues.](#) In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment and Teaching of 21st Century Skills*. Springer Netherlands.

Book targeting the assessment and teaching of 21st century skills. The specific focus of this chapter is on methodological challenges, such as establishing validity.

Deliverable 2- Assessment

The goal of deliverable 2 is to provide a **roadmap and menu of options** for a child-oriented assessment tool measuring effects of G4S programming on attitudes and behaviors relating to collaboration. This deliverable is structured around four main components. First, a general overview of the assessment strategy. Second, a description of the general categories of questions that could be included in the child-oriented assessment. Within this section, options for different scales—which provide a continuous assessment measure—are described. Third, a protocol for a task measuring prosocial behavior is described. Fourth, examples of collaboration tasks that have been implemented in previous work are described. Note that these are not likely to be part of the core assessment, nor are they likely to be instantiated in their exact forms. Rather, they are included here to provide an example of the key features of the kinds of tasks designed to measure collaborations of dyads of children generally within the target age range of the G4S programming.

Part 1: Overview and assessment strategy

Goals of child-oriented assessment

Previous child-oriented assessments have not captured changes in children’s responses in pre- and post G4S programming. Some possible areas for improvement in thinking about the design are as follows. First, future assessment measures could focus on the inclusion of more **continuous measures**. In doing so, the assessment tool may become more sensitive — i.e., better-positioned to capture smaller changes in children’s responses to the questions before versus after their experience with the curriculum. Second, given the current focus on collaboration, the new questionnaire could show a commensurate targeted **focus on assessing attitudes and behaviors that are related to collaboration**. For instance, assessing prosocial behavior as indexed by children’s willingness to share with others, even when doing so comes at a personal cost. Additional measures of interest could include partner choice questions (e.g., would you rather play with a child who was previously collaborative or someone who you worked along with). Third, it is important to note that the **existing questionnaire**, although it did not capture change in its previous implementation, has many strengths and should be consulted and perhaps adapted when creating the new assessment questionnaire.

Implementation plan

The questionnaire will be administered by teachers and/or facilitators who have been trained by the E4S team. For logistical reasons, the questionnaire should be designed to allow for **simultaneous testing of a full classroom of children**. Additionally, because of the target age range (3- to 6-years), language and imagery should be simple and compelling to encourage engagement in the youngest participants. Moreover, because children will likely be responding to the questionnaire themselves, clear graphics should be used instead of words in soliciting their responses. For instance, it would be better to present scales with images compared with scales with words or numbers.

The questionnaire will be administered before children participate in the G4S programming designed to foster collaborative skills. This first implementation will serve as the “pre-test” and will serve as the **baseline** against which children’s later responses will be compared.

It is worth noting that there can be issues associated with implementing the exact same assessment measure at Time 1 (T1) and Time 2 (T2). Two issues in particular are: (1) children may remember how they answered and be inclined to provide the same answer for the sake of remaining internally-consistent; (2) alternatively, children may think that because they are being asked the same question again, their first answer was incorrect and they may, thus, change their answer based on this inference. Strategies for addressing this concern are outlined in Deliverable 4. For the purpose of the current assessment, this concern is attenuated for two main reasons. First, the T1 and T2 implementation points will be separated by several months, making it unlikely that children in this age range will recall what they answered at T1 when they are completing the questionnaire at T2. Second, and related, through the incorporation of more continuous measures, the chances that children will remember their specific responses are low.

Establishing comprehension is important for children in this age range. To this end, suggestions are made in Part 2 below for the inclusion of **comprehension checks** that can be administered at the classroom level. Underlying these suggestions is the idea that the goal is for children to understand the questions, scenarios, etc before they answer, but it does not matter whether they understand immediately or with additional help from facilitators. To this end, the comprehension checks are designed to help facilitators identify children who are struggling with the questions and give them one-on-one attention to coach them until they understand. Note that this kind of coaching should not happen after it has been established that children meet a comprehension criterion.

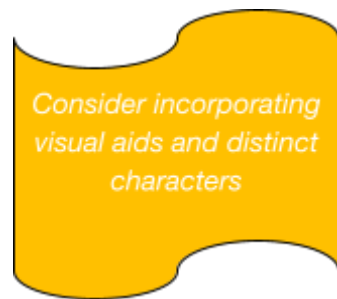
Finally, because some of the tasks suggested for inclusions in the questionnaire are dependent on number competency, a simple **counting** question is included. This could be the very last task included. The relevant literature justifying this particular task is included in its description below.

Part 2: Assessing expectations, evaluations, and preferences

Overview of approach and possible scenarios

In general, the question types outlined under Part 1 will be centered on short stories that are presented to children by a facilitator. Ideally, the stories would be displayed both on the child's print-out as well as on a screen. However, if you have to choose, I would show them on the screen and then have characters on the print-out to make the link between the questions and the stories very clear.

In designing the stories, it is useful to create characters that have different-sounding names and are wearing differently colored clothing. This helps children distinguish them, and facilitators can speak to these visual features when talking about different characters. If there is a clear target child in a story, they can be circled with a red or yellow circle to make it even easier for children to understand whose choices they are thinking about. If in-house graphic support is available for vignette creation, that is ideal. Otherwise, they can be mocked up using vector images available on websites like freepik. Full story lines can be built out in Vyond. However, both freepiks and Vyond require subscriptions.



Given that the goal of this questionnaire is to establish whether children's responses to questions relating to collaboration change as a result of the G4S programming, scenarios can tap a range of different choices related to collaboration. Some examples are as follows:

1. **Helping.** Helping here can be operationalized as comforting, sharing, and/or helping a peer achieve a goal. Scenarios can depict situations where one character is in need of help and the other either chooses to help, chooses not to help, or has yet to make a decision.
2. **Choosing to work alone or collaboratively** Scenarios can depict a situation in which one child could work by themselves to achieve a goal or they could contribute to a group project, which would yield higher overall benefits. However, the benefits would need to be divided up. As one kind of example, one character has a choice between creating a small garden to grow one kind of fruit or vegetable. Since they are working alone, they can only grow a small amount of produce. Alternatively, they can contribute to a community garden through working with people in their neighborhood. However, in this case, all the vegetables are divided up and no one is sure how much produce they'll get at harvest.
3. **Trust.** Scenarios can depict situations that require one character to put trust in another, even though this opens them up to potential exploitation. Some examples would be one character who asks a peer to hold a sweet treat and promise not to eat it while they go

to a different area to do something else. Or, one character asks the other to watch something of value (a bike).

4. **Fairness.** Scenarios can depict a person who acts selfishly toward another. For instance, one character in a classroom fetches a box of crayons and refuses to share them with a classmate.
5. **Respect** for rules and/or rights. Scenarios can depict situations in which one character does something to benefit themselves, despite the negative impact this decision has on others' outcomes. For instance, students are lining up to receive school breakfast and a student cuts in line, to help themselves first. Alternatively, a student violates a turn-taking pattern in a game. Or, a student hogs a soccer ball that is supposed to be used by a whole group of children.



Figure 2. Example helping story. Characters are in differently-colored t-shirts and facilitators can point toward the characters and even mention the colors during story-telling to make sure that younger children are able to follow the scenario.

Scales

Depending on the question type at hand, different scales will need to be deployed. As mentioned above, it is useful to use continuous measures because these are more likely to be sensitive to small changes than are binary (e.g., yes or no) measures. However, using scales can be challenging for younger children. To address this challenge (1) scales should be designed using clear graphics that align with the question being asked. For instance, scales asking

*Use age-appropriate
visually engaging
scales*

questions about “a lot” versus “a little” can use shapes of different sizes or arrays of different numbers of dots. Some additional consideration:

1. Whether or not to allow a midpoint. This depends on the question at hand and whether a midpoint is meaningful. If so, then using a scale with odd numbers is preferred. If not, a scale with even numbers is preferred.
2. While it can be more efficient timewise to present children with a full scale, it can be hard for children to orient to the full scale. One method that gets around this is to first ask a binary question (e.g., was this good or bad) and then ask the more continuous question (e.g., was it very good (2.5), kind of good (1.5), or only a little good (0.5) or very bad (-2.5), kind of bad (-1.5) or only a little bad (-0.5). This is useful when there is no midpoint.

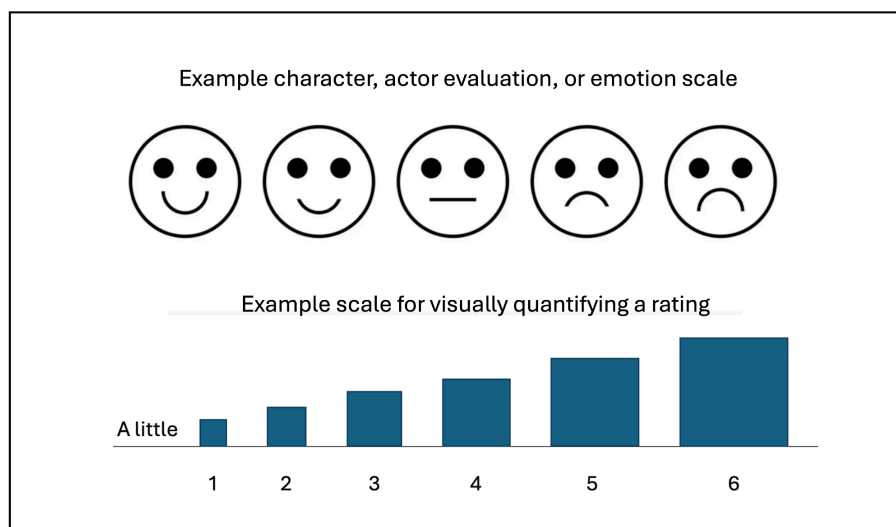
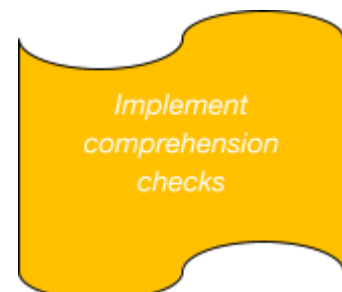


Figure 3. Example scales. The top could be used to ask questions about how good or bad an act was (as could an adapted version of the bottom scale). It could also be used to solicit ratings about how an act might make someone feel. The bottom scale is an example of how to visually depict continuous measures to make them easier for younger children to use.

Comprehension checks

It is useful to establish comprehension about stories and scales before children are given opportunities to answer questions directly. Given that this questionnaire will be implemented with a large group of children, questions could be directed to the whole group. For



instance, children could be asked to raise their hands to indicate the response to a comprehension question. Children who answer incorrectly should be given additional attempts and, if possible, one-on-one attention and coaching to make sure that they've understood before recording their answer.

To provide a concrete example based on the story depicted in Figure 1. Before children are asked to evaluate the characters' actions and the characters themselves, it would be good to establish that the children were able to follow which character did what. To that end, a question format might be:

“Who fell down and hurt themselves? Raise your hand if you think it was Maria.”

Facilitator points to character in purple shirt; facilitator pauses and waits for children to raise their hands.

