The Work of Play:

Child-Led Research as a Practice of Agency and Inclusion

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Abstract

Despite growing adoption of participatory design frameworks, children's involvement in shaping design challenges remains largely adult-driven. Problem spaces are typically predefined before children enter the process, limiting their ability to articulate their own needs and constraining the authenticity of resulting outcomes. This study examines whether child-centred design (CCD) can be understood as a child-specific expression of inclusive design (INCD), and how an integrated approach to both frameworks supports agency, play, and equity in design research practice.

Using Karen Feder's (2020) CCD framework as its primary methodological lens, this research conducted three iterative co-design workshops with children aged five to nine, using self-regulation tools as a frame of inquiry. Through organic participant attrition, the study evolved into a longitudinal case study with a single six-year-old co-designer, JC, whose sustained engagement across all three sessions produced a richly detailed record of child-led design thinking in practice.

Three primary findings emerged. First, authentic child agency operates as a continuous social negotiation rather than a static condition granted by researchers. Second, play functions as a rigorous, multimodal methodology for design thinking. Third, and most significantly, the study identifies a "Process-as-Prototype" effect: the inclusive values embedded in the research environment were directly replicated in the child's final design output. Together, these findings establish that child-centred design is not just compatible with inclusive design, but a natural child-specific expression.

Keywords

Child-Centred Design, Inclusive Design, Co-Design, Design Research, Design for Play

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And finally, to the children who participated in this study, and to their grown-ups for their trust and willingness to be part of this work: thank you. Each session was marked by openness, curiosity, and forms of connection that cannot be taught or replicated. This research is shaped, in every sense, by what you shared, created, and made possible.

Dedication

For "J," the child who reminded me of who I was, and showed me who I could become.

Before you, I believed I had to choose:

to be an educator or a designer, to care or create, my heart or my craft.

You arrived in my world with a spark all your own. One missing shoe, climbing shelves, singing BINGO with your whole body, you were labelled "difficult," the way I once was, a child whose fire didn't fit the room. In you, I recognized a reflection of my younger self: curious, impulsive, spirited, and in need of someone willing to meet you as you were. I worried I would not be enough for you, that I wasn't equipped to teach the lessons you needed. Instead, you shifted everything I thought I knew, and I began to learn from you instead. You taught me that connection isn't always what you'd expect, but it can be earned through presence, trust, and choosing a child *exactly as they are*. In the seemingly small, yet profound moments you offered, like the day you placed a pea in my mouth and met my eyes, you showed me that *relationship* is the foundation of all learning, even my own. I had never eaten peas before that day, and I never will again. I'm glad that you convinced me to try, though.

Designing for you, the alphabet cards, the learning tools, was the first time I understood that design could be an act of care. That the two parts of me I thought would never fit together were never meant to be separate.

This thesis exists because of you.

Because you made me believe that children deserve to shape the worlds we build for them. Because you taught me that voices do not need volume to hold power. Because you reminded me that I could be both the child who once needed support and the adult who now creates it.

Because change often begins with something small– like a single pea.

Thank you for being my first co-designer, my mini mentor, and the child who changed the course of my life without ever needing the right words. Everything I write, research, and design in this space is rooted in the lessons you taught me at only three years old.

You gave my inner child the kind of teacher we both needed.

This work is for both of us.

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Statement of Contributions

While I, Kennedy Kozak, am the primary author of this thesis and responsible for the research design, data collection, and analysis, this project is a collaborative effort. The conceptual and physical artefacts presented in this document were co-authored with the creative and curious participants of the co-design workshops.

Co-Designers (JC, OO, GB, EL, AT)

The young co-designers were the creative conceptual leads and collaborators throughout this research. Their contributions were essential as they designed physical artefacts and co-created the research environment through their active commitment and playful approaches. Their willingness to engage in the "Work of Play" ensured this study came to fruition as a genuine, co-authored record of their expertise and agency.

1. Introduction

1.1 Background

Historically, the design of artefacts and environments for children has been a predominantly adult-centric process. Even within participatory frameworks where children are designated as "design partners," their agency remains constrained by structural adult control (Druin, 2001). These approaches typically rely on top-down research methods in which problem spaces are predefined and rigid guidelines are imposed. As a result, children's participation is shaped and often limited by adult-defined priorities. (Druin, 2001; Iversen et al., 2017). In response, scholars have advocated a shift towards a "Child as Protagonist" approach (Iversen et al., 2017), which positions children as driving agents throughout the research process, from problem definition to post-project reflection. This transition towards collaboration, agency, and shared authorship reflects a broader recognition of children as competent social actors (James & Prout, 1997) and creative thinkers capable of impactful contributions to the design of their worlds. Child-Centred Design (CCD) has emerged as a prominent methodological approach to promote the shift from theory into practice and a growing body of research in this field has championed CCD for its ability to prioritize a child's unique ways of being. Central to this approach is Karen Feder's (2020) reconceptualization of the design research process as an open-ended practice of play and exploration. This commitment to lived experience as a form of expertise is also a core principle of inclusive design (INCD). Although these two frameworks have not been explicitly theorized together in existing scholarship, CCD and INCD overlap in their commitment to engaging users as active participants in the design process (Treviranus, 2018). While INCD establishes a strong ethical mandate for designing *with* those most impacted by design decisions, it offers limited age-specific guidance for meaningfully supporting children's participation in the context-specific environment central to a child-led process. Accordingly, this study examines the theoretical convergence of these theories by investigating whether CCD can be understood as a child-specific expression of INCD and more broadly, how an inclusive, child-centred approach actualizes agency and play-based opportunities in design research.

1.2 Problem Statement

Despite the growing adoption of participatory design frameworks, children's involvement in defining design challenges remains largely adult-driven. While children are increasingly included in the prototyping stages of design projects, adult priorities and pre-determined problem spaces continue to shape which problems are addressed and how solutions are

developed (Iversen et al., 2017). The adult-centric approach limits children's ability to articulate their own needs and creative intentions, raising significant questions about the authenticity and inclusivity of the resulting design outcomes. Identifying a valuable synergy between child-centred design and inclusive design to improve opportunities for children to assert their agency in playful, exploratory ways.

1.3 Purpose and Significance

Through a series of iterative co-design workshops guided by Karen Feder's (2020) CCD framework, this research follows the development of an Inclusive Child-Centred approach to design research. Using self-regulation tools as a light frame for inquiry, children are asked to frame and develop their own social-emotional learning artefacts to examine how child-centred and inclusive frameworks impact co-design environments. Central to this approach is the championing of Play Literacy which positions an understanding of genuine play as a fundamental methodological requirement when conducting research with children. By examining how a play-based, child-led methodology operationalizes inclusive design principles, this study reframes the researcher as a participant-learner, illustrating how moment-to-moment facilitation choices either sustain or collapse the space for child agency.

1.4 Research Questions

RQ1: How do children shape the design process when given agency over problem definition and design outcomes?
RO1: Observe and analyze how children initiate, frame, and iterate on design challenges during co-design workshops, using self-regulation tools as a light frame of inquiry.

RQ2: How does play support children in expressing ideas, negotiating meaning, and influencing design outcomes?
RO2: Examine how open-ended, multimodal play facilitates children's communication, decision-making, and creativity, and how these processes inform both the design process and the resulting artefacts.

RQ3: How are inclusive design principles enacted in practice through child-centred design methods during child-led co-design?
RO3: Analyze how CCD processes support inclusion, agency, and equity in children's participation, and examine whether CCD can be considered a child-specific application of inclusive design principles.

2. Literature Review

2.1 Learning Through Play: The Foundation of Child Participation

Play is essential to children's learning, exploration, and self-expression. It enables them to make sense of themselves and the world around them through interaction with environments, objects, and others (James & Prout, 1997). Understanding play's developmental role better positions children as capable participants in research and design environments, shifting the mindset from viewing children as "adults in the making" to recognizing them as competent social actors (James & Prout, 1997). Drawing on the historical work of Froebel, Montessori, Piaget, and Vygotsky, play can be viewed as a vehicle for cognitive, social, and emotional growth and understanding its importance is essential to designing effective child-led research environments.

2.1.1 Theories of Learning Through Play

Recognized as a cornerstone of early childhood development, play supports learning opportunities, emotional regulation, and creativity (Piaget, 1962; Vygotsky, 1967). For many childhood theorists, play functions as the fundamental 'work' of childhood, serving as the primary, natural lens through which children process and navigate their daily lives (Montessori, 1912/2004; Piaget, 1962). Play provides a natural framework for child-centred research as it parallels how children learn, communicate, and problem-solve through exploratory activities. Maria Montessori, whose work centred on child-led approaches, viewed children as self-directed and capable learners, suggesting that they can offer significant value and insight into their world when given the opportunity to do so. Lev Vygotsky (1967), another well-known childhood theorist, also emphasized the importance of child autonomy, intersecting it with play and learning by describing play as a *zone of proximal development* (ZPD). He theorized that the ZPD was the sweet spot between what a learner can do alone and what they can achieve with help from someone more skilled. In a co-design context, the ZPD is the space where a child's potential is activated through the facilitation of interaction, where a researcher serves as a scaffold, allowing children to engage in complex design thinking.

When considering learning through play as a comprehensive research tool, the design process can facilitate the construction of understanding in *collaboration* with research goals. Adapting research environments to better reflect the realities of childhood, such as through playful modalities, engages children as active, capable beings within a social world, providing them the opportunity to add valuable insights (James & Prout, 1997; Feder, 2020). As such, integrating play into design research provides a context-aware

mode of inquiry, granting the participatory access required to advance child-led perspectives (Treviranus, 2018; Feder, 2020).