“Now raise your hand if you think it was Paula”

Facilitator points to character in green shirt; facilitator pauses and waits for children to raise their hands.

“Thanks for answering my question! The character who fell down and hurt themselves was Maria.”

Facilitator checks in with children who got it wrong.

It is, of course, possible that doing this for all features of all stories will not be feasible both because it will take too long, and relatedly, would be too taxing for children. However, this example is here to provide a model for how to phrase and implement a comprehension. When the questionnaire is designed, the team can decide upon the features of the questions that are most crucial for children to understand and build comprehension questions around those. Similarly, if a single scale is being used for most or all of the responses, it would be useful to devote a comprehension check to ensuring that children know how to use the scale. By way of one example (which is likely not directly relevant but, again, may provide a useful model for how to craft and implement this kind of comprehension check:

“Let's pretend we're using this scale to talk about foods we really really like and foods we really really don't like. Can you show me what you would circle to show me how much you like your favorite food. And can you show me what you would circle to

show me how you hate your least favorite food. And what about foods in the middle? What would you circle to show me how you feel about foods that you think are just ok.”

Child is considered to have met the comprehension criterion if they circle a shape in the positive direction for their favorite food, in the negative direction for their least favorite food, and something in between for the good they think is just ok.

Measures to assess expectations, evaluations, and preferences

Expectation

Here children are asked to show what they think did or will happen in a story. For instance, in the helping story outlined above in Figure 1, children might be asked:

“What do you think happened next? Do you think Paula decided to comfort Maria or do you think Paula decided to walk away and continue playing.”

The trick here is how to convert a question like this into a **continuous measure**, and this can be done in a few ways. For instance, it could be: “How much do you think Paula tried to comfort Maria? A tiny bit, a bit, a lot, etc.” Alternatively: “How hard do you think Paula worked to comfort Maria? Not very much, a little, etc.”

Another way is to add a question about **certainty**. Do you think Paula decided to comfort Maria? [yes/no]. How sure are you? [certainty scale]. This is then converted into a continuous value by combining the directionality from the yes/no question (positive/negative) with a number from the certainty scale. While this offers a relatively straightforward means of creating a continuous measure from the researcher’s perspective, caution is warranted when building in questions about certainty because it is not always clear that young children really understand what this means. If certainty is used, a comprehension question should be implemented to make sure children understand how to rate things on a scale of certainty.

A riff on the expectation-style questions is to ask children what they think *should* or *ought* to happen. This question measures children’s understanding of rules or norms that govern different behaviors. Sometimes children’s perceptions of what *should* happen deviates from

their expectations of what *will* happen so, depending on the question at hand, it can be useful to include both an expectations measure as well as a **norms measure**.

Evaluation

Children can be asked to evaluate both **actions** as well as the **characters** who completed different actions. If possible, it is a good idea to have *both* action and character evaluation questions, as children's answers can sometimes be different when they are rating the act compared with the agent who committed the act. Paula decided to comfort Maria by giving her a hug. Do you think it was good or bad that Paula gave Maria a hug? [scale]. Now I want you to think about Paula. Do you think Maria is a nice person or a mean person? [scale].

Partner choice

Partner choice questions can rely on the same kinds of scenarios described above except, here, two characters are presented and they make different choices. Children are then given the opportunity to “choose” who they would prefer to interact with. The content of the partner choice questions can involve features that are relevant to the children being assessed. For instance, a choice to invite someone to a party, a choice to work with someone on a school project, etc.

One interesting application of a partner choice question would be to assess **children's preferences for those who collaborate versus those who do not**. For instance, Paula decided to work together with her classmates to complete the block tower vs. Paula decided to work by herself to complete the block tower. Then, children are asked to evaluate the character or action using scales above - who would you rather be friends with / invite to your birthday party / do a school activity with / etc.

Short number task

To address concerns about variation in number competency, a simple number task could be included. A starting point for this could be a simple question involving 6 items. Six items can be shown on screen and children can be asked to count them. Previous work on numerical competency, suggests that if children can count above 5 they are cardinal principle knowers and have a solid grasp of numbers. Given the age range, there may be a subset of children who fail this task and follow-up tasks can be conducted to assess their number competency. See Marchand et al., 2022 for more information.

Number knowledge is relevant for the task that will be described next and, for children who do not pass the ‘count 6’ task, the number of stickers they divide up could be adjusted. In this case, it would be important to use the same number of stickers at T1 and T2.

Part 3: Behavioral task for measuring prosocial behavior

In this task, children will be given a set of **resources** (e.g., stickers) and given the opportunity to divide them between themselves and another child. This works well if children are presented with two clear containers or spaces for their stickers. The containers should be clearly distinguishable so that children can understand which stickers they will be keeping and which ones they will be sharing. For the purpose of this example, we can assume that two envelopes will be used and that stickers are the resource that children will be dividing up. Regardless of whether the team uses stickers or not, it is important to use resources that are similar within each classroom and child. Otherwise, children may share the ones they don't care about and keep the ones they value.

Materials needed

1. Two envelopes
2. Six identical stickers
3. One different sticker (e.g., star or plain circle)
4. Paper clip

Example script

"I'm going to put 6 stickers here."

Facilitator counts them while putting them down. Or leads the classroom in the act of counting them out from the front of the class.

"Right now all of these stickers belong to you. You can do whatever you want with them. You can keep as many as you want for yourself or you can give as many as you want away to another [boy/girl, match gender] who we will see later."

Facilitator asks children to take the two envelopes and lay them side-by-side on the table or desk.

"First let's make sure you know which envelope is yours to keep. Do you see the one sticker that is different from the others? Put that sticker on your envelope so that you know it's yours to take home."

“Any stickers you want to keep for yourself you put in your envelope. And any stickers you want to give to the other boy/girl you put in the other envelope.”

“Now before you play the game, I want to make sure you understand the instructions. Right now who do these stickers belong to? Raise your hand if they belong to you. Raise your hand if they belong to someone else.”

Address comprehension as described above: i.e., correct children who get it wrong and ask again: so who do these belong to right now?

“That’s right. Now where do you put the stickers you want to keep for yourself?” Can you show me by picking up your envelope and raising it above your head. And where do you put any starbursts you want to give to the other [boy\girl]? Can you show me by picking up the other envelope and raising it above your head.”

Correct if necessary

“Great! It’s time to make your decision. Now it’s your turn to put all the stickers into the two envelopes. You can put as many as you want in your envelope and as many as you want in the other envelope. When you’re done, please attach the other envelope to your questionnaire with the paperclip.”

Part 4: Collaboration tasks from the literature on the development of collaboration

A set of tasks that could be implemented with few materials, ranging from the simplest to the most complex:

String-pulling task

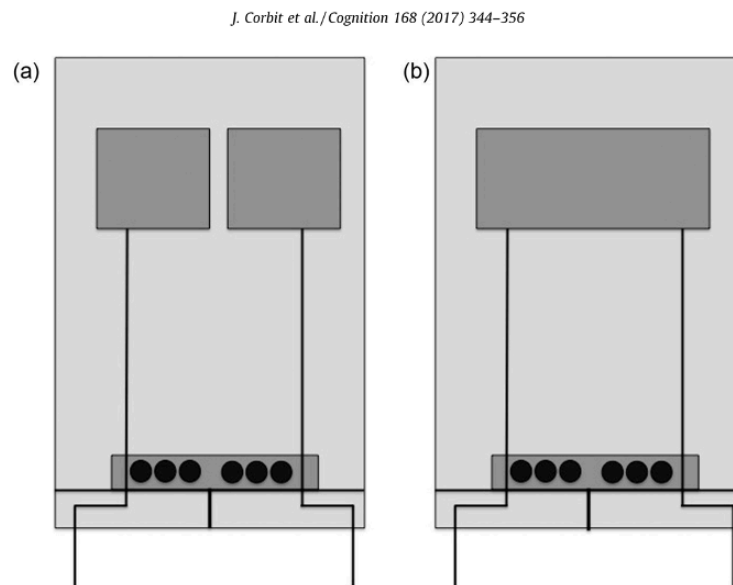


Figure 4. Schematic Illustration of Pulling Game in (a) parallel work and (b) collaboration configurations.

Description

This task involves two children either working collaboratively (right) or in parallel (left) to secure rewards (e.g., marbles). This can be set up as two conditions (e.g., what happens after collaboration vs. parallel work), as a choice (e.g., children can choose whether they want to work together or in parallel), or as a task (e.g., only the collaboration version is implemented as part of the G4S programming). An advantage of this set-up is that it is straightforward to change the pay-offs associated with parallel vs collaborative work to explore how this influences children’s decisions. I realize this would not be a top priority here, but I generally like that it is quite a flexible method. (Image from Corbit et al., 2018).

Box-based string-pulling task

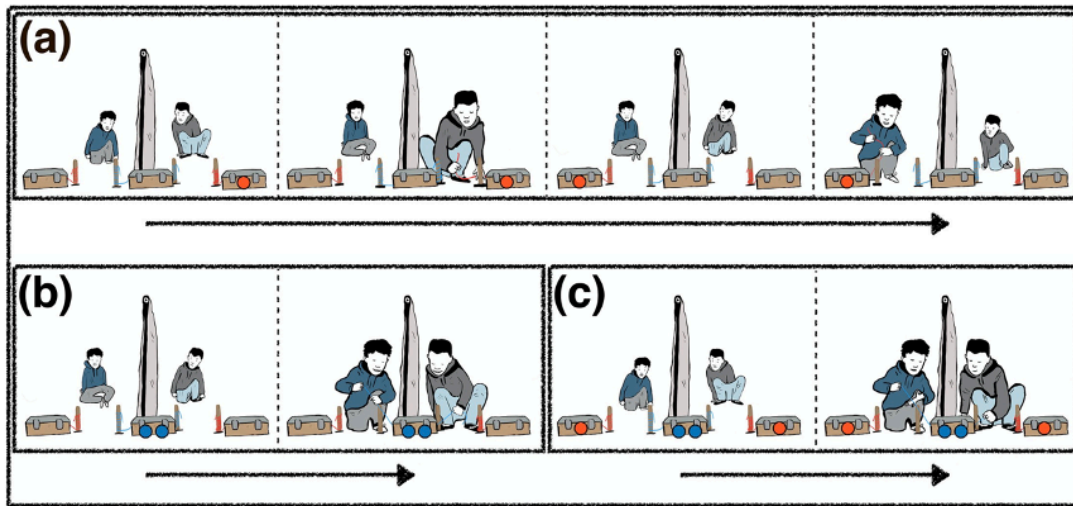


Figure 5. Procedural steps. (a) Individual and (b) collaboration trials; at the beginning of each trial children sit next to each other facing the devices; depending on condition, one (individual) or both (collaboration) participants then move toward the devices and pull the rope either alone or together with the peer; c) forced-choice trial with each device baited.

Description

This is very similar to the task described above, but relies on different materials. It may be slightly easier to set up, though I personally find it less intuitive. (Image from Stengelin et al., 2020).

Option 3: Multiple tray method

Description: This method is probably not worth pursuing for two main reasons: (1) it is quite complicated to set up, and (2) it is more suitable for older children. That being said, it offers a nice illustration of a more fine-grained approach to measuring collaboration so I thought it worth including here for that reason.

In this task, children can either move trays individually or they must work together to move trays. In both cases, children move the trays to an opening in the plexiglass box and then dump the rewards into two collection boxes. Like option 1, this is quite a nice method, because it affords the opportunity to manipulate the payoffs involved in individual vs. parallel work. (Image from Schäfer et al., 2023).

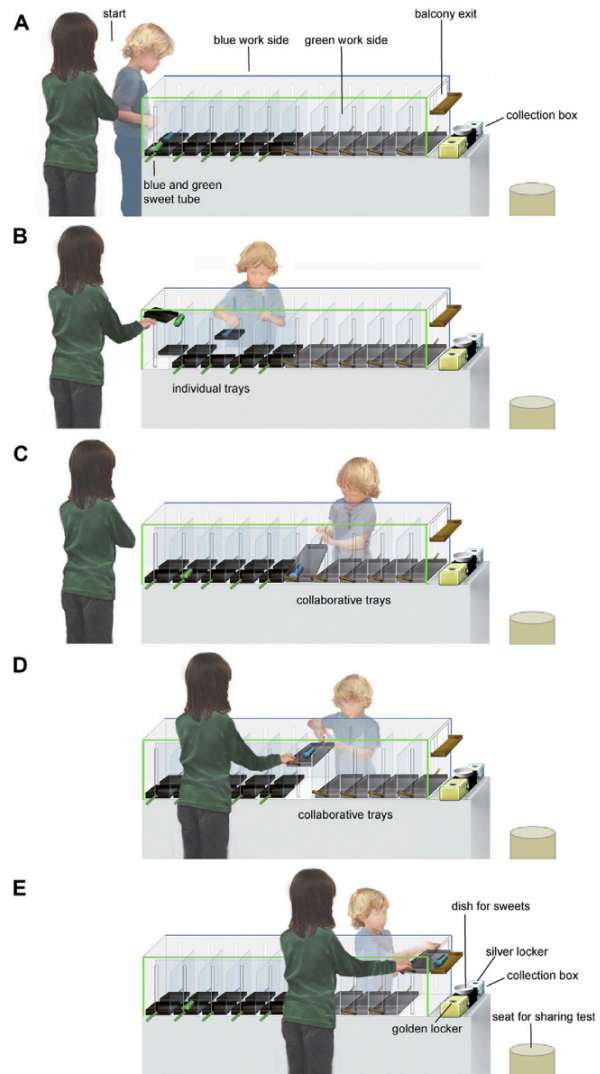


Figure 6. Multiple tray Method.

Deliverable 3 - Recommendations on MEAL plan components

Introduction

As part of the review of G4S's evaluation process, fellows identified specific areas for improvement within the components of the project's Monitoring, Evaluation, Accountability and Learning (MEAL) components (e.g., goal-setting, indicators definition from the Logical Framework, learning questions and lessons learned from the implementation) to help generate a set of recommendations focused on the efficacy of learning from the project.

Complementary, the recommendations are aimed to improve the G4S MEAL Plan through a robust understanding of context variables and available data, which will contribute to the sustainability of the project for possible expansion/replication, transfer, closure or redesign.

Why MEAL?

The G4S project aspires to have a robust Monitoring and Evaluation (M&E) system supported by an M&E Plan centred on learning from the project implementation with a rigorous methodology for collecting, analyzing, and communicating data in order to contribute to project success.

Taking into consideration that E4S is going through a process of certification with the PM4NGOs-a nonprofit organization that promotes and sustains the professionalism of program and project management in the international development sector-it was agreed that the **recommendations will be framed within the contents of the [MEAL DPro Guide](#)** as it complies with international standards for "Monitoring, Evaluation, Accountability and Learning" (MEAL) while incentivizing purposeful learning from a systematic assessment of the value of the G4S project.

The DPRo guides state that MEAL is a key contributor to achieving outcomes and results, therefore, the guide highlights the importance of strengthening the organizations' capacity for MEAL: a team with the adequate proficiency, a system for MEAL embedded within the core processes of the organization, and strong components for accountability and learning.

The objective of this section is to frame the observations into 3 categories: 1) MEAL components; 2) MEAL plan and system; and 3) Accountability and learning.

MEAL components

From the series of components included in the MEAL DPro Guide, this section has selected those that are mostly required by donors and authorities due to their crucial role in the organization's alignment. Therefore, MEAL, as part of a built system of project management, helps the teams in achieving objectives by aligning efforts and resources to ensure that everyone is working towards a common purpose which optimizes efficiency and success.

Plus, the chosen components use a standardized language from the guides and specific terminology that facilitate communication within the organization and external stakeholders by avoiding ambiguity and improving the comprehension of concepts and processes inherent to G4S project management.

Theory of Change (ToC)

The G4S **Theory of Change** (ToC) illustrates the strategic intent of E4S on how change is expected to happen and has been constructed to contribute to the E4S ToC. As seen below, the 'measurable effects', 'wider benefits' and 'impact' outline the expected result from achieving outcomes from its different projects and program components.

THEORY OF CHANGE

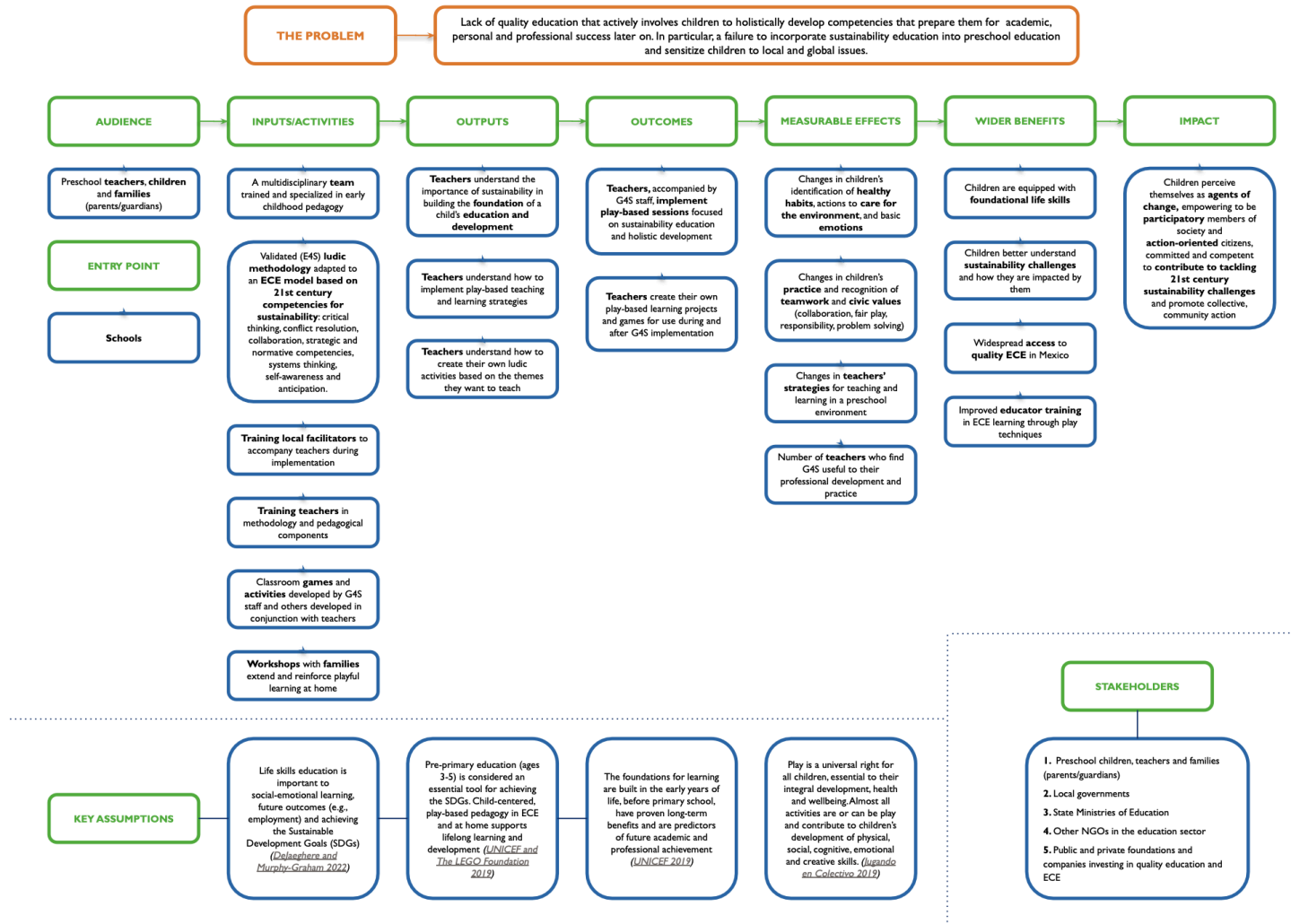


Figure 7. G4S ToC.

To further strengthen G4S’s MEAL components, it is recommended that the organization adapt its ToC to a project-specific version. This tailored ToC should provide a clear description of the anticipated change, supported by evidence from previous experiences, assessments, or external sources. As appreciated in the ToC, the current ToC shows the complexity addressed by the G4S program while combining the logic from a project based representation.

The program’s ToC can also benefit from linking its goals to the organization’s pathways for achieving the broader aspiration in their global ToC. The following diagram illustrates the alignment of outcomes and goals so indicators can be adequately defined.

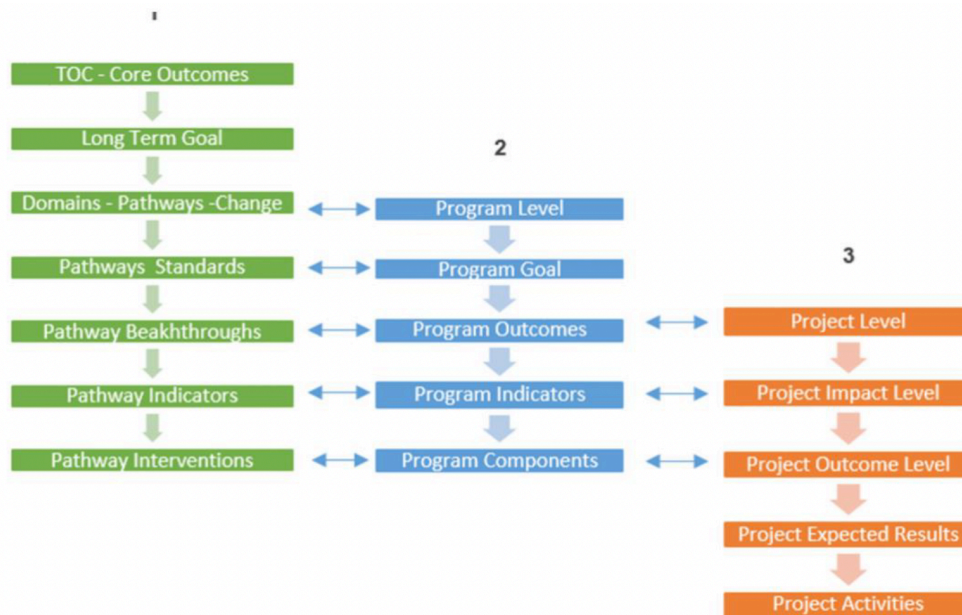


Figure 8. Relationship between an organization’s ToC, its programs, and projects.
(Program DPro Guide, 2017, p.44)

By differentiating the logic behind the achievement of goals at a project level from the logic required to achieve outcomes at the program level, an adapted ToC can clarify the extent that MEAL can cover.