2.1.2 Play as Meaning-Making

It is through play that children begin expressing their thoughts, emotions, and understandings, with play acting as the bridge between a child's internal life and the external environment (Froebel Trust, 2014). Friedrich Froebel (2014), the founder of the kindergarten movement, posited that it is play that helps children give visible form to their ideas through a process in which "the inner is made outer," internal abstractions become symbolized in real-world interactions. Piaget (1962) defined this as "symbolic play", as children use objects, gestures, and imagination to recreate and reinterpret real-world situations. It is through this understanding that play provides more than "just" recreational activity and acts as a system for meaning-making (Vygotsky, 1967; Piaget, 1962). Froebel (2014) and Piaget (1962) both highlight the transformative nature of play as meaning-making in their work, stating that it is *essential* for children as they learn to translate emotion and experience into action. Vygotsky's (1967) theories on the development of symbolic thought argued that in play, a child learns to separate meaning from object, and a physical item becomes a "pivot" to represent a different reality. The capacity for children to assign and subsequently reassign meaning to various materials and objects is a crucial skill that directly underpins the complex cognitive processes involved in design thinking. The ability to see a block not just as wood, but as a phone, a car, or food, is not a learned technique but a developmental milestone that emerges through play in early childhood (Vygotsky, 1967).

2.1.3 Play and Design Thinking

Design thinking and play share a foundational ethos. Both value curiosity, iteration, and the freedom to explore without fear of failure. In *Lifelong Kindergarten: Cultivating Creativity through Projects, Passion, Peers, and Play* (2017), Mitchel Resnick identified the "creative learning spiral", a cycle of imagining, creating, playing, sharing, and reflecting, as the primary engine of creative thought. Resnick's (2017) playful learning process mirrors the iterative nature of the design cycle, in which designers create through cycles of ideation, making, and iteration (Sanders & Stappers, 2014). When applied to child-led research settings, design thinking processes yielded significant cognitive and affective benefits for participants. McNally et al. (2017) and Carroll et al. (2010) demonstrated that when children engage in playful design activities such as prototyping, testing, and revising, they developed greater creative confidence and problem-solving skills–core competencies of design thinking. In these research settings, the more playful aspects of a child-led design approach were not a distraction from the work, as they allowed children

to engage with design thinking in developmentally accessible formats (McNally et al., 2017; Carroll et al., 2010).

The work of Karen Feder (2020) extended the connection between the spirals of design and creative thinking by proposing a child-centred design framework that employs play-based principles as a formal research methodology. Feder viewed play as a co-created research method defined by open-ended exploration and reflection, reducing the barriers to entry by enabling children to engage in design thinking in contextually-appropriate manners (Feder, 2020; McNally et al., 2017). Child-appropriate methods of inquiry, such as play, are the "work of the child" (Piaget, 1962; Montessori, 1912/2004), meaning that the design outcomes that emerge are evidence of their expertise.

2.2 Children as Designers: Expertise, Participation, and Agency

Designing with children by providing them with appropriate modes of participation recognizes them as "experts of their own experiences." They are individuals who bring unique, situated perspectives shaped by their interactions, emotions and environments (Druin, 1999; Feder, 2020). Both inclusive design and contemporary childhood studies have argued that agency, the ability to autonomously shape and influence one's environment, is not a trait someone gains as they age, but a right that must be actualized through involvement that holds genuine, consequential influence over the outcome (United Nations, 1989). However, translating this theoretical standard into practice raises questions: What actually constitutes authentic participation? And how does it foster truly equitable research settings?

2.2.1 The Child as Expert of Experience

Children's lived experiences provide critical insight into how they engage with and interpret the world. Research that prioritizes their perspectives emphasizes their expertise, regardless of how it may conflict with societal or adult norms (Shaw et al., 2022). Feder (2020) argued that for designers to access this knowledge, they must be willing to exit familiar settings and engage with children in their everyday contexts. An immersion that allows the designer to see the child’s rhythms, routines, and relationships not as research data, but as facets of their experiential knowledge. Participatory and inclusive design frameworks have offered broad principles for capturing this type of ethnographic data, but they often struggle to prioritize the specific "child-ness" inherent in capturing children's perspectives in research settings. The work of Feder (2020) addressed this by outlining a child-centred design framework featuring twelve tenets that make up a child-centred design process:

Characteristics of the child-centred design approach:

- *Child-centred*
- *Process-oriented*
- *Grounded in exploration*
- *Open-ended*
- *Experience-based*
- *Open for surprises*
- *Reflection-driven*
- *Confronting assumptions*
- *Mindset-motivated*
- *Beyond tools and methods*
- *Acknowledging other perspectives*
- *Dedicated to engaging*

These characteristics reflected a shift towards valuing the interpretive and affective dimension of children's experiences beyond typical research methods. As Druin (1999) and Iversen et al. (2017) argued, children's natural curiosity and intuitive understanding of their specific environments is precisely what allows them to surface insights that adult designers might have missed. So, centering the research process on these twelve aspects introduces practical methods to bridge the gap between what the designer needs to know and how the child expresses their expertise.

2.2.2 Children as Active Participants

Active participation is how the child's expertise becomes revealed and actualized within the design process. Druin's (2001) levels of research participation framework identified four degrees of engagement, each increasing in opportunities for agency. From users to testers to informants and design partners, the shift from passive engagement to active collaboration varied depending on the stage at which children were invited into the design process, impacting what their participation looked like. Can and İnalhan (2017) noted in "Having Voice, Having a Choice," even studies that did engage children as "equal" co-designers often struggled to maintain genuine equity in practice. Aspects and adult structures, such as institutional timelines, technical constraints, and preconceived outcomes, frequently reasserted control over the design process, exposing the risk of "tokenistic" involvement where children are invited into the space, but their perspectives and opinions have little to no real impact. (Can & İnalhan, 2017; Hart, 1992). Hart (1992) found that tokenism occurs in "those instances in which children are apparently given a voice, but in fact have little or no choice about the subject or the style of communicating

it, and little or no opportunity to formulate their own opinions." This dynamic directly violates the mandates of the UN Convention on the Rights of the Child (1989). Aligning with Hart's (1992) critique, Yip et al. (2017) suggested that deploying developmentally aligned methods equips children to actualize their expertise, elevating research from superficial involvement into that state of meaningful and active participation.

2.3 Shifting Power in Design Research

When children are supported as active participants with valuable real-world experiences, their sense of control, enjoyment, and their investment in the creative process increases (Druin, 1999; Alderson, 2008). But engaging children in design research involves navigating complex and often invisible power dynamics between adult researchers and young participants, even when honouring the value of their inputs. Standard design processes have often privileged adult perspectives as insights get filtered through a lens prioritizing efficiency and standardized outcomes (Can & İnalhan, 2017). Child-centred design explicitly challenges this imbalance by advocating for shared decision-making, reflexive practice, and methods that redistribute creative and interpretive authority from the researcher to the participant.

2.3.1 Adult-Driven vs. Child-Led Problem Definition

Problem framing is an essential step in the design process where stakeholders determine a project's scope, questions, constraints, and goals. In traditional design research, this stage is almost exclusively managed by adults, followed by phases of research, ideation, prototyping, and evaluation. Children are most often invited into the process during the latter stages, effectively reducing their role to one of Druin's (2001) lower-level "objectives of participation": users, testers, or informants, depending on what is being asked of their participation. This top-down approach risks privileging adult assumptions over children's lived experiences. When designers define the problem in advance, they inherently create blind spots within the research. As Fails et al. (2013) and Druin (2001) argued, failing to center the child's authentic priorities severely limits the creative potential of the process and represents a fundamental missed opportunity for genuine co-design. To counteract these limitations, Iversen et al. (2017) expanded upon Druin's (2002) framework by repositioning children as "protagonists." A shift actively dismantling traditional research hierarchies and equipping children with the authority to dictate both the what and the why of the project. Aligning with the work of Iversen (2017), Resnick (2017) found that problem-based learning is often most effective when "learners are supported to take ownership of the problem." He noted that encouraging children to be initiators of the creative direction positions them to "make" ideas rather than passively "get" them. Anchoring research in this deeply personal context equips children to clearly articulate

their priorities, goals, and eventual solutions, as the project is driven by their own lived reality rather than an imposed brief (Iversen et al., 2017; Shaw et al., 2022).

2.3.2 Inclusive and Reflexive Practices

Empowering children to frame the problem is only effective when also anchored by ongoing inclusive and reflexive practices. As the United Nations Convention on the Rights of the Child (1989) reinforces, there is an ethical imperative to respect children as capable contributors. Specifically, Article 13 states that children have the right to "freedom of expression," including the freedom to:

> *"seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of the child's choice."*

Upholding these rights requires a framework that addresses the invisible power dynamics previously discussed. The Lundy Model (2007) provided a structure for this by breaking down participation into four essential pillars:

- **Space:** Creating a safe, child-friendly environment where children feel encouraged to express themselves without fear of adult correction.
- **Voice:** Providing multimodal methods (Feder, 2020) so children can communicate through play, art, or digital media. As Friedrich Froebel observed, in play the child is "free to determine [their] own actions. [feeling themselves] to be independent and autonomous" (Liebschner, 1992).
- **Audience:** Ensuring the researcher is actively listening and documenting the child's intent rather than just their "data output."
- **Influence:** Demonstrating how the child's "atypical" insights (Treviranus, 2018) directly shaped the final design.

These pillars of inclusive expression are not self-sustaining, so reflexivity serves as the means through which they are held together. Maintaining "Space" and "Voice" requires the researcher to continuously examine their positionality, building awareness of how their presence, body language, and implicit biases may impact children's expression (Lundy, 2007; Yip et al., 2017). The pillars of "Audience" and "Influence" also require reflexivity, especially in relation to the invisible power dynamics embedded in acts of interpretation. Reflexive awareness is complemented by methods such as member checking and triangulation, which involve returning to participants to verify interpretations (such as asking, "Is this what you meant?"). Together, these practices underscore the effectiveness of co-design in supporting the integrity of the child's

perspective, empowering a shift that actively redistributes power within design research (Iversen, 2017; Shaw et al., 2022; Feder, 2020).