Furthermore, explicitly stating project-level assumptions—such as public education policies that support the project and administrative cycles that best align with project implementation—would further enhance the ToC’s effectiveness.

As for the stakeholders, each location where the project is being implemented could benefit from mapping the different interventions as a variable that needs to be monitored.

Results Framework

While the project has established a solid long-term goal, the **results framework** would benefit from a more detailed articulation of preconditions and pathways to achieve it (e.g. considering

data regarding early childhood development). These pathways, as illustrated below, should define the relationships between preconditions and their contributions to the overarching objective. This approach should be grounded in evidence-based models that support the intervention and align the framework’s results with the project’s conceptual structure (MEAL DPro Guide, 2019, p. 24).

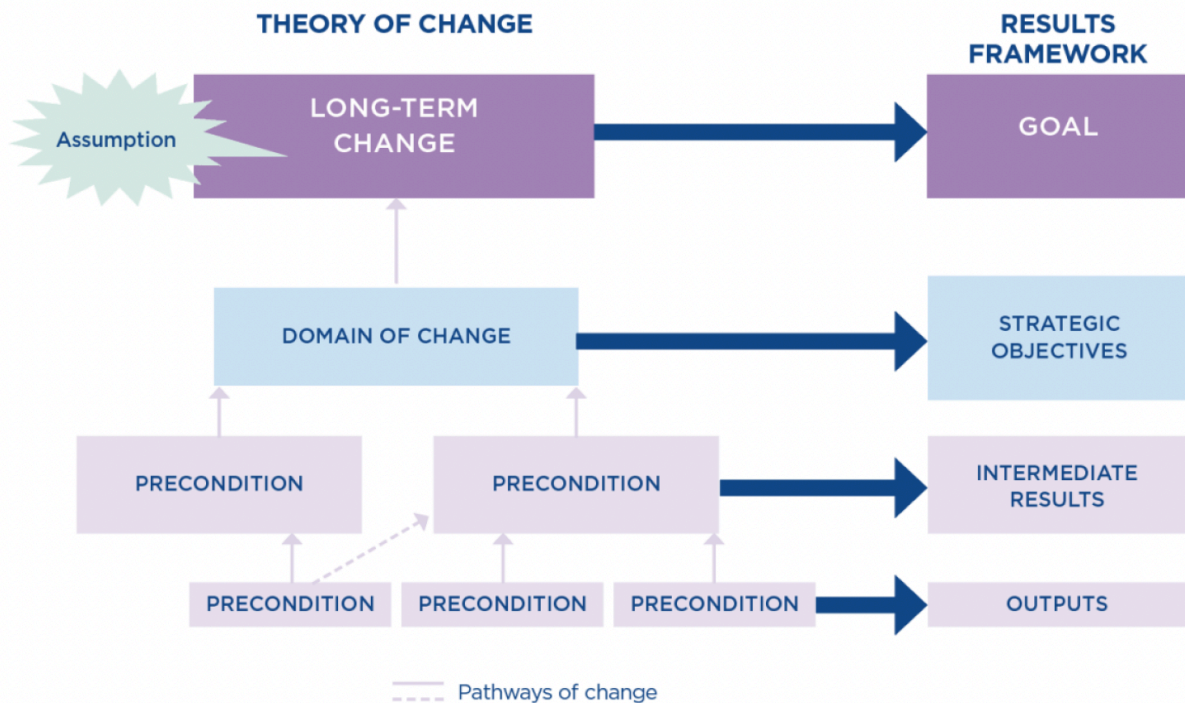


Figure 9. Translating the ToC content into results framework objectives statements (MEAL DPro Guide, 2019, p.24)

Currently, G4S is reframing a valuable resource in an internal document named **Problem and Objectives Trees**. As reviewed by the fellows, there is an opportunity to strengthen the alignment between the objectives tree, the results framework, and the project-specific ToC. This alignment would highlight closer connections between the objectives tree, strategic objectives in the results framework, and the domain of change articulated in the ToC.

A results framework could state expected results primarily as outputs at the project level rather than broader programmatic outcomes. This approach can be advantageous for better understanding the project’s scope. However, while program **components** align with strategic objectives, defining clearer cause-effect relationships between identified problems and their solutions would make the project’s approach more transparent. Specific interventions should directly address these root causes, emphasising transparency, and coherence.

Logical framework (logframe)

G4S is also developing a complex **logical framework (logframe)** for its program. The internal version of the reviewed logframe combines project- and program-level perspectives. To better align with the organization's priority of understanding the positive effects of its interventions, it is recommended to adapt the logframe to a purely project-level focus.

At this level, the framework would detail the following structure:

- **Activities:** Conducted with the provided resources and inputs.
- **Outputs:** Achieved through activities (second-level rows).
- **Outcomes:** Generated for children (third level).
- **Overall Goal:** Contributed to by the outcomes (upper row).

Revising **objective statements** in the logframe could also help in developing indicators with appropriate thresholds for effective goal monitoring. These thresholds should focus on more than just summative reach. For instance, goals contained within the logframe require evidence to substantiate the expected percentages, ensuring they are realistic and achievable. Needs assessments and context analyses for each location could further inform differentiated goals and baselines, accounting for the variability in results between interventions based on preconditions and assumptions.

Other MEAL instruments that were shown to the fellows were the tables with objectives, indicators and items for each audience (teachers, families/caregiver and children), these can be significantly improved for their target beneficiaries: rather than focusing solely on measuring perception or reach—such as the number of teachers trained or changes in perception from entry-exit surveys—quality thresholds could provide a more nuanced assessment. Additionally, G4S should continually monitor **risks** in its project context, such as school infrastructure, natural disasters, political conditions, and other external disruptions.

Developing a comprehensive **matrix of indicators** with robust collection techniques—including standard and custom indicators, direct and proxy measures, and qualitative and quantitative methods—could further enhance this framework. Incorporating a third-party **impact assessment** would also add credibility and value to the MEAL components.

Overall, setting adequate goals and indicators while monitoring assumptions, highlight the three most important factors that determine the skill level required by the project manager to lead a project effectively.

MEAL plan and system

In previous sections, the logframe was identified as a cornerstone of the MEAL Plan. According to the Project DPro and MEAL DPro Guides, **monitoring** typically focuses on the lower levels of the logframe (e.g., activities and outputs), which assess the performance of actions, while **evaluation** examines to what extent the project was able to contribute to achieving outcomes and impact goals.

Evaluation	Goal/Impact	Contributed to by the outcomes.
	Outcomes	Strategic objectives and intermediate results.
Monitoring	Outputs	Achieved through activities.
	Activities	Conducted with the provided resources and inputs.

Table 5. Monitoring and Evaluation with the Logframe levels

The guides conceive projects as continuous cycles of planning and implementation throughout their lifecycle. To align with this approach, it is strongly recommended that G4S secure **a dedicated team** for the development, monitoring, and management of the MEAL Plan and system. While MEAL resources within the organization are currently available intermittently, DPro guidance suggests consistent engagement to maximize the project’s impact.

For the **Performance Management Plan (PMP)**, assigning a team with defined roles using a RACI matrix would enhance clarity around task ownership. Clear role definitions within the PMP would also generate insights into the intervention model, associated costs, timelines, and contextual factors.

To sustain continuous engagement, a well-designed **feedback and response mechanism** is crucial. This system should facilitate effective communication among stakeholders through different channels: top-down (for the community and direct/indirect beneficiaries), bottom-up intended for internal and external governance structures hierarchically above the project/program (e.g. donors, authorities, boards, etc.), and horizontal channels (peer organizations, project level teams, allies, etc.), ensuring feedback is captured and addressed systematically.

Finally, it is recommended to outline the **type of evaluations** needed (real time, final, ex-post) for the project. When referring to **Impact Assessment** that complies with international standards planning and budgeting are crucial for these exercises as they are costly and require significant time and resources.

Successful **ex-post evaluations** are often conducted by a specialized third party (consultancy firms, multilateral organizations, universities and academia, etc.) to assess the extent to which change is sustained after the project has concluded. These evaluations have an advantage over final evaluations as they can collect evidence required to better understand the social scope of the project while determining which interventions have been continued by the self-efforts of the participants of the project.

Impact assessment is also essential for adjustments to the ToCs (the organization's, the program's and the project's ToC) as it assesses the intended (and the unintended) effects that can be attributed to the program: an important asset for the organization, policy makers and funders. Thus, it is recommended that the G4S budget and MEAL planning consider this component and allocate resources (or apply for such).

Accountability and learning

Intentional planning of learning activities throughout the project lifecycle is critical. The project's **learning plan** could benefit from incorporating specific learning questions that address both the purpose of implementation and broader contributions. For example, questions exploring how the intervention creates a context-based model for teachers, potentially aligned with Sustainable Development Goals, would be particularly valuable.

In terms of accountability, a **Summary Evaluations Table** and **Evaluation Terms of Reference** should clearly describe planned evaluations, priority questions, timelines, budgets, and specific evaluation methods. These plans should include concise evaluation questions, proposed methodologies, and clearly defined roles and responsibilities for the project manager, implementing team, and MEAL team.

Effective accountability measures also require robust **communication plans** to ensure findings, performance metrics, and results are shared appropriately. Reports should be tailored to specific audiences:

- **Beneficiaries:** Including children, teachers, caregivers, and communities.
- **Donors and Authorities:** Aligned with agreed governance structures.
- **Stakeholders:** Across the G4S ecosystem.

These communication plans should ensure the transparency and accessibility of results, fostering trust and collaboration across all project stakeholders.

Consideration of context variables and available data

The implementation of the G4S project takes place within a complex educational landscape, where various social, political, natural, and cultural factors can act as barriers to achieving intervention results or, conversely, serve as opportunities to contribute to the desired change.

This section outlines the **context variables** currently not addressed in the G4S intervention. It also emphasises the importance of **leveraging relevant available knowledge**, which may significantly enhance the project's impact on public policies and interventions within the educational communities served by G4S.

These considerations are tied to recommendations for **stakeholder management** within the local ecosystems where the project operates. The goal is to understand and learn from the project's implementation through its relationship with its ecosystem and its integration with other actors, thereby contributing to the desired change.

Context variables

The educational landscape is dynamic and, while it adheres to continuous cycles, it can often be unpredictable and variable. Considering E4S's aspiration to scale its interventions and expand to schools across different regions, three context variables have been identified: **political cycles, educational cycles, and context situation**. These variables can be incorporated into each planning cycle and reflected in various tools mentioned in previous sections. For instance, they may inform the definition of assumptions within the logical framework or be listed as risks in the risk register, where their probability and impact can be effectively monitored.

Political cycles

Mexico's education system operates at a federal level and coordinates with the individual education systems of its 32 states. This complexity poses significant challenges for classroom interventions by civil society organizations. It is critical to acknowledge that professional development and training opportunities for teachers function both nationally and locally. Therefore, **the program's monitoring must account for the varying regulations across states**, which are often not aligned and lack coordination.

Adding to this complexity are the **political cycles** at both state and federal levels. Electoral periods introduce additional challenges, particularly during transitions between administrations. Outgoing administrations present the highest risk of interruptions to project continuity and sustainability, especially, when there is a change in the ruling party or governing coalition. In contrast, new administrations (within their first two years) or those in intermediate phases may

offer more stability for interventions by securing authority commitments and facilitating project management conditions.

It is also essential to monitor changes within the **education ministries**, as leadership turnover at both local and federal levels is a frequent reality in Mexico. Such changes can disrupt agreements critical to the implementation and evaluation of projects like G4S.

From a monitoring and evaluation perspective, securing **access to local data** is vital. Education authorities hold indispensable information for implementing interventions aimed at achieving outcomes. However, transparency and accountability remain significant challenges in targeting actions and evaluating results. Consequently, it is recommended that these **assumptions and preconditions** be incorporated as context variables to be monitored and evaluated throughout the project lifecycle.

School year cycle

The educational system follows the natural rhythm of the **school year**. Teachers and administrators face a substantial administrative burden, making it crucial for an external project like G4S to plan implementation and evaluation through a process of engagement and negotiation with local stakeholders. This approach ensures the project's relevance and alignment with **the educational calendar**.

E4S has demonstrated experience in understanding and adapting the school year cycle, because school year planning typically begins in the months leading up to the end of the previous cycle (May to July). These months could represent a critical window for G4S to continue securing stakeholder commitment, raising awareness, obtaining authority approvals, and negotiating agreements with the teaching structure.

The project can further benefit from documenting, validating and sharing how it has been able to align its implementation with the distinct **phases of the school year**, for example: conducting diagnostics at the start of the cycle, focusing on the recovery and reinforcement of foundational learning before the winter break, achieving annual learning goals by Easter, and addressing critical competencies needed for the subsequent school year, particularly during key transition periods (e.g. preschool to primary school).

By monitoring and evaluating these factors, G4S can draw lessons to better understand how the school year cycle presents both barriers and opportunities for intervention.

Context situation

The socio-cultural dynamics of each locality present risks and opportunities that must also be monitored. Social disruptions—whether reported through traditional or digital media—can significantly impact the assumptions underpinning a project, potentially halting its operations.

To mitigate this, the MEAL Plan and System should equip field teams, local offices, and supervisory personnel with tools to monitor these variables. By proactively tracking the socio-cultural context, the project team can improve its **responsiveness to emergent risks** and capitalize on opportunities.

As mentioned before, a **feedback-response mechanism** can constantly report the monitoring of the context situation along with the **log-issue** and **risk register** as two useful tools to follow up on problems and risks. Under the participatory and governance principles described in the Project DPro Guide, the project can assure that relevant stakeholders are informed, involved and included to address and act upon the context situation.

Available data

G4S is an early childhood educational program designed to foster sustainability competencies to children aged 3 to 6 from vulnerable communities. Leveraging the power of learning through play, the program seeks to develop essential skills such as communication, critical thinking, teamwork, empathy, and resilience. This is achieved by accompanying educators to implement a play-based curriculum with their students, supported by ongoing engagement from caregivers.

The implementing team has gathered evidence through various iterations of the project, employing both qualitative and quantitative methods to measure its results and learn from the intervention. However, there remains a need for a deeper understanding of how the project contributes to outcomes and intermediate results and a more specific understanding of the context (e.g. early childhood development, poverty, stress factors, etc.).

This section highlights **available data** that suggest variables capable of helping G4S identify factors leading to positive effects from its interventions, as well as uncovering potential barriers and biases.

Currently, the evaluation techniques revised in G4S focus primarily on changes in beneficiaries' perceptions (e.g. levels of satisfaction and perceived benefits within teachers and caregivers through surveys and questionnaires). While valuable, the project could significantly benefit from incorporating **data and insights** produced by recognized institutions and organizations specialising in early childhood development and children's vulnerabilities, and from monitoring and evaluating these variables.

If there is data available for the attended communities, a more detailed intervention can be planned to assess if any of the variables is positively or negatively affected by the program/project or if they could compromise the results. For example, children's poverty conditions (toxic stress, violence, malnutrition, abuse, etc.), child's development (fine and gross motor skills, language, emotional and cognitive skills), learning proficiency (e.g. achieved early foundational literacy and math skills) and education indicators (e.g. access to health, care and

education services, school attendance, and quality of education infrastructure and teachers competencies).

Such an approach would represent a milestone in enhancing the organization's capacity to monitor and evaluate its interventions, enabling the development of more robust methodologies for impact assessment.

The available data significantly reinforces the evidence base for the results framework and ToC, enabling triangulation of data while reducing the subjectivity of problem definitions. Combining multiple perspectives to validate needs assessments will enhance the reliability and relevance of project outcomes.

Below is a non-exhaustive list of information and knowledge resources generated by organizations and institutions recognized for their rigorous data collection, analysis, interpretation, and communication practices. Each entry includes a brief description of its relevance to G4S, highlighting its potential to complement the project's identification of expressed and perceived needs with normative and comparative benchmarks and useful data needed to set baselines and to produce analysis from data in order to understand the effect of correlations and causality.

- **Health and Nutrition National Survey (ENSANUT)**

- Conducted by the National Institute of Public Health, ENSANUT provides comprehensive data across Mexico's 32 states. Covering topics such as early childhood development, foundational skills, access to education and healthcare services, poverty conditions, and nurturing care, this survey offers critical insights to contextualise G4S interventions within local realities.

- Shamah-Levy T., Vielma-Orozco E., Heredia-Hernández O., Romero-Martínez M., Mojica-Cuevas J., Cuevas-Nasu L., Santaella-Castell J.A., Rivera-Dommarco J. (2020). [*Encuesta Nacional de Salud y Nutrición 2018-19: Resultados Nacionales*](#). Instituto Nacional de Salud Pública. Cuernavaca, México.

- **Research and studies from the Early Childhood Pact (Pacto por la Primera Infancia)**

- This non-profit organization specializes in advocacy and research for children. Its studies encompass a wide range of indicators, including nutrition, vaccination, civil registration, foundational literacy and numeracy, early childhood development, and public budgeting. Given its network of over 400

local organizations, mapping their contributions within the G4S ToC represents an opportunity to foster social change and disseminate knowledge.

- Pacto por la Primera Infancia (2019). [1er Ejercicio de Participación Ciudadana por la Primera Infancia. Reporte de Resultados Preliminares. Ejercicio de participación para niñas y niños menores de 6 años, adolescentes, cuidadores y ciudadanos en general.](#) p.44
 - Sotomayor, Alberto (2024). [México: segundo informe de progreso de políticas de primera infancia.](#) Diálogo Interamericano, Primera Edición.
 - Beltrán, Ixchel (2024) [La deuda pendiente: Acceso a los derechos. Análisis de la pobreza multidimensional en primera infancia,](#) México 2018-2022.
- **Research and studies from the National Council for the Evaluation of Social Development Policy (Coneval).**
 - As a decentralized public entity, Coneval coordinates evaluations of Mexico's National Social Development Policy. Its resources include indicators on early childhood development and social interventions, offering valuable data for benchmarking and contextualizing project goals.
 - Consejo Nacional de Evaluación de la Política de Desarrollo Social y Fondo de las Naciones Unidas para la Infancia (CONEVAL-UNICEF). (2016). [Pobreza y derechos sociales de niñas, niños y adolescentes en México,](#) 2014.
 - Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). (2019). [Metodología para la medición multidimensional de la pobreza en México \(tercera edición\).](#) Ciudad de México.
 - Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). (2021). [Nota técnica sobre la medición multidimensional de la pobreza,](#) 2018-2020.
- **National Consultation for Children and Youth - National Electoral Institute (INE)**
 - The INE, an autonomous electoral authority, has conducted this consultation ten times. The most recent edition explores issues like environmental relationships, key societal challenges, and overall well-being (including security). Its age-specific items serve as useful reference points for designing interventions aligned with the Sustainable Development Goals (SDGs).

- INE (2024) [*Consulta Infantil y Juvenil 2024 Propuesta metodológica para implementar un sondeo por el que se identificará la temática.*](#)
- INE (2024) [*10a Consulta Infantil y Juvenil 2024, Tú eres la pieza más importante: 3 a 5 años.*](#)
- **OpiNNA Survey for Early Childhood**
 - Led by the national authority for early childhood policy in collaboration with civil society organizations, the OpiNNA survey addresses diverse topics relevant to early childhood development. This resource can provide baseline data for designing and implementing tailored surveys for children within the scope of G4S.
 - OpiNNA Primera Infancia (2017) - [*Consulta con Niñas y niños de 3-5 años a través de expresiones gráficas*](#) 47 PP

By integrating insights from these resources, G4S can leverage established benchmarks and high-quality data to enhance its methodologies for monitoring, evaluation, and impact assessment.

Deliverable 4- Future-focused roadmap

Introduction

E4S already has a track record of delivering impact through its various programs. To further strengthen its evidence base, we have prepared some future recommendations with the aim of helping E4S scale its efforts. We have grouped the recommendations by topic.

Measurement

To refine evaluation processes, we recommend that G4S develop clear guidelines on when to include behavioral measures of collaboration. This should consider factors like the **intervention's goals** and the **participants' developmental stage**. Additionally, while already gathering data, considering ways to measure other outcomes, such as the impact on literacy and numeracy, could be helpful in the future. Teamwork measures, such as group problem-solving tasks, can also add valuable insights if implemented with care.

A **mixed approach**—using in-depth assessments in select schools while maintaining standard methods elsewhere—can reveal detailed insights alongside broader trends. Control groups across both methods strengthen findings, offering robust evidence of the intervention's impact and scalability.

Methodology adjustments can enhance hypothesis testing. For example, shifting to one-on-one assessments or conducting evaluations closer to the intervention can yield more precise data.

Partnerships

Explore opportunities for collaboration with organizations like [GLOT in Colombia](#), which uses play-based learning kits to enhance literacy and numeracy. Partnering with research organizations specializing in the intersection of play-based education and sustainability skills can further enhance these initiatives.



Consider complementing the G4S **ToC** to include the contributions from different stakeholders on achieving change. A map and plan for managing local and national stakeholders is relevant for the different stages of the project, from institutions and **organizations generating knowledge, research and producing data** (e.g. National Institute of Public Health, World Bank, Coneval, Mejoredu, PISA-OECD, Unicef, local universities, etc.) to **advocacy organizations and coalitions** (e.g. ECD Pact, Mexicanos Primero, Save the Children, Cemefi, etc.).