2.4 Co-Design with Children: Practices, Methods, and Challenges

Within child-centred research, co-design functions as a methodological and ethical approach that recognizes children's capacity to ideate, evaluate, and reflect as the experts they are (Feder, 2020). Co-design positions children in more active roles by creating the space for them to influence a project direction, meaning, and outcomes through hands-on engagement (Iversen et al., 2017). Co-design introduces a combination of processes and methods that seek to support meaningful participation while also navigating the challenges of sustaining equitable collaboration.

2.4.1 Committing to a Child-Led Co-Design Process

Co-designing with children involves restructuring the design process so that participation is both authentic and manageable for young collaborators (Yip et al., 2013). This involves adapting the environment so that children's perspectives can be easily supported, observed, and reflected back to them. Research in child-centred design consistently demonstrated that co-design was most effective when it operated as an open-ended, exploratory, and collaborative process in which both adults and children adopt the role of co-learners (Guha et al., 2013; Iversen et al., 2017).

Feder (2022) expanded upon the commitment to child-led exploration through the "internship as child" model, which required designers to inhabit the child's everyday environment to understand their lived experience firsthand. Her approach reframed the entire design process as a series of "play opportunities"–moments for dialogue, discovery, and shared meaning-making. In child-led co-design, a session might shift from drawing to storytelling to role-playing as children follow their curiosity through the fluidity of play (Vygotsky, 1967; Resnick, 2017). Maintaining a balance between openness and structure, while also providing accessible materials, enables children to engage based on their levels of comfort and interest (Mazzone et al., 2008; Iversen et al., 2017). Co-design can facilitate successful engagement because it naturally leverages play as a viable mode of inquiry as children explore, test, and communicate ideas through action rather than relying solely on verbal articulation (Feder, 2020; Iversen et al., 2017).

2.4.2 Interpreting the Child's Voice

Translating the child's voice during the synthesis phase represents the final, and perhaps most complex, challenge in child-led co-design. The ambiguity of co-designed artefacts foster creativity, yet demand a highly nuanced, reflexive approach to interpretation.

Interpreting and documenting children's designed work is an ethically charged process. Several studies have highlighted the difficulty in translating a child's idea into a fully realized design product, with a notable challenge in the gap between informal language (such as stories, drawings, or play) and the formal language required to create design specifications (Shaw et al., 2022; Mazzone et al., 2008). Frauenberger et al. (2012) noted that this ability to interpret formal and informal visual language is a well-developed skill for many designers, but because the interpretive act is never neutral, power dynamics, personal biases, and the underlying goals of the researcher (whether framed by the researcher or the children) all impact which aspects of the project are recorded.

As children build, draw, or model artefacts, they externalize internal thoughts that may be too complex for verbal explanations (Froebel Trust, 2014). Sanders and Stappers (2014) found that the resulting artefacts from child-centred co-design were often ambiguous, but claimed that the ambiguity "generates opportunities for creativity, expression and discussion." Due to the challenges of sometimes vague design outputs, the relationship of making, telling, and enacting can function as a built-in process for reflexivity. Without a reflexive approach to interpretation, the researcher risks unintentionally "filtering" the child's voice and potentially negating the agency and autonomy facilitated during the co-design sessions (Kelly et al., 2025; Shaw et al., 2022; Feder, 2022). High levels of interpretive care are what sustain the co-design relationship even after the physical session ends, and every analytical choice requires a researcher who remains dedicated to engaging with the child's logic and committed to acknowledging their perspective.

2.5 Conclusion

Across the literature, play is consistently identified as a foundational mechanism through which children learn, communicate, and construct meaning (Piaget, 1962; Vygotsky, 1967; Froebel Trust, 2014). Though a widely acknowledged expression of experience and creativity, few studies closely examine *how* play functions as a communicative and decision-making mechanism within child-led co-design, particularly in relation to meaning-making, negotiation, and influence over final design outcomes (Kelly, 2025; Sanders & Stappers, 2014; Shaw et al., 2022). Existing work often celebrates play as a condition for engagement without sufficiently interrogating its role in shaping design processes and artefact development. The literature also showcases how participatory and co-design frameworks argue for children's right to contribute as autonomous experts of their own lived experience in modes and formats most meaningful to them. (Druin, 1999; Iversen et al., 2017; Feder, 2020) Together, these bodies of work challenge adult-centric research paradigms that marginalize children's agency, positioning play-based co-design as both a methodological necessity and an ethical imperative. While inclusive design and

Design Justice frameworks advocate for the redistribution power toward marginalized users through relevant and engaging methods, there remains a lack of research that explicitly examines CCD as a child-specific enactment of inclusive design principles in practice (Costanza-Chock, 2020; Feder, 2020; Treviranus, 2018). In particular, little empirical work has examined how CCD methods operationalize inclusion, equity, and agency or how these values manifest in both the process and the outcomes. In response to these gaps, this study explores how children shape the design process when granted agency over both problem definition and design outcomes through play-based, multimodal co-design workshops. Drawing on Feder's Child-Centred Design framework (2020) the study adopts CCD as its primary theoretical and methodological lens, situated within an inclusive design orientation.

3. Methodology

"Creativity doesn't come from laughter and fun: It comes from experimenting, taking risks, and testing the boundaries."

- *Mitchel Resnick (2017)*

3.1 Theoretical Framework

This study adopts a dual-framework approach that integrates child-centred and inclusive design. These frameworks serve as the analytical and ethical guidelines for the research, dictating how it is structured, how data are gathered, and how the resulting design outcomes are evaluated. Adopting the position that CCD may operate as a child-specific expression within the broader field of inclusive design, the study examines the relationship between these two frameworks to better understand where they intersect, diverge, and inform one another.

3.1.1 Applying Child-Centred Design

Child-centred design emerged from the broader participatory design movement, encouraging children to be invited into the various stages of the design process. Within this evolving field, Karen Feder (2020, 2022) developed a comprehensive CCD framework designed to bridge the gap between abstract developmental theory and the practical requirements of design research. Feder's work is a mindset and a structured protocol that allows non-specialist designers to navigate the complexities of child-led engagement with professional and ethical rigour. Feder's framework is fitting as it prioritizes experience-based engagement and relationship-building in the child's everyday context. It supports the decision to embed play, co-creation, and reflection as the primary generative activities, enabling the research questions to be examined directly through the

eyes of the child. Grounding the methodology in Feder's CCD framework creates a space where children define the design problem and envision solutions, and their voices shape the full scope of the research process. This application specifically addresses:

- **Process Structure:** Ensuring the design journey remains open-ended, play-based, and exploratory rather than predetermined by adult agendas.
- **Power Dynamics:** Actively negotiating the relationship between the adult researcher and child participants to protect the child's agency.
- **Data Integrity:** Defining how children's contributions are recorded, interpreted, and carried forward into design outcomes without losing their original intent.

This study also seeks to apply and expand upon Feder's research by introducing a new dimension: the explicit integration of inclusive design. Utilizing her tested framework as a baseline gives a platform to explore how CCD can be evolved into a specialized expression of inclusive practice.

3.1.2 Inclusive Design

Inclusive design is a complementary theoretical lens for centering diversity, equity, and the intentional inclusion of voices that are often marginalized in the design process. The Inclusive Design Research Centre defines inclusive design as *"design that considers the full range of human diversity, including ability, language, culture, gender, age, and other forms of human difference"* (IDRC, n.d). At its core, inclusive design seeks to challenge dominant norms in design by ensuring that the people most affected by design decisions are sincerely involved in shaping them– a principle commonly expressed as "nothing about us, without us." (Costanza-Chock, 2020; Treviranus, 2018).

Oftentimes, inclusive design has been applied to increase accessibility and reduce barriers. While this remains foundational, this study extends the application of INCD to children, an often overlooked and underrepresented group in design research (Druin, 2002). Although not typically categorized as a "marginalized population" in policy terms, this study also believes that children are a group whose voices have been historically minimized and therefore merit inclusion under the ethical commitments of INCD. Inclusive design strengthens the CCD lens by cementing two key values:

- **Participation with intention**: not just involving children, but ensuring their participation is equitable, meaningful, and influential in shaping outcomes.
- **Respect for diversity in childhood**: recognizing that childhood is not a universal experience; children differ in communication, culture, neurodiversity, emotional expression, and comfort with co-design.

This practice involves providing multimodal avenues for expression, such as drawing, storytelling, building, and movement, which align with the values of a CCD mindset (Feder, 2020; Sanders & Stappers, 2014). As it is grounded in INCD principles, the study does not assume that including children automatically makes a process inclusive. Instead, inclusion becomes an explicit design requirement embedded from recruitment and session structure to the final interpretation of outcomes.

3.1.3 Integrating CCD and INCD

The primary methodological objective of this study is to integrate child-centred and inclusive design research methods to establish a unified approach to engaging children in design research. Feder's CCD framework (2020) provides the essential mindset for child-led exploration, and an inclusive design approach provides the ethical guidelines required to ensure that this exploration is accessible to a diverse range of participants. This study does not view these as separate requirements, but as a singular, integrated methodology that represents the best approach for working with children in design research. Employing these two lenses in tandem allows the study to move beyond a simple application of theory. Instead, it creates an evaluative process where the effectiveness of a child-centred mindset is tested against the standards of inclusive practice. The dual-lens approach is positioned as a necessary evolution in design research, defining a process that is developmentally appropriate and ethically sound.

3.2 Research Design

This study is built around the premise that children solve design problems most authentically when no one has already decided what the problem is. Rather than arriving with a fixed brief, the research invites a small group of children into three iterative co-design sessions, moving from initial framing through playful making to reflection and refinement. The development of social-emotional tools is used as a light starting point for children to investigate the problem space in the ways which they see fit. Provided materials are open-ended, timelines are flexible, and the researcher's role is one based on facilitation of opportunities. Data is collected continuously across all three sessions using audio recordings, field notes, and the artefacts themselves, creating a layered record that could be cross-referenced in relation to the whole dynamic of the study.