Likewise, creating **partnerships with different community-based organizations** (e.g. Comunitar) and implementing partners (e.g. Save the Children, aeioTU, Sesame Workshop, etc.) can foster a collaborative ecosystem where interventions can be better integrated.

The involvement and active participation of **local communities, grassroots organizations and local key stakeholders** can also offer opportunities to achieve objectives and transfer the project once it is concluded in order to sustain change. Therefore, feedback-response mechanisms and an inclusive governance of the project can be beneficial for sustainability, transparency and accountability.

The scope of **sustainability** requires special attention on nurturing partnerships with both **private and public sectors**. The former include donors, corporate foundations, companies and local entrepreneurs while the latter need special attention to sustain change and public commitment within administration changes.

Future directions to build on Deliverable 1

Educator training

Invest in analyzing the current educator training program to measure its **effectiveness**. A thorough evaluation can help identify areas of success and opportunities for improvement, ensuring the training supports educators in fostering playful learning environments. For more insights, refer to the *Playful Learning Dissemination Report* [here](#).

Parent training

G4S currently conducts monthly parent training sessions over a six-month period as well as a pre- and post-program assessment. In the future, it might consider increasing the frequency of assessments or exploring alternative tools to better assess the program's impact on participants' lives. To enhance the program, G4S should invest in evaluating its effectiveness by **analyzing outcomes** and collecting data on how parents are supported in fostering playful

learning at home. This analysis can provide actionable insights and guide improvements. Relevant research and examples can be explored further [here](#).

Future directions to build on Deliverable 2

There are several different areas for expansion upon Deliverable 2. Here, three potential areas for expansion are described, ranging from the least to most energetically- and time-intensive.

First, as discussed under Deliverable 2, there are certain limitations associated with implementing the same, exact questionnaire at two different time points. Also as discussed above, these limitations are not particularly germane to the current plan because pre- and post-tests are implemented months apart. Nevertheless, the team may wish to continue—in future interactions of this kind of work—to **create two very similar versions of the questionnaire and counterbalance their implementation**. E.g., School 1 gets Q1 and the pre-phase and Q2 at the post phase while School 2 gets Q2 at the pre phase and Q1 at the post-phase. Since there are so many schools in the network, this seems feasible.

Second, the final section of Deliverable 2 describes different **dyadic collaboration tasks** that have been employed with young children. These tasks are resource-intensive to implement because they require one-on-one or one-on-two facilitation. However, they remain useful for at least two key reasons. (1) they provide a measure of behavior in a context that calls upon collaboration with a peer. This has certain advantages in terms of ecological validity relative to a questionnaire-based task. (2) the payoffs associated with individual versus collaborative work can be manipulated, providing insight into the conditions under which children prefer collaboration to individual work. The team may consider implementing a simple collaboration task like this as part of a **pilot program** with a small number of schools. In addition or alternatively, the team may wish to use these tasks for inspiration for the kinds of collaborative activities that are incorporated into the G4S curriculum.



Finally, if the results from the current child-oriented assessment measure show changes in the hypothesized direction—namely, children will score higher on measures relating to collaboration in the post-test compared with the pre-test—the team may wish to pursue some version of a **Randomized Controlled Trial (RCT)**. Doing so would help provide evidence for (or against) the causal relationship between G4S programming and the observed increases in children’s scores. Currently the research design is correlational. This means that results in the positive direction will be difficult to attribute conclusively to the G4S programming, as there are other **confounding variables** at play. For instance, perhaps children will score higher on all measures because they are older at Time 2.

If an RCT is pursued, the team could identify a group of schools and randomly assign half of them to receive the G4S collaboration curriculum and the other half to receive a control curriculum. Note that while random assignment is the ‘gold standard’ in many respects, it is also important to **match schools** as much as possible on demographic features. For instance, it would be undesirable to have an RCT in which all the experimental schools are high socioeconomic status (SES) while all control schools are low SES because this would introduce a confound. If matching is possible, random assignment would be done *within* the matched schools.

Note that if the G4S team wishes to pursue publication of RCT findings, they should steps to secure approval from any relevant research **ethics boards (IRBs)**, and to follow specified procedures for obtaining and recording participant consent (usually written consent from parents / guardians is required) and child assent (usually verbal).

Future directions to build on Deliverable 3

This section focuses the recommendations on three aspects of the **sustainability and continuous learning** from the implementation of the project G4S: the strengthening of the E4S organizational capacity, the potential of the project to generate knowledge, and the strategic continuity and advocacy.

Strengthening organizational capacity

In alignment with the recommendations outlined in this report, the importance of enhancing the **organizational capacity for project and program management** is paramount. This includes a dedicated focus on the roles and responsibilities of the MEAL Plan and System team. Continuous professional development, alongside certifications in PM4NGOs methodologies pursued by E4S, will be instrumental in building robust monitoring and evaluation frameworks. These efforts will ensure the creation of impactful reports that demonstrate mastery of MEAL tools and their integration into organizational practices.

Generating knowledge

The **MEAL Plan and communication strategies** should prioritize the dissemination of knowledge, including lessons learned and best practices, to foster a deeper understanding of the operational context. Leveraging available data and collaborating with other stakeholders, G4S can effectively contribute to measurable outcomes and goals for childhood development.

Additionally, the systematic evaluation of both **project and program performance** will enhance transparency and accountability within the third sector. This approach supports the

professionalisation of organizational teams while promoting a culture of evidence-based decision-making and continuous improvement.

Strategic continuity and advocacy

To align with E4S's **scaling strategy**, it is advisable to revisit expansion goals. Evidence may reveal that the most significant impact on key indicators lies in a balanced approach combining targeted interventions and universal actions for children. **Differentiated strategies** for project closure, sustainability planning, and scalability should consider conditions under which the project could conclude, be transferred, extended, replicated, or scaled, with or without costs.

A well-designed **MEAL Plan and System** will provide E4S with essential insights for stakeholder management, including authorities, donors, partner organizations, and interest groups. Learning questions will guide the identification of intervention models capable of achieving sustainable change while avoiding dependencies.

As part of the organised civil society's mandate, improved monitoring and evaluation instruments can help pinpoint direct and indirect causes of structural issues affecting children. In turn, these insights will strengthen advocacy efforts to demand the fulfilment of children's rights to education, play, and learning in Mexico.

This set of recommendations highlights the potential for G4S to lead by example in educational innovation and impact-driven practices. By fortifying its organizational capacity, leveraging high-quality data, and employing evidence-based strategies, the project can achieve **measurable and sustainable outcomes for children**. Furthermore, its commitment to transparency and knowledge dissemination reinforces its role as a trusted advocate for children's rights.

The lessons learned from this project will not only strengthen internal processes but also contribute to the broader ecosystem of educational and social interventions. These outcomes align with the mission to create systemic change, empowering children and their communities through education and play.

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Quantitative study comparing cooperation behavior of Mexican-heritage versus European-American siblings. Cooperation among Mexican-heritage siblings was higher in the experimental task and as reported through mothers, hinting at family socialization practices as an important factor.

Amador Buenabad, N. G., Sánchez Ramos, R., Schwartz, S., Gutiérrez López, M. L., Díaz Juárez, A. D., Ortiz Gallegos, A. B., González Ortega, T. G., Vázquez Pérez, L., Medina-Mora Icaza, M. E., Domenech Rodríguez, M. M., & Villatoro Velázquez, J. A. (2020). Cluster Randomized Trial of a Multicomponent School-Based Program in Mexico to Prevent Behavioral Problems and Develop Social Skills in Children. *Child & Youth Care Forum*, 49(3), 343–364. <https://doi.org/10.1007/s10566-019-09535-3>

Experimental study comparing the effects of different types of school-based interventions on children’s social behavior and parents parenting behavior in Mexico.

Andrews, J. J., & Rapp, D. N. (2015). Benefits, costs, and challenges of collaboration for learning and memory. *Translational Issues in Psychological Science*, 1(2), 182–191. <https://doi.org/10.1037/tps0000025>

Review discussing the benefits and costs of collaborative learning from an educational and cognitive psychological perspective. Includes also practical implications for the optimization of learning benefits in collaborative activities.

Ardoin, N. M., & Bowers, A. W. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review*, 31, 100353. <https://doi.org/10.1016/j.edurev.2020.100353>

Systematic review considering 66 studies across a time span of 25 years that investigated early childhood environmental education programs.

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Perspective paper summarizing literature on the importance of play for various developmental domains and the role of play in child therapy.

Barnett, W. S., & Nores, M. (2012). *Investing in Early Childhood Education: A Global Perspective*. National Institute for Early Education Research. https://www.researchgate.net/publication/277555787_Investing_in_Early_Childhood_Education_A_Global_Perspective

Report providing details on the importance of investing in early childhood education, especially from an economic and societal perspective. Mainly focussing on the U.S. but with implications that apply globally.

Barrable, A., & Booth, D. (2020). Increasing Nature Connection in Children: A Mini Review of Interventions. *Frontiers in Psychology, 11*, 492. <https://doi.org/10.3389/fpsyg.2020.00492>

Mini review reporting on studies that investigated interventions to increase nature connection in children. Also provides some recommendations for future research and practice.

Bascopé, M., Perasso, P., & Reiss, K. (2019). Systematic Review of Education for Sustainable Development at an Early Stage: Cornerstones and Pedagogical Approaches for Teacher Professional Development. *Sustainability, 11*(3), 719. <https://doi.org/10.3390/su11030719>

Systematic review investigating early education for sustainable development with a focus on suitable pedagogical approaches. Also considers the role of teacher professional development and citizenship education.

Beltrán, Ixchel (2024) *La deuda pendiente: Acceso a los derechos. Análisis de la pobreza multidimensional en primera infancia*, México 2018-2022 <https://www.pactoprimerainfancia.org.mx/wp-content/uploads/2024/08/Analisis%20de%20la%20pobreza%20multidimensional%20en%20primera%20infancia%20Mexico%202018-2022.pdf?t=1722533776>

The report contains valuable information regarding poverty in early childhood in different dimensions: education lag, lack of access to health, social security, quality nutrition, households and basic services. The report provides main findings for each of the 32 states in Mexico with recommendations and downloadable databases from the research.

Buil, P., Roger-Loppacher, O., & Tintoré, M. (2019). Creating the habit of recycling in early childhood: a sustainable practice in Spain. *Sustainability, 11*(22), 6393. <https://doi.org/10.3390/su11226393>

Early childhood education on sustainability, including recycling, can help instill environmentally conscious behaviors as lifelong habits.

Burns, S., Yu, E., Brathwaite, L., Masum, M., White, L., Dhuey, E., & Perlman, M. (2024). Improving young children's peer collaboration in early educational settings: A systematic review. *Review of Education*, 12(2), e3484. <https://doi.org/10.1002/rev3.3484>

Systematic review summarizing studies on how peer collaboration might be increased through interventions in children aged zero to six years.

Centre for Education Statistics and Evaluation. (2018). *A review of the effects of early childhood education*. NSW Government, Department of Education.