3.2.1 Research Approach: Qualitative Participatory Co-Design

A qualitative lens is essential for capturing the subjective, nuanced, and often nonverbal ways in which children navigate the design process (Sanders & Stappers, 2008). Unlike quantitative measures that prioritize standardized outcomes and frequency, qualitative inquiry allows for the deep exploration of meaning-making, emotional expression, and

interpersonal dynamics. Capturing how children negotiate meaning and shape the process requires a focus on these phenomena, as they are inherently tied to the unique, situated contexts of the individual participants (Feder, 2022; Shaw et al, 2022).

Participatory research supports the qualitative approach by reframing children from objects of study to active contributors of knowledge (Alderson, 2008; Druin, 2001). Child-led co-design provides the developmentally appropriate tools necessary for this collaboration, utilizing the "make, tell, and enact" cycles established by Brandt et al, (2012). Cross-referencing the physical artefact (making), the accompanying narrative (telling), and the demonstrated use (enacting) substantiates that a finding is not an isolated occurrence, but a consistent reflection of the child's intent (Brandt et al., 2012). Capturing this data is imperative to not only to uphold the methodological reliability of the research but also to safeguard the authenticity of the child's creative output (Shaw et al., 2022; Feder 2020; Yip et al., 2017). A primary challenge in child-centred co-design lies in the tension between highly individualized insight and structural accountability; embedding these triangulation mechanisms directly into the process actively mitigates concerns regarding data validity.

In many research paradigms, rigour is equated with the frequency of a finding, pressuring researchers to "average out" data to find common trends. But within an inclusive design framework, this logic is inverted; even a "one-for-one" solution, such as an insight derived from a single child's unique interaction with materials, constitutes a valid and significant design data point (Treviranus, 2018). The "outlier" data is not a statistical error, but a "critical edge case" that offers a unique lens into the perspectives of the participants.

3.2.2 Participant Profile

A total of five children participated across three co-design sessions. Four children participated in session one, while only one child participated in sessions two and three due to scheduling and commitment constraints. Participants ranged in age from 5 to 9. This age range was intentionally selected, as children within this developmental stage typically demonstrate emerging symbolic thinking, increasing social awareness, and a growing ability to express ideas through multimodal forms, including speech, play, and material interaction. These capabilities support meaningful engagement in co-design activities that prioritize making, exploration, and iterative thinking. No specific demographic diversity criteria were applied during recruitment. However, children with a range of communication styles, abilities and backgrounds attended the sessions. Characteristics were noted contextually during data collection, particularly where they

influenced how children engaged with materials, expressed ideas, or participated in the co-design process.

Co-Designer	Age	Sessions Attended
JC	6	3
EL	9	1
OO	9	1
GB	8	1
AT	5	Did not stay

Table 1. Co-Design Participant Table

3.2.3 Recruitment and Consent

Participants were recruited through word of mouth and social media outreach, with information shared directly with parents and guardians outlining the study's purpose, structure, and voluntary nature. Written informed consent was obtained from parents or legal guardians prior to participation. Children provided assent through simplified, visually supported forms designed to align with their developmental levels. Assent was obtained at the beginning of each session to confirm children's ongoing willingness to participate. The assent forms included visual indicators (happy, neutral, and sad faces) to help children express how they felt about participation. When children selected neutral or negative responses, the children were invited to have a brief, age-appropriate conversation to understand their feelings and ensure that these responses did not indicate a desire to withdraw. Clarification of these answers reinforced the voluntary nature of the co-design sessions and created space for the co-designers to feel comfortable and have their voices uplifted early on in the research process. Consent and assent were treated as ongoing processes, and children were reminded at the start of each session that they could take breaks, choose not to participate in specific activities, or withdraw at any time without consequence, supporting a child-centred and ethically responsive research environment.

3.3 Data Collection

3.3.1 Multimodal Qualitative Data Capture

To capture children's thinking as it emerged in the act of designing, data collection involved an observation of embodied interactions. The data produced during the co-design sessions was captured through audio recordings of each session, naturalistic observations, and handwritten field notes that tracked recurring themes, conversations, and specific interactions with materials and the other participants. Visual evidence was

limited to photographs of the participants' hands and their prototypes to ensure anonymity while documenting the tactile nature of the design process. These assets were stored on a secure drive, with audio recordings scheduled for deletion post-publication, while photographs are retained indefinitely as primary research evidence. Physical artefacts and creations remained with the researcher for the duration of the workshops to facilitate preliminary coding and were offered back to the children following the final session.

** Note:* During the final co-design session (Session 3), a technological failure resulted in the loss of the session's audio recording. Data capture for this critical session relied exclusively on thick-description field notes and immediate post-session reflective memoing.

3.3.2 Session Design and Facilitation

Following the CCD framework established by Karen Feder (2020, 2022), the research workshops were conducted at a local community recreation centre, to improve engagement and authenticity. The research was conducted over three 60–90-minute sessions, allowing the children time to experiment while maintaining sustained engagement. Each session followed a consistent three-phase structure:

Figure 1. Co-Design Workshop Materials

- **Phase 1: Orientation:** This initial period facilitated the transition into a "design thinking" mindset by establishing expectations and warm-up activities.
- **Phase 2: Generation:** As the core exploratory phase, generation focused on the active "work of play" where children used diverse materials to engage in iterative co-design research and prototyping.
- **Phase 3: Reflection:** Each session concluded with a period for children to narrate their creations, ensuring their design intent was accurately recorded.

Creative supplies, such as crafting materials, stickers, paper, cardboard, and adhesives, were offered for the children to experiment with and invent. The children were also offered non-conventional materials, such as wood, various small toys, fabrics, and recyclables, to encourage invention and experimentation outside of typical constraints (FLIGHT, 2018). By providing a broad mix of materials, the workshops allowed for what

Mitchel Resnick (2017) refers to as "tinkering," which lies at the intersection of play and making where children try out ideas, make adjustments, and refine their plans as they make their way towards an end-result *(note that this is not the same as an end-goal)*.

In alignment with both CCD and INCD principles, facilitation was characterized by a non-directive approach. The goal was to support the child's process without steering the design outcome. Key strategies included:

- **Scaffolding:** Providing technical assistance, such as helping with adhesives only when requested and offering insights when asked.
- **Non-Directive Prompts:** Using open-ended questions such as *"For anxiety, what would that feel like...what textures or what materials would you use to create that character?"* to invite reflection without imposing adult interpretations or "correct" answers.
- **Dynamic Flexibility:** Remaining responsive to the emotional and sensory needs of the participants. If a child required a shift in movement or a change in material to stay engaged, the session protocol was adjusted in real-time to maintain an inclusive environment.

While the study was designed for a small group, participant attrition resulted in a longitudinal single-participant case study with JC across all three sessions. Rather than treating this as a limitation to overcome, the study embraces this as consistent with qualitative case study methodology, where depth of engagement is prioritized over breadth of participation.

Also, as an act of recognition, each co-designer was offered a certificate of contribution at the close of the final session. The certificates acknowledged their role not as research subjects, but as co-authors and creative leads of the work.

3.4 Data Analysis

3.4.1 Analytic Approach: Hybrid Thematic Analysis

This study employed a reflexive, hybrid thematic analysis to examine how children made design decisions through material interaction and lived experience. The data was analyzed using a two-pronged approach:

1. **Inductive Coding:** Initial codes were allowed to emerge naturally from the transcripts and field memos. This bottom-up approach revealed organic values, such as the children's rejection of pre-planning in favour of immediate material manipulation.

2. **Deductive Mapping:** Once the organic themes and notable moments were established, they were deductively tested against Karen Feder's (2020) twelve characteristics of Child-Centred Design. This synthesis allowed the study to evaluate how effectively the practical data aligned with existing CCD theory.

3.4.2 Methodological Congruence & Embodied Analysis

The data analysis phase was directly inspired by the way the youth co-designers approached prototyping during the co-design workshops. During initial observations, it became apparent that the children consistently opted not to plan. Instead, they worked directly on their projects, employing a "play first" methodology. In alignment with the child-based methods, the coding and data analysis were conducted through a hands-on "crayons and paper" process as well. The mapping process involved transferring transcript quotes, field notes, and observational codes onto pieces of paper, and using crayons and tape, the data was physically sorted, grouped, and mapped by placement, colour relationships, and various notes drawn on the cards. Moving directly into analysis without extensive pre-planning allowed inductive codes and themes to emerge naturally. The play-based analytical approach facilitated a more natural, fluid cognitive process. Speaking aloud, sketching out thoughts in real time, and prioritizing the experiential act of discovering connections, the research data were engaged with in a manner similar to how the children had engaged with their materials. All analytical decisions were grounded and supported by the "make, tell, enact" cycles and the Lundy Model (2007) ensuring congruence with the co-designers' valued perspectives.

Figure 2. Play-Based Data Analysis Map

3.4.3 Ensuring Rigour and Trustworthiness

To ensure the trustworthiness of the findings, the data collection and analysis process relied on the multimodal triangulation of the children's "make, tell, and enact" cycles (Brandt et al., 2012). Because prototypes (especially those drafted by children) can appear illogical to others, their physical artefacts (make) were cross-referenced with their verbal explanations (tell) and their dynamic play-testing behaviours (enact). The iterative nature of the co-design sessions naturally facilitated both triangulation and member-checking. As the primary co-designer continuously play-tested and revised her artefacts over time, she actively validated the interpretation of her design process.