Good overview of why early childhood education is important, and international findings on the effectiveness of programmes.

Consejo Nacional de Evaluación de la Política de Desarrollo Social y Fondo de las Naciones Unidas para la Infancia (CONEVAL-UNICEF). (2016). *Pobreza y derechos sociales de niñas, niños y adolescentes en México, 2014*.

<https://www.coneval.org.mx/Medicion/Documents/Estudio-Pobreza-Coneval-Unicef.pdf>

This report focused on the desegregated data on poverty for children, this helped in focalising policies and served as a reference for subsequent research on multi-dimensional poverty.

Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). (2019). *Metodología para la medición multidimensional de la pobreza en México (tercera edición)*. Ciudad de México.

<https://www.coneval.org.mx/InformesPublicaciones/InformesPublicaciones/Documents/Metodologia-medicion-multidimensional-3er-edicion.pdf>

This is the third edition of Mexico's official methodology used by Coneval to measure poverty in Mexico.

Corbit, J., McAuliffe, K., Callaghan, T. C., Blake, P. R., & Warneken, F. (2017). Children's collaboration induces fairness rather than generosity. *Cognition*, 168, 344-356.

<https://doi.org/10.1016/j.cognition.2017.07.006>

Empirical paper investigating children's responses to inequality following collaborative versus parallel work.

Custer, S., King, E. M., Atinc, T. M., Read, L., & Sethi, T. (2018). *Toward data-driven education systems. Insights into using information to measure results and manage change*.

<https://www.brookings.edu/wp-content/uploads/2018/02/toward-data-driven-education-systems.pdf>

This article discusses the importance of knowing which data is wanted and needed by decision-makers, that is, the aimed use of data should define its collection.

Davis, J., & Elliott, S. (Eds.). (2024). *Young Children and the Environment: Early Education for Sustainability* (3rd ed.). Cambridge University Press; Cambridge Core. <https://doi.org/10.1017/9781009199971>

Book with a focus on early childhood education for sustainability containing both, scientific background and practical ideas. Also, it includes case studies which provide an international perspective on the topic.

Diamond, A., & Lee, K. (2011). Interventions Shown to Aid Executive Function Development in Children 4 to 12 Years Old. *Science*, 333(6045), 959–964. <https://doi.org/10.1126/science.1204529>

Scientific review of interventions and programs that support the development of executive functions in children. It explicitly mentions pretend play when talking about the Tools of the Mind program.

Doebel, S., & Lillard, A. S. (2023). How does play foster development? A new executive function perspective. *Developmental Review*, 67, 101064. <https://doi.org/10.1016/j.dr.2022.101064>

Perspective paper that discusses how play might foster development, suggesting that play provides children with the practice and knowledge they need for developing culture-specific executive function skills.

Ekeh, M. C. (2023). Developing Early Graders' Collaborative Skills through Group-Work, Play-Based Pedagogy. *International Journal of Learning, Teaching and Educational Research*, 22(4), 160–177. <https://doi.org/10.26803/ijlter.22.4.10>

Qualitative study suggesting that teachers' knowledge of play-based pedagogy is an important factor in the development of children's collaboration skills.

Garcia, C., Greenfield, P. M., Navarro-Hernández, A. M., Colorado-García, J., & Vidaña-Rivera, T. M. (2021). Cooperative play and globalized social change: Mexican children are less cooperative in 2017 than in 1967. *Current Research in Ecological and Social Psychology*, 2, 100003. <https://doi.org/10.1016/j.cresp.2020.100003>

Quasi-experimental design comparing Mexican children's behavior in a cooperation board game between 1967 and 2017. The results indicate an increase in competition and a decrease in cooperation.

Ginsburg, K. R., & Committee on Psychosocial Aspects of Child and Family Health. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, 119(1), 182-191. <https://doi.org/10.1542/peds.2006-2697>

Play is essential for healthy child development and maintaining strong parent-child bonds.

González-Salamanca, J. C., Agudelo, O. L., & Salinas, J. (2020). Key Competences, Education for Sustainable Development and Strategies for the Development of 21st Century Skills. A Systematic Literature Review. *Sustainability*, 12(24), 10366. <https://doi.org/10.3390/su122410366>

Systematic review investigating how 21st century skills are incorporated into school curricula, raising challenges such as the development of appropriate assessment of these skills.

Güler Yıldız, T., Öztürk, N., İlhan İyi, T., Aşkar, N., Banko Bal, Ç., Karabekmez, S., & Höl, Ş. (2021). Education for sustainability in early childhood education: A systematic review. *Environmental Education Research*, 27(6), 796–820. <https://doi.org/10.1080/13504622.2021.1896680>

Systematic review of articles published from 2008 to 2020 on early childhood education for sustainability, analyzing the research methods used and the focus of the content.

Hartwig, E. (2020). *Orientaciones programáticas sobre la importancia de la calidad de la educación para la primera infancia en América Latina y el Caribe*. Fondo de las Naciones Unidas para la Infancia (UNICEF). <https://www.unicef.org/lac/media/6431/file/Orientaciones>

Report by UNICEF in Spanish highlighting the importance of high-quality early childhood education, the current status in Latin America and the Caribbean, and future directions.

Hedefalk, M., Almqvist, J., & Östman, L. (2015). Education for sustainable development in early childhood education: A review of the research literature. *Environmental Education Research*, 21(7), 975-990. <https://doi.org/10.1080/13504622.2014.971716>

Research shows that education for sustainable development in early childhood can instill environmentally conscious behaviors as lifelong habits.

Hirsh-Pasek, K., & Hadani, H. S. (2020). A new path to education reform: Playful learning promotes 21st-century skills in schools and beyond. *Policy 2020*

Brookings. https://www.brookings.edu/wp-content/uploads/2020/10/Big-Ideas_Hirsh-Pasek_PlayfulLearning.pdf

Brookings article containing recommendations on how and what children need to learn to thrive in the 21st century.

Hirsh-Pasek, K., Michnick Golinkoff, R., Berk, L. E., & Singer, D. (2008). *A Mandate for Playful Learning in Preschool: Presenting the Evidence*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195382716.001.0001>

Book arguing that learning in preschool should be playful and not only focus on academic learning, but instead take social development into account.

Hughes, F. (2023). Early Childhood Educators' Professional Learning for Sustainability Through Action Research in Australian Immersive Nature Play Programmes. *Educational Research for Social Change*, 12(1), 69–82. <https://doi.org/10.17159/2221-4070/2023/v12i1a6>

Australian report on the importance of sustainability in education and how educators perceive its relation to play in nature.

INE (2024) *Consulta Infantil y Juvenil 2024 Propuesta metodológica para implementar un sondeo por el que se identificará la temática* <https://repositoriodocumental.ine.mx/xmlui/bitstream/handle/123456789/175813/ConsultaInfantilyJuvenil-2024-SondeoMetodologia.pdf>

Important asset that explains the methodological proposal to implement the national survey for children and youth, the topics and the results from children's voice with data from all the states.

INE (2024) *10a Consulta Infantil y Juvenil 2024, Tú eres la pieza más importante: 3 a 5 años*. <https://repositoriodocumental.ine.mx/xmlui/bitstream/handle/123456789/176301/ConsultaInfantilyJuvenil-2024-boleta-3-5.pdf>

The document contains the illustrated survey that was used for the 10th National Survey for Children and Youth. It is chosen as an important resource because it is targeted for children 3-5 and containing topics and items that can be used in G4S intervention.

Kennedy, T. J., & Sundberg, C. W. (2020). 21st Century Skills. In B. Akpan & T. J. Kennedy (Eds.), *Science Education in Theory and Practice: An Introductory Guide to Learning Theory* (pp. 479–496). Springer International Publishing.

Book chapter providing an overview of 21st century skills and highlighting the importance of evaluating their implementation in the classroom as well as assessing increase in these skills in students.

Lee, R. L. T., Lane, S., Brown, G., Leung, C., Kwok, S. W. H., & Chan, S. W. C. (2020). Systematic review of the impact of unstructured play interventions to improve young children's physical, social, and emotional wellbeing. *Nursing & Health Sciences*, 22(2), 184-196. <https://doi.org/10.1111/nhs.12732>

Systematic review investigating the effectiveness of play interventions on children's physical activity level, social engagement and emotional wellbeing. The included studies report positive impacts on the respective domain.

Legare, C. H. (2012). Exploring Explanation: Explaining Inconsistent Evidence Informs Exploratory, Hypothesis-Testing Behavior in Young Children. *Child Development*, 83(1), 173-185. <https://doi.org/10.1111/j.1467-8624.2011.01691.x>

Original research article demonstrating that children use exploratory play behavior to find explanations for inconsistencies, underlining the role of play in child learning.

Liu, C., Solis, S. L., Jensen, H., Hopkins, E., Neale, D., Zosh, J., Hirsh-Pasek, K., & Whitebread, D. (2017). Neuroscience and learning through play: A review of the evidence. *The LEGO Foundation*.
https://cms.learningthroughplay.com/media/zbcd21td/neuroscience-review_web.pdf

White paper by the LEGO foundation summarizing evidence from neuroscience that is related to the five characteristics of playful learning: Joyful, meaningful, actively engaging, iterative, socially interactive. This evidence emphasizes why playful learning works.

Lillard, A. S. (2017). Why Do the Children (Pretend) Play? *Trends in Cognitive Sciences*, 21(11), 826-834. <https://doi.org/10.1016/j.tics.2017.08.001>

Opinion paper by a well-known developmental psychologist discussing potential functions of pretend play in humans. She concludes that it might serve similar functions as in animal play fighting, that is social behavior and emotion regulation.

Mackley, H., Edwards, S., Mclean, K., & Cinelli, R. (2022). Building collaborative competencies through play with outdoor loose parts materials in primary school. *Cambridge Journal of Education*, 52(4), 431-451. <https://doi.org/10.1080/0305764X.2022.2030300>

Qualitative study reporting that providing loose parts materials for primary students' outdoor play may support shared understanding during play, a precursor for collaborative skills.

Marchand, E., Lovelett, J. T., Kendro, K., & Barner, D. (2022). Assessing the knower-level framework: How reliable is the Give-a-Number task?. *Cognition*, 222, 104998. <https://doi.org/10.1016/j.cognition.2021.104998>

Paper outlining a commonly-used method for assessing number knowledge in young children, the so-called Give-N task.

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. *Developmental Psychology*, 43(4), 947–959. <https://doi.org/10.1037/0012-1649.43.4.947>

Original research article suggesting that behavioral regulation is linked to academic skills (emergent literacy, vocabulary, and math skills).

Milteer, R. M., Ginsburg, K. R., Council on Communications and Media Committee on Psychosocial Aspects of Child and Family Health, Mulligan, D. A., Ameenuddin, N., Brown, A., ... & Swanson, W. S. (2012). The importance of play in promoting healthy child development and maintaining strong parent-child bond: Focus on children in poverty. *Pediatrics*, 129(1), e204–e213. <https://doi.org/10.1542/peds.2011-2953>

A clinical report highlights that play is vital for child development and parent-child bonding but notes that children in poverty often miss out. This is due to limited access to programs and parental constraints like lack of time and energy.