Alongside the documentation and research design, post-session memoing was also utilized to actively audit the researcher's own biases. Doing so helped bring awareness to an ingrained, teacher-like instinct to guide children toward aesthetically pleasing or "functional" outcomes. Creating logs of where these biases appeared aligns directly with both CCD and INCD values on reflection-driven practice, and allowed for any adult-centric instincts to be consciously countered prior to the following session (Feder, 2020; Treviranus, 2018). Reflexive pivots upheld the study's core commitment to child agency, elevating both the rigour of the research's design and the validity of the data (Shaw et al., 2022; Yip et al., 2017).

4. Findings

4.1 Introduction

This chapter presents findings from a series of co-design sessions with child participants, with a primary focus on a six-year-old participant, JC, and the development of her board game, [JC's] Life. The findings draw on observed behaviours, participant dialogue, and interactions with materials and the research environment across multiple sessions. Attention is given to how participants moved through the space, engaged with tools and materials, and directed interactions with the researcher and one another. Documenting shared patterns across participants and a detailed case study tracing JC's process over time. The findings are organized into three themes, each capturing recurring actions and interactions observed during the sessions.

4.2 Dismantling the Classroom

The first co-design session began by establishing the physical layout of the space. Seating was arranged without assigned placement. Chairs, tables, and the floor were all available for use. Participants were not directed toward a specific location and chose independently where to position themselves. Materials were distributed across the space and included paper, cardboard, wood pieces, fabric, string, tape, beads, and recyclables. Tools like scissors and a hot glue gun were readily available. The accessibility of the materials was reinforced by the pre-opening of packaging for most of the supplies.

Participants moved freely within the room. Movement included standing, sitting, kneeling on the floor, and walking between areas. Participants shifted positions multiple times throughout the session, often changing location as they engaged with different materials. Breaks occurred without formal announcement. Participants stepped away from their workspaces and returned without seeking permission or acknowledgment.

During the first session, participant AT left shortly after it began. This action occurred without interruption.

Language used by the researcher avoided directive phrasing. Participants were not instructed on what to make, how to make it, or when their work was complete.

4.3 Theme One: The Social Negotiation of Power

The first session included multiple instances in which participants directed interactions with the researcher and the structure of the session itself. These interactions began early in the session and continued across subsequent sessions in both verbal and non-verbal forms. Following a group discussion in which the children were identified as leaders of the space, JC initiated direct communication with the researcher.

> "...if you tell us what to do, can you please say please? Because I don't like being told something without [inaudible] please."

This statement was delivered in a clear and steady tone and was not accompanied by hesitation. The researcher happily complied. Throughout the workshop, participants engaged with tools and materials without requesting instruction or permission. OO and JC independently selected and used tools such as a hot glue gun and complex fasteners. Their engagement included applying glue, joining materials, and adjusting components without seeking confirmation. GB used the same tools with some requested assistance. EL repeatedly altered her prototypes during the session. This included taking apart previously assembled components, discarding elements, and reconstructing new versions using the same or different materials. JC also participated in this cycle. These actions occurred multiple times within a single session.

GB also demonstrated a different pattern of engagement. He paused his work frequently, stepped away from his workspace, and returned intermittently. During these periods, he redirected his attention toward different materials or activities that were not directly connected to his prior work.

Across participants, engagement with the session structure did not follow a fixed sequence. Movement, material use, and interaction with the researcher varied throughout the duration of the session.

GB's engagement with power was uniquely nuanced. While he maintained a formal hierarchy by addressing the researcher as 'Teacher,' his actions at the end of the first session suggested a developing relational trust. By presenting a handmade bracelet and

card, followed by a hug, GB signalled that his use of traditional titles was perhaps a source of security rather than an acknowledgment of adult control.

The sessions accommodated a wide spectrum of creative temperaments. While JC maintained a verbally and physically active presence, often narrating her design through storytelling, EL engaged in a more solitary, quiet mode of inquiry. EL focused on small-scale prototypes, creating in a self-contained manner that was respected by both the researcher and peers. Conversely, OO's trajectory was marked by a social emergence. Initially quiet, he became increasingly communicative as others expressed interest in his prototype, using his work as a bridge for social connection.

A notable moment of facilitation occurred during the introduction of the hot glue gun. The researcher experienced a brief internal hesitation regarding the safety of independent use; however, following the study's commitment to competency over protection, the tool was provided without restriction. The researcher maintained discrete supervision, observing from a distance that allowed for safety without interrupting the children's flow or signalling adult fear.

4.3.1 JC's Case Study: Agency

During the first session, JC began interacting with materials before the activity explanation was completed. She moved toward the materials table, selected items, and began assembling components without waiting for further instruction. She chose tools including a hot glue gun, larger scissors, and fasteners. She handled these tools independently, applying glue, cutting materials, and attaching components. JC verbally defined her project early in the session, stating she was creating a board game titled [JC's] Life. JC titled the game after herself, marking an association between her personal identity and the design output. She described the purpose of the game as being for players "when they're angry to calm them down." While working, JC alternated between engaging with materials and speaking to others in the room. She initiated communication with the researcher, including requesting the use of manners and discussing personal stories and pop culture.

The second session was conducted individually. Upon entering the space, JC moved directly toward the materials and began working without prompting. She did not remain seated at a table. Instead, she moved throughout the room, placing materials on the floor and working across multiple surfaces. Materials were spread out around her as she worked, including paper, tools, and partially completed components. JC took breaks intermittently. These breaks involved stepping away from her materials, pausing activity, and returning without verbal acknowledgment or request. When asked to describe

aspects of her design, JC occasionally responded with "You'll see." These responses were brief and not followed by additional explanation. After responding, she returned to working with materials.

In the third session, JC continued working in a self-directed manner. She selected materials, modified components, and continued developing her board game. Her agency was evidenced by her total occupancy of the workshop environment when she reached for a juice box on the table and initiated a break without verbal inquiry or a pause for permission. Furthermore, she began collecting materials for a personal project entirely separate from the research goals. By utilizing the workshop as a resource for her own creative life outside the design of the game, JC demonstrated that she viewed herself as the primary director of both the space and the materials. During the final session, she initiated verbal feedback toward the researcher, describing them as "creative" and "kind." These comments occurred during active engagement with her work.

JC continued to determine when to request assistance. Requests were specific and task-based, such as asking for help with materials or tools, after which she resumed independent work. Her movement throughout the space remained consistent, including shifting between working positions and adjusting the placement of materials.

Figure 3. OO's Prototypes

4.4 Theme Two: Play as a Mode of Inquiry

Participants engaged directly with materials, often beginning with physical interaction rather than verbal planning. Making activities included cutting, taping, wrapping, assembling, and modifying components during use. Material interaction occurred continuously throughout the sessions. Participants handled materials repeatedly, testing different configurations and altering components as they worked. OO spent an extended period wrapping wooden pieces in yarn, sustaining a quiet sense of deep focus. He also placed beads into a plastic tube to create a shaker, which he then wrapped in yarn. When asked to explain how the object would function, OO responded that it made him feel "happy." He did not provide additional technical explanation and continued working on the object.

Participants engaged with materials through sensory interaction, including handling textures, adjusting weight, and producing sound through movement. Play was utilized to

bridge lived experience with design thinking. OO and EL referenced current toy trends to validate their prototypes. GB used the room's physical space to test the performance of his work; his prototypes evolved from static objects into increasingly complex designs featuring auditory feedback and 'explosion' effects, which he tested as he wandered the room to observe their impact from different angles.

4.4.1 JC's Case Study: Play

During the development of *[JC's] Life*, JC began her process without formal planning, stating, "I want to paint my idea." She moved directly into painting and assembling components without sketching or outlining prior steps. She did request assistance putting on an apron to protect her clothing. While creating game components, JC modified materials during active use. During a playtest, she cut her points cards in half after noting there were not enough to continue gameplay. She continued using the altered cards without pausing to refine them. Game rules were adjusted during play. When elements of the game interrupted flow, JC changed the rules mid-activity and continued play with the updated structure.

During sessions, JC initiated "dance breaks." These occurred at different points in the making process and involved stopping work, standing, and engaging in movement. She stated that adults should play more and not be so "serious." The researcher participated in these breaks alongside JC before both returned to the activity.

During the design of the emotion cards, she referenced the movie *Inside Out* as a point of comparison for how the emotions were represented. Throughout the making process, JC verbally referenced the board game *The Game of Life* and various television shows as influences for the game's structure; however, these television references were not represented as physical components in the final prototype.

4.5 Theme Three: Process-as-Prototype

The final prototype, [JC's] Life, featured several mechanics and components that directly corresponded to the observed structural and social conditions of the research sessions. These parallels were identified through JC's verbal statements and the physical configuration of the game's rules.

4.5.1 Structural Parallels in Game Mechanics

JC specified that the game's emotion cards be left blank for players to draw or colour themselves. She explicitly identified the "smiley face forms" used during the research assent process as the inspiration for this mechanic, stating she "really enjoyed" them. The game featured an opt-out mechanic where players could state, "That is an important

feeling," to end a turn without sharing. This was similar to the voluntary participation protocols established in Session 1, where participants were informed of their right to stop or withdraw at any time, a protocol enacted when participant AT left the session without interruption. JC established a rule allowing players to "pause gameplay at any time". This mirrored the observed behaviour throughout the workshops, where participants, including JC and GB, shifted away from materials or took intermittent breaks without seeking verbal permission or acknowledgment.

4.5.2 Facilitation Parallels in Gameplay

The "Archer Penguin" required players to plug their ears, sing, and dance. This physical requirement corresponded to the "dance breaks" JC initiated during the making process, which the researcher participated in upon her request. The "feel-good flower" prompted players to speak positive affirmations aloud. This mechanic mirrored the verbal interactions observed during the sessions, where JC initiated feedback toward the researcher, describing them as "creative" and "kind" during the active assembly of the game. JC constructed the final prototype using recycled materials from the open-access supplies. She stated the game was made "with love" and chose these materials because they were "better for the environment," echoing the independent selection process facilitated by the open-access room setup.

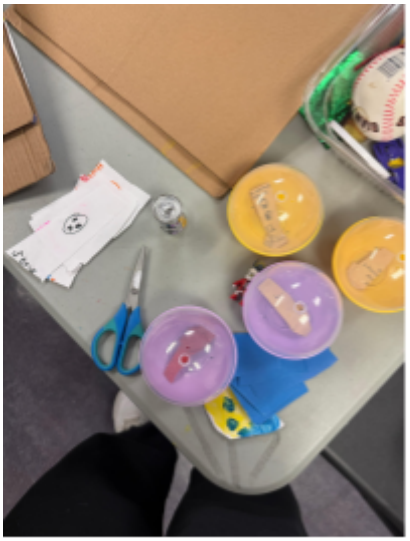

Figure 4. JC's Session 2 Workstation

4.6 How to Play [JC's] Life

[JC's] Life is a cooperative board game centred on emotional regulation and sensory experience. The objective of the game is not to race to a finish line, but to accumulate points through emotional sharing and expression, resulting in a cooperative victory for all players. The basic gameplay operates on a continuous loop of movement, reflection, and reward:

- A player begins by spinning the 1-14 spinner.
- The player then moves their piece a number of spaces across the open, square-less board.
- Next, the player draws a number of emotion cards equal to the number they spun.
- From the drawn hand, the player selects one emotion card. They must then share a memory or story associated with that feeling. If a player does not feel drawn to

share, they can utilize the opt-out mechanic. They affirm the value of the emotion, such as stating "That is an important feeling," and return the card to the pile.
- Upon successfully sharing or affirming, the player earns a single points card to add to their inventory.

As players navigate the board, they can land on or interact with several dedicated zones that trigger specific physical or emotional mechanics:

- **The Archer Penguin:** Landing near this character initiates a mandatory movement break. The player must plug their ears, sing, and dance for an undetermined amount of time.
- **The Kitty Pool:** A cat-themed resting space where players earn a "calming parachute" to physically attach to their game piece.
- **The Feelings Garbage Can:** A receptacle where players can yell unwanted feelings, memories, or frustrations, and slam the lid shut. The can remains closed to contain the feelings until they are "dumped out" after the game concludes.
- **The Feel Good Flower:** A plant component that requires players to take a break and speak positive affirmations out loud into it to help it grow.

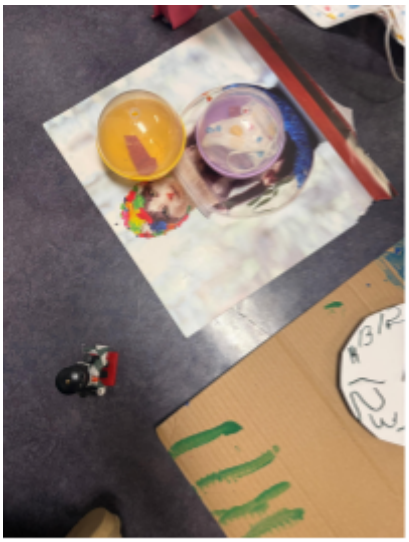

Figure 5. [JC's] Life Archer Penguin and Kitty Pool

The conclusion of [JC's] Life forgoes a traditional winner-takes-all approach. At the end of the game, players are rewarded based on the number of points cards they have earned, with prizes including a dancing skeleton pirate toy or a physical crown. During the final playtests, JC introduced an added cooperative modification to the win state: both players get to share the crown. The points system is used to determine a temporary hierarchy, dictating that the player with the most points gets to wear the crown first.

4.7 Summary of Findings

Across the co-design sessions, participants demonstrated varied forms of agency through their interactions with the environment, materials, and researcher. These actions included directing communication, selecting and using tools independently, modifying or abandoning work, taking breaks without permission, and, in one instance, leaving the session entirely. Play-based activity was consistently observed throughout the sessions. Participants engaged directly with materials without extended verbal planning, often

beginning with immediate making. Prototyping occurred through ongoing manipulation, including cutting, assembling, dismantling, and reconstructing components during use. Participants also incorporated movement, sound, and repetition into their making processes.

Participant JC's case study documented sustained engagement across three sessions. Her actions included defining the concept and purpose of her board game, modifying materials during active play, adjusting rules in real time, initiating breaks, and directing interactions with the researcher. Her answers ranged from detailed explanations to brief statements.

The final prototype, [JC's] Life, included mechanics and components that reflected activities observed during the sessions. These included options for pausing gameplay, selecting from multiple responses, opting out of sharing, and engaging in physical movement such as singing and dancing. The game also incorporated prompts for verbal expression, including discussing emotions and stating affirmations.

Across all sessions, participant actions, material use, and game development occurred without a fixed sequence, with ongoing adjustments made during active engagement. These observations conclude the presentation of findings and lead into Chapter 5, where these data are examined in relation to Inclusive Child-Centred design and play theories.

5. Discussion

5.1 Introduction

In child-centred design, the research environment is not a neutral container, but an active component of the design outcome. The physical, social, and relational conditions of the space were not separate from the artefacts produced within them. Instead, these conditions were repeatedly enacted and reconfigured by the co-designers, and later reappeared in the structure and mechanics of JC's final prototype. Examining how participant actions, such as directing communication, withdrawing from participation, modifying materials in real time, and engaging through play, extend existing understandings of child-centred design, gives attention to inclusive design principles that are enacted through facilitation and environment. A key pattern identified throughout this analysis is the "Process-as-Prototype" effect, in which the conditions of participation are embedded in the resulting design outcome.

5.2 Answering RQ1: Agency, Power, and Problem Framing

When given agency over problem definition and design outcomes, children reconstruct the physical, social, and conceptual boundaries of the research. Answering the question *"How do children shape the design process when given agency over problem definition and design outcomes?"* requires moving past the assumption that adults can just hand over power. True agency operates as a continuous social negotiation where young participants test, claim, and reshape dynamics to fit their needs and realities.

5.2.1 Redefining Agency

Across the sessions, the co-designers demonstrated that agency is not just granted at the outset of participation, but something actively negotiated through interaction with the space, the research process, and one another. Agency became visible not as a static condition, but as a lived practice co-created in real time.

When one co-designer (AT) chose to leave at the start of the first workshop, her decision was openly accepted, in accordance with the study's established assent procedures and core values. Though her peers encouraged her to stay and participate, AT's decision to leave was ultimately hers alone. While unplanned, AT's exit contributed to the understanding that within our research space, agency was not only stated but upheld without consequence. Moments where these acts of self-determination were encouraged contributed to a shared understanding of the social and structural parameters of the workshops. With these parameters in place, participants were able to begin navigating not only their own autonomy, but also how agency operates in relation to others. This became especially visible in how the co-designers negotiated expectations, communication, and interaction within the group.

When JC opened the research sessions by asking, "...if you tell us what to do, can you please say please?...", it was more than just a request for politeness. It was also her testing the malleability of our social contract. She was checking to see if I truly meant what I said about them being the ones in charge of the space. It was both an assertion and a test of boundaries, which was welcomed and used to open up conversation about how we would inhabit this space together.

Once JC and the other co-designers understood that their perspectives would reshape the social structure, they began to test their physical allowances too. The transition from social to physical agency was most evident in the ways that the children chose to engage with the process and the materials they used. During the first session, co-designer OO felt he needed a hot glue gun to best execute his ideas. Initially, I was hesitant to "allow" this

due to skill concerns, but both CCD and INCD call for questioning assumptions, leading to a conversation about confidence and competence rather than whether he "could." When the co-designers decided they could all use it properly and safely, the hot glue gun was invited into the prototyping process. OO and JC expressed pride in their independent use of the "risky" tool, especially because they found it more efficient than the other available tools. GB asked for help with the hot glue gun, sharing concerns about the heat and his ability to use it as intended. The help provided in that moment, and consequently throughout the following sessions, followed the "scaffolder" approach as suggested within Vygotsky's (1967) Zone of Proximal Development theory. Prompts were offered when requested, and assistance was limited to what the co-designer directed, with follow-up questions to ensure any help was an extension of their ideas, not adult overreach.

Figure 6. GB's "Calming Walk" illustration

As the sessions progressed, GB's experience in the research environment introduced a notable data point. Agency does not always manifest as a rejection of structure. GB continually referred to me as "Teacher," even when reminded that "just Kennedy is okay too." Initially, there were concerns that this was a reflection of unnoticed hierarchical structures being upheld, but GB's broader behaviour–taking frequent self-directed breaks, moving freely across the room, and shifting between projects with playful curiosity–suggested a high degree of behavioural autonomy that contradicted traditional classroom compliance. The "proof" of GB's agency was eventually found in his unprompted social initiations. When GB gifted me a handmade bracelet and a personalized card that he had made during the session, depicting us going on a calming nature walk, he moved beyond the role of a participant fulfilling a research brief into that of a social director. In a traditional hierarchy, the child often waits for the adult to define the relational terms. By initiating this exchange of care, GB asserted his power to define our relationship on his own.

Accommodating these diverse expressions of autonomy aligns with the ethos of inclusive design, which cautions against standardizing human experiences (Treviranus, 2018). Mandating a specific type of "rebellious" agency could have created new barriers for GB, who seemed to need familiar structures to feel secure enough to be creative. An authentically child-centred environment must be a responsive container (Feder, 2020),

encouraging all aspects of the research–including the titles we use–to be redefined by those within it. Agency, then, is not a finite goal but a context-dependent definition co-created through the unique interactions between participants, researchers, and structure.

5.2.2 Children as Self-Directed Framers

When design projects invite children into the process only after adults have established the parameters, they strip participants of their ability to articulate their own priorities (Iversen et al., 2017). This is a core concern in INCD. If the problem is predefined by an outsider, the solution is already biased. In my workshops, I found that when these boundaries are loosened, children actively and repeatedly reconstruct the problem space entirely.