OpiNNA Primera Infancia (2017) - *Consulta con Niñas y niños de 3-5 años a través de expresiones gráficas* 47 PP https://www.gob.mx/cms/uploads/attachment/file/737400/REPORTE_OPINNA_NACIONA_L-C.pdf

This document displays a set of children (ages 3-5) responses to different topics through drawings and graphical expressions. The analysis and visualisation of data sets and important precedent for exercises intended to collect children's voices.

Pacto por la Primera Infancia (2019). *1er Ejercicio de Participación Ciudadana por la Primera Infancia. Reporte de Resultados Preliminares. Ejercicio de participación para niñas y niños menores de 6 años, adolescentes, cuidadores y ciudadanos en general.* 44 pp <https://drive.google.com/file/d/167X45z7j9dEWCqvaeFwt4QMHUGfVAczR/view>

This preliminary report was published by the ECD Pact and recognised as a milestone in Participation exercise for girls and boys under 6 years old, adolescents, caregivers and citizens in general. The annexes contain valuable resources, data and references.

Parker, R., Thomsen, B. S., & Berry, A. (2022). *Learning Through Play at School – A Framework for Policy and Practice.* *Frontiers in Education*, 7, 751801. <https://doi.org/10.3389/feduc.2022.751801>

This article summarizes international research findings on the effects of learning through play. The authors present four key challenges and how they might be addressed.

PM4NGOs (2020), *Project Management for Development Professionals Guide PMD Pro*, 2nd Edition. 217 pp

<https://pm4ngos.org/download/128/english/19367127/project-dpro-guide-pmd-pro-2nd-edition.pdf>

A guide with a standardized methodology on Project Management for Professionals working in Social Development and Emergency Response.

PM4NGOs (2017), *Program Dpro. Program Management for Development Professionals Guide* 178 pp.

A guide with a standardized methodology on Program and Portfolio management for project and programme managers working in Social Development and Emergency Response.

<https://pm4ngos.org/methodologies-guides/program-dpro/#:~:text=Quick%20Guides-,Program%20DPro%20Guide,-English%0A6.34%20MB>

PM4NGOs (2017), *Theory of Change. Guide for Program Practitioners* 35 pp

<https://pm4ngos.org/methodologies-guides/theory-of-change/#:~:text=ToC%20%E2%80%93%20Theory%20of%20Change%20Guide%20for%20Program%20Practitioners>

A guide with a standardized methodology on framing a theory of change for project and programme managers working in Social Development and Emergency Response.

Rakesh, D., McLaughlin, K. A., Sheridan, M., Humphreys, K. L., & Rosen, M. L. (2024). Environmental contributions to cognitive development: The role of cognitive stimulation. *Developmental Review*, 73, 101135. <https://doi.org/10.1016/j.dr.2024.101135>

Literature review on the impact of environmental influences on children's cognitive and neural development.

Ramani, G. B. (2012). Influence of a playful, child-directed context on preschool children's peer cooperation. *Merrill-Palmer Quarterly*, 58(2), 159–190.

<https://doi.org/10.1353/mpq.2012.0011>

Experimental study comparing children's activities and interactions in a structured, adult-driven versus a less structured, child-driven building task. Children cooperated and interacted more in the child-driven, more playful context.

Sawyer, J. (2017). I think I can: Preschoolers' private speech and motivation in playful versus non-playful contexts. *Early Childhood Research Quarterly*, 38, 84–96. <https://doi.org/10.1016/j.ecresq.2016.09.004>

Original research article investigating children’s private speech in a playful vs. non-playful setting. In a playful setting children’s private speech was associated with higher levels of motivation.

Schäfer, M., Haun, D. B., & Tomasello, M. (2023). Children’s consideration of collaboration and merit when making sharing decisions in private. *Journal of Experimental Child Psychology*, 228, 105609. <https://doi.org/10.1016/j.jecp.2022.105609>

An empirical paper exploring the links between collaboration and merit with additional consideration of children’s sensitivity to being watched by others. Included here because it provides an example of a collaboration task with children.

Schulz, L. E., & Bonawitz, E. B. (2007). Serious fun: Preschoolers engage in more exploratory play when evidence is confounded. *Developmental Psychology*, 43(4), 1045–1050. <https://doi.org/10.1037/0012-1649.43.4.1045>

Original research article demonstrating that children use exploratory play behavior when they encounter confounded evidence that does not allow for causal inference (compared to unconfounded evidence).

Shamah-Levy T., Vielma-Orozco E., Heredia-Hernández O., Romero-Martínez M., Mojica-Cuevas J., Cuevas-Nasu L., Santaella-Castell J.A., Rivera-Dommarco J. (2020). *Encuesta Nacional de Salud y Nutrición 2018-19: Resultados Nacionales*. Instituto Nacional de Salud Pública. Cuernavaca, México. https://ensanut.insp.mx/encuestas/ensanut2018/doctos/informes/ensanut_2018_informe_final.pdf

Report summarizing the results of the national survey of health and nutrition in Mexico from 2018-2019. Also includes information on how parents interact with their children to support their development.

Shonkoff, J. P., & Richmond, J. B. (2009). Investment in Early Childhood Development Lays the Foundation for a Prosperous and Sustainable Society. *Encyclopedia on Early Childhood Development*.

Summary on why early childhood education/intervention is crucial, with a focus on brain development.

Singh, A., Yeh, C. J., & Boone Blanchard, S. (2017). Ages and Stages Questionnaire: A global screening scale. *Boletín Médico Del Hospital Infantil de México*, 74(1), 5–12. <https://doi.org/10.1016/j.bmhmx.2016.07.008>

The ASQ is a developmental screening instrument to be filled out by parents, which covers various areas of child development from 0-5 years.

Siraj-Blatchford, J., Mogharreban, C., & Park, E. (Eds.). (2016). *International Research on Education for Sustainable Development in Early Childhood* (Vol. 14). Springer International Publishing. <https://doi.org/10.1007/978-3-319-42208-4>

Book providing a collection on education for sustainable development in various countries across the world (e.g., Chile, USA, Korea, Kenya).

Sotomayor, Alberto (2024). *México: segundo informe de progreso de políticas de primera infancia*. Diálogo Interamericano, Primera Edición.

<https://www.pactoprimerainfancia.org.mx/wp-content/uploads/2024/08/Informe%20de%20Progreso%20de%20las%20Políticas%20de%20Primera%20Infancia.pdf?t=1722533587>

The report is the second delivery from a collective effort in Mexico to monitor and evaluate the progression in the policies, actions, institutional change and system change for Early Childhood. It includes the challenges and observations relevant to the ecosystem of stakeholders: budgeting and intersectionality; quality in ECD services; and ECD measurement.

Stengelin, R., Hepach, R., & Haun, D. B. (2020). Cultural variation in young children's social motivation for peer collaboration and its relation to the ontogeny of Theory of Mind. *PLoS One*, 15(11), e0242071. <https://doi.org/10.1371/journal.pone.0242071>

An empirical paper exploring the links between collaboration and Theory of Mind. Included here because it provides an example of a collaboration task.

Taylor, M. E., & Boyer, W. (2020). Play-Based Learning: Evidence-Based Research to Improve Children's Learning Experiences in the Kindergarten Classroom. *Early Childhood Education Journal*, 48(2), 127–133. <https://doi.org/10.1007/s10643-019-00989-7>

Scientific article summarizing what play-based learning is, which types of play exist, which social and academic benefits may result from play-based learning, and how educators can facilitate play-based learning.

TeGrootenhuys, B. (2021). *The Value of Play-Based Learning in Early Childhood Classrooms*. https://nwcommons.nwciowa.edu/education_masters/303/

Master's thesis summarizing literature on learning through play, including its historic background and potential social and academic benefits.

Tomasello, M., & Hamann, K. (2012). The 37th Sir Frederick Bartlett Lecture: Collaboration in Young Children. *Quarterly Journal of Experimental Psychology*, 65(1), 1–12. <https://doi.org/10.1080/17470218.2011.608853>

Theoretical article reflecting upon the evolution and ontogeny of human collaboration by integrating various research findings.

UNESCO. (2017). *Education for Sustainable Development Goals: Learning objectives*. UNESCO. <https://doi.org/10.54675/CGBA9153>

Guide for education professionals that identifies learning objectives and suggests topics and learning activities for the different Sustainable Development Goals. It includes implementation methods at different levels.

UNESCO, UNICEF, Institution, B., & the World Bank. (2017). *Overview: MELQO: Measuring Early Learning Quality and Outcomes*.

Presents two modules for the assessment of the development of 4-6 year olds and the quality of their learning environments. The module on child development and learning (MODEL) includes direct child observation and a teachers/parents questionnaire, focussing on the domains of executive function, social-emotional development, early mathematics skills and early literacy skills.

UNESCO. (2018). *Issues and trends in education for sustainable development*. UNESCO. <https://doi.org/10.54675/YELO2332>

UNESCO publication that provides an overview of Education for Sustainable Development and its challenges in policy and practice.

Wells, N. M., & Lekies, K. S. (2006). Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism. *Children, Youth and Environments*, 16(1), 1–24. <https://doi.org/10.1353/cye.2006.0031>

Large-scale study with interviews of adults reporting on their childhood nature experiences and their adult attitudes and behaviors towards the environment.

Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S. L., Hopkins, E., Hirsh-Pasek, K., & Zosh, J. (2017). [The role of play in children's development: A review of the evidence](#). *The LEGO Foundation*.

White paper by the LEGO foundation focusing on different types of play, such as play with objects or pretend play, and which functions they might serve in child development.

Wilson, M., Bejar, I., Scalise, K., Templin, J., William, D., & Irribarra, D. T. (2012). Perspectives on methodological issues. In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment and Teaching of 21st Century Skills*. Springer Netherlands. <https://link.springer.com/10.1007/978-94-007-2324-5>

Book targeting the assessment and teaching of 21st century skills. The specific focus of this chapter is on methodological challenges, such as establishing validity.

Yogman, M., Garner, A., Hutchinson, J., Hirsh-Pasek, K., Golinkoff, R. M., Baum, R., ... & COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH. (2018). The power of play: A pediatric role in enhancing development in young children. *Pediatrics*, 142(3). <https://doi.org/10.1542/peds.2018-2058>

Clinical report summarizing the development of play, effects and benefits of play, challenges, and implications for preschool education.

Zosh, J. M., Hassinger-Das, B., & Laurie, M. (2022). [Learning Through Play and the Development of Holistic Skills Across Childhood](#). *The LEGO Foundation*.

White paper by the LEGO foundation considering how play might serve the development of holistic skills, specifically cognitive, social, emotional, physical, and creative skills.

Zosh, J. M., Hopkins, E. J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. (2017). [Learning through play: A review of the evidence](#). *The LEGO Foundation*.

White paper by the LEGO foundation emphasizing the importance of learning through play in the 21st century with a focus on the characteristics of playful learning experiences (joyful, meaningful, actively engaging, iterative, socially interactive).