A significant finding was that every co-designer utilized a materials-first approach to framing. In traditional adult design, the process often follows a linear trajectory: brainstorm, sketch, plan, and finally, build. However, the co-designers inverted this. They did not wait for a formal plan and opted to explore the available supplies first, allowing the tactile qualities of the materials to guide their ideation. I watched as OO began his process by feeling the weight of the wooden pieces and the texture of the yarn. JC jumped right into painting. When I asked whether she was planning to sketch anything first, she simply responded, "Nope." EL and GB both started collecting various materials and bringing them to their workspace, navigating their ideas by tinkering with the supplies (Resnick, 2017). This demonstrates that the specific palette of supplies offered directly affects the trajectory of the framing and outcomes as well. Because I provided an open-access environment where everything was within reach, the materials directly influenced the co-designers' decisions, framing the project's possibilities through their physical affordances.

Outside of material engagement, the co-designers also drew in external references as part of their framing processes. OO and EL frequently referenced current toy trends and popular items on the market when constructing their projects, not copying, but discussing the features and mechanics they liked best, and what they might change. JC and GB, who were also the most conversational during the sessions, seemed influenced by pop culture and social interactions, mentioning family stories or TV show episodes as they worked. Social dynamics also played a significant role in how framing evolved over time. OO's moved from a quiet, solitary maker to a more social role as others expressed interest in his prototypes, indicating that his design framing was influenced greatly by his

social environment. Since OO was only available for one session, the impact of this could not be investigated further.

JC's engagement with framing could be more deeply understood as she attended all 3 workshops. During the first session, she declared she was building a board game for players "when they're angry to calm them down," and continued that project throughout. By establishing both the how and the why on her own terms, she moved from being a participant in my study to being the lead Designer of her own (Resnick, 2017). JC's framing remained fluid across sessions, with the definition of the problem and the mechanics of her prototype evolving in response to ongoing play, material engagement, and emerging ideas. During playtesting, when JC adapted components (cutting the points cards in half to create more) and rules (modifying and changing them as we played) to maintain the flow of the game, she demonstrated responsiveness to both functional needs and experiential quality, reframing the problem and her prototype with each new obstacle. By the conclusion of the final session, JC's project had evolved beyond a narrowly defined game "for when they're angry" into a more expansive emotional regulation experience. Her design process demonstrates how sustained meaningful engagement can transform an initial concept into a more complex, multidimensional outcome, reinforcing the idea that framing evolves with and within design outcomes.

5.2.3 Agency as an Ongoing, Responsive Process

Exercising agency does not end once the initial design problem is framed. It is sustained through the continuous opportunity to pivot, test, and alter the work as new challenges arise during the physical act of making. In this study, the co-creation of the definition of agency and the co-creation of problem framing functioned as a mutually constitutive process where each informed and reshaped the other. As participants engaged with materials, social interactions, and evolving ideas, the boundaries of the problem and the meaning of agency were actively negotiated.

Across the sessions, the co-designers' creative trajectories did not follow a linear progression. They were a showcase of Resnick's (2017) "creative learning spiral," in which imagining, creating, and reflecting occur in overlapping and iterative cycles. Ideas were not treated as endpoints but as temporary anchors that supported further exploration. As the co-designers, and notably JC, moved through this process, each iteration opened space for reinterpretation rather than closure.

JC's engagement is evidence of this dynamic. She demonstrated sustained self-direction in her design decisions, adapting the mechanics of her prototype in response to her own

observations and intentions. At no point did she rely on external validation to proceed. This mode of engagement, where a co-designer assumes control over the direction and scope of the design process, aligns with Iversen's (2017) concept of the "Child as Protagonist." My role in each session became increasingly minimized, with JC's evolving narrative guiding the progression of the work

What emerged through this process was not just the exercise of agency within a fixed framework, but the continuous redefinition of both agency and the framework itself. As JC adjusted her prototype, she was also reshaping the conditions of the design space–reframing the problem, redefining priorities, and setting the pace for further exploration. Agency was not something applied to a predefined task, but something that actively participated in shaping the task as it unfolded.

The findings across these sessions demonstrate that supporting a child's agency requires a facilitation approach grounded in responsiveness and a sustained comfort with ambiguity. A researcher must remain attuned to the pivots initiated by the child, allowing both the framing of the problem and the direction of the process to evolve in response. Agency is not isolated to individual decision-making, but operates across multiple layers of the design process, shaping how problems are defined, how interactions unfold, and how meaning is constructed through making. Feder's (2020) characterization of child-centred design as process-driven and grounded in engagement finds valuable expression in these moments of live renegotiation, where the session's structure adapts alongside the participant's actions. When children are empowered to continuously reshape the conditions of the task, the artefacts that emerge are not isolated outputs, but reflections of an ongoing interplay between social interaction, emotional context, and iterative decision-making.

5.3 Answering RQ2: Play as Design Thinking

Evaluating the second research question, *"How does play support children in expressing ideas, negotiating meaning, and influencing design outcomes?"* requires recognizing that play is the primary cognitive and emotional framework through which children navigate the world. While Karen Feder's (2020) CCD framework is built upon playful, experience-based inquiry, it does not explicitly list the mastery of "genuine play" as a core requirement for the researcher. The results of this study show that a deep, practitioner-level understanding of what genuine play is and how to engage with it fully is a fundamental prerequisite for CCD research. Play is not an engagement strategy, but a necessary environmental and investigative vehicle for successful child-centred inquiry.

5.3.1 Understanding Play

Genuine play, as defined in Chapter 2, is self-fulfilling. Its purpose and satisfaction are located within the activity itself rather than in an externally imposed outcome. Learning and understanding the theories of play is a fundamental prerequisite for playful inquiry. Facilitating child-led research requires an ability to recognize, interpret, and respond to play as it unfolds. Without it, important data, insights, and opportunities can be missed. The ability to apply and engage with playful modes of inquiry is conceptualized here as "Play Literacy", a practical understanding of how play operates as a way of thinking and communicating, and the capacity to work with it in real time. My background as an Early Childhood Educator directly shaped how the co-design sessions were structured and supported. Play Literacy informed my decision to prioritize "loose parts" (FLIGHT, 2018) over "prescriptive" toys, which was purposefully done to enable a wide range of exploration, as they do not dictate specific uses or outcomes. This honoured the study's goals of play and agency by leaving the framing entirely to the child. Play Literacy also influenced the structuring of the session timelines. I opted for three shorter sessions to allow for sustained engagement and reflection, rather than a single, high-pressure workshop. The structure accommodated for the changing intentions, repeated experimentation, and iterative modification that JC and the other co-designers engaged in.

Feder's (2020, 2022) CCD research provides a strong foundation for this type of work. Its emphasis on process-driven inquiry and its directive for researchers to meet children where they are–within spaces and practices that are meaningful to them–establishes important conditions for participation. However, the framework also assumes that the researcher already possesses the skills necessary to facilitate such an environment. Play Literacy is a response to this, as it teaches a researcher to distinguish between a child testing a material's physical limits and a child testing the social boundaries of the room. It includes recognizing when play is used to deepen engagement, when it serves as a vehicle for technical "stress-testing," and when it is a tool for social negotiation. Without this literacy, the flattened hierarchy promised by CCD can easily collapse back into adult-directed instruction the moment the "messiness" of play begins. As such, developing Play Literacy is essential for researchers seeking to facilitate meaningful child-led inquiry. An applied understanding of how children use play to think, communicate, and regulate their experiences is foundational to successful work.

However, the notion that child-led design research requires a background in child development acknowledges the broader reality that design and early childhood education are distinctly different fields. While it is unreasonable to expect standard design

curricula to provide full ECE training, relying solely on a traditional design toolkit is insufficient for authentic Inclusive Child-Centred Design. Designers seeking to implement CCD must aim to cultivate Play Literacy. CCD provides the actionable guidelines for involvement, but it is the facilitator's Play Literacy that creates the resilient, responsive environment necessary for that involvement to actually succeed.

5.3.2 Tinkering as Design Thinking

Open-ended play functions as a robust mode of inquiry precisely because it is a multimodal language for children. Data from the first workshop session demonstrated that the physical act of making serves as a site of design thinking. OO illustrated this through his extensive period of tinkering, exploring his artefact's utility through its weight, texture, and auditory feedback (Resnick, 2017). For OO, sensory engagement was the primary way he tested hypotheses and expressed preferences directly through his hands. When asked to explain what the object did, he described how it made him feel rather than how it functioned. The thinking was not missing, it was happening through the interaction. Each action produced information, and each new piece of information informed what he did next. This is iterative testing, just not in a verbal or linear form.

This is where play and the concept of tinkering, as introduced by Resnick (2017), needs to be taken seriously. It can look unstructured from the outside, but it is doing the exact work that design thinking claims to value. When OO adjusted materials, tested outcomes, and kept going without stopping to formalize his decisions, he was moving through cycles of exploration, evaluation, and refinement. The difference is not in the thinking itself, but in how that thinking is expressed.

When placed alongside more formal models like the Double Diamond, the overlap becomes difficult to ignore. "Discovery" shows up as initial material exploration. "Definition" happens as attention narrows through repeated interaction. "Development" is visible in the constant modification of components, and "Delivery" emerges when something becomes stable enough to be used or shared. The co-designers were not skipping steps, they collapsed them into the same action. While adult designers navigate these phases through formal brainstorming and verbal ideation, the co-designers achieved the exact same cognitive milestones through multimodal play. JC's process reinforced this further. She did not plan before making and she did not treat her design as something that needed to be resolved before it could be tested. She built, played, noticed what worked, and changed it. That kind of responsiveness is often what designers aim to achieve through prototyping and user testing, but here it happened without needing to be staged as a separate phase.

These examples show that tinkering, play, and design thinking are not separate processes, but different expressions of the same underlying activity. They all rely on iteration, responsiveness, and a willingness to follow what emerges rather than forcing a predetermined outcome. Play keeps this process fluid, accessible, and grounded in interaction. The direct implications for INCD are clear. When participation is measured by how clearly someone can explain an idea before acting on it, it excludes those who think through doing. It privileges a specific mode of communication and treats it as the default. Which INCD clearly advocates against. Here, the workshops demonstrated that valuable design thinking *can* happen without that constraint, directly enacting the principles of both CCD and INCD. Recognizing tinkering as valid design work expands who can participate and how their contributions are understood, allowing more diverse ways of thinking to meaningfully shape design outcomes.

5.3.3 Facilitating Playful Environments for Inclusive Outcomes

The theoretical alignment of play and design thinking is effective only if the researcher actively facilitates an environment that supports it. Play does not operate in isolation. Play has to be given the time, space, and tools to unfold naturally, following the direction it spontaneously flows.

A play-based approach introduces a kind of creative agility that more structured, outcome-driven approaches naturally constrain. When children are given the space to explore without immediate correction or evaluation, they develop strategies for persistence and adaptation. JC demonstrated this clearly when she stated, "When I make something and I'm so close to making it and it goes wrong, I just cover it up and say, well, it'll dry!" Her response reframes what might traditionally be considered failure into something workable, even generative. Her openness to mistakes represented resilience and a completely different relationship to outcomes. What JC showed was that things can't "go wrong" if there is no forced direction to begin with.

The openness is facilitated. It requires resisting the urge to over-structure, to predefine success, or to intervene too quickly when something appears off track. In line with Feder's (2020) emphasis on process-driven engagement, the role of the facilitator becomes one of maintaining the conditions where surprises and deviation are not only allowed but expected. These are the moments where children begin to express ideas most freely, because the pressure to be correct has been removed.

Beyond supporting resilience, facilitating a responsive and playful environment allows participants to engage in design thinking by constantly reacting to and reassigning

Figure 7. [JC's] Life Board, Player, Spinner, and Crown

meaning to their surroundings. JC demonstrated this skill continuously throughout her sessions, dynamically adapting and repurposing the provided craft supplies into functional game pieces. Specific game features she developed reflected that the facilitation of a playfully inclusive environment directly influenced her design decisions. Her overarching game concept, alongside mechanics like the "feel good flower," or template-based emotion cards aligned with Piaget's (1962) theory of symbolic play, where her play was a representation of the environment she was witnessing. These were not externally assigned requirements yet they emerged through her interaction with an environment that prioritized care, openness, and participation. Play acted as the mechanism through which values were translated into design. What mattered in the space became what mattered in the artefact.

This is where the connection between play and inclusion becomes most visible. Inclusion is often discussed in terms of access, but in practice, it is about whether participants can engage in ways that are natural and meaningful to them. Play enables this by accommodating multiple forms of expression. In the sessions, children expressed ideas through making, negotiated meaning through interaction, and influenced outcomes through continuous adaptation. None of these required formal articulation, yet all of them contributed directly to the design process. Play supports children in expressing ideas by allowing them to think through action, in negotiating meaning by keeping the process open and responsive, and in influencing design outcomes by embedding their experiences directly into what they create. These are not separate functions. They occur simultaneously within the act of play itself. Facilitating a playful environment is not an enhancement to child-centred design, it is the condition that allows it to function as intended. When play is supported, inclusion is not something that needs to be added afterwards. It is built into the process from the start.

5.4 Answering RQ3: The Intersection of Child-Centred Design and Inclusive Design

Evaluating the third research question, "*How are inclusive design principles enacted in practice through child-centred design methods during child-led co-design?*" requires examining the fundamental structures of design research. The findings of this study show

that inclusion is not a secondary layer or a retroactive checklist within the co-design process. Inclusion occurs directly and exclusively through the conditions established by child-centred methodologies. By analyzing the co-design workshops through the dual frameworks of Karen Feder's (2020) Child-Centred Design approach and inclusive design, it is clear that CCD practices are not only complementary to INCD, but are actually what make INCD applicable to children.

5.4.1 The Conditions for Inclusion

The co-design session format served as the primary condition for inclusion, demonstrating that when a research environment is built with low floors, high ceilings, and wide walls (Resnick, 2017), the process itself becomes a means for equitable participation. Traditional design research often builds "high floors" by requiring specialized literacy or "narrow walls" by forcing children into specific activities. INCD warns us that this standardization is exclusionary. In this study, the findings demonstrated that using Feder's (2020) CCD framework to establish more expansive conditions dismantled the barriers that usually sideline young participants and naturally made the space more inclusive.

The primary evidence for "low floors" and "wide walls" was found in JC's immediate physical and conceptual ownership of the design process. Because the sessions were developed with unstructured materials, JC was able to enter the design process with minimal adult intervention or direction. The success of her generative process relied on the materials available during the session: paper, fabric, and craft items, encouraging experimentation and self-direction, mirroring the open, iterative ethos of play and design thinking (Feder, 2020; Sanders & Stappers, 2014). The familiar, low-stakes barrier to entry was reduced, allowing the co-designers to focus on expressing ideas rather than mastering a tool. (Guha et al., 2013; Resnick, 2017) Co-designers like JC did not need to seek answers from me, as she was acknowledged and honoured as the expert in the room, holding the answers and abilities herself. The "wide walls" approach is a direct enactment of inclusive design's "one-size-fits-one" philosophy. The research did not assume a standardized path for the "average child" but instead provided an infrastructure flexible enough to accommodate all the co-designers ' specific emotional and creative edges. Avoiding a prescribed mode of participation allowed each child's individual needs and ways of working to become assets within the design process.

The inclusive approach was fundamentally rooted in Feder's CCD framework, evidenced by the *open-ended, process-oriented,* and *mindset-motivated* approach, moving *beyond tools and methods* when it came to the structuring of the workshop sessions. The research often had to *confront assumptions* about the "correct" way to design, and

remain *open for surprises* revealed through the co-designers' playful inquiries. By treating member checking as a live, relational experience, and an opportunity to connect and build community, the entire format was *dedicated to engaging* with the co-designers as the experts of their own experiences. The research remained *grounded in exploration* rather than adult interpretation. Finally, the convergence of field notes, photographic documentation, and physical prototypes in the data analysis phase ensured that the data was not tethered to a single, adult-biased observation but was instead a *reflection-driven* exercise in *acknowledging other perspectives*. The mechanics of [JC's] Life, like the "take a break" rule or the "feel good flower" were reflections of the environment and confirmation that the entire study was a *child-centred, and experience-based,* co-authored record of her expertise.

5.4.2 Responsive Facilitation as Inclusive Practice

If structure sets the conditions for inclusion, facilitation is where those conditions are honoured. Responsive facilitation is the active, moment-to-moment enactment of inclusive design principles. It required constant attention to how authority was expressed through language, posture, and intervention. More importantly, it required active unlearning.

During one of the early sessions, my ingrained educator instincts surfaced and I asked JC to sit down while she was cutting paper. I immediately corrected myself, telling her she could remain standing and reminding her that she knew how to keep herself safe. The initial directive reintroduced a classroom hierarchy. The correction returned control over her body and working style. What followed made that visible. JC continued to move fluidly throughout the space, working at tables, on the floor, and from her chair, adjusting her position based on what her process required. Her engagement did not decrease without structure; it expanded because it was self-directed. Moments like this demonstrate that inclusive environments are not maintained through intention alone. They require deliberate interruption of default behaviours and a willingness to address them as they occur.

Language functioned as another key site of inclusion. Small linguistic choices carried real consequences in how authority circulated. Replacing directive phrases like "be careful" with prompts grounded in awareness positioned the co-designers as capable rather than in need of control. This became particularly important when participants began using tools such as the hot glue gun. Rather than enforcing a fixed rule about access, competency was negotiated in context. This approach avoided assuming limitations while still maintaining safety, allowing participants to engage with materials in ways that

reflected their own readiness and confidence, honouring the agency and independence we were trying to establish in the space. Validation was also reframed through language. When GB asked, "Do you love what I made?", responding with, "I love how excited you are to share it with me," redirected the focus away from adult approval and toward his own sense of ownership. The value of the work was not positioned as something to be granted, but something already present in his engagement. Protecting the integrity of his ideas while reinforcing that meaning did not need to be externally confirmed to be valid was a deliberate choice under the CCD and INCD methodologies.

Responsive facilitation also shaped the social environment. Participating in moments of shared play, such as JC's spontaneous dance breaks, disrupted the expectation that the adult remain separate from the activity. Engaging alongside her positioned me as a co-participant rather than an evaluator. This mattered because inclusion is not only about access to materials or decision-making, but about belonging within the space itself. As hierarchy became less rigid, care circulated within the group rather than being directed from above.

A reflection-oriented mindset, as encouraged in Feder's (2020) framework, supported ongoing awareness of how verbal cues and facilitation choices influence perceived authority in the room. Language that mirrors "teacher-like" directives can inadvertently reintroduce hierarchical structures, whereas more open and descriptive communication helps sustain a collaborative environment. Adjustments such as allowing the co-designers to stand, move, or work on the floor without correction were intentional acts that disrupted conventional classroom expectations. In doing so, the facilitation approach acknowledged that participants engage with, focus on, and interact with materials in diverse ways. Essential acts towards maintaining inclusive, child-led participation.

5.4.3 Child-Centred Design is Inclusive Design

The most compelling evidence of the intersection between child-centred design and inclusive design emerged not through isolated behaviours, but through what this study identifies as the Process-as-Prototype Effect. This refers to the direct replication of the research environment's values, structures, and social dynamics within the final design outcomes themselves, as evidenced in JC's board game, [JC's} Life. What was facilitated was not just participation, but a set of conditions that were ultimately re-authored by JC into material form.

Inclusive design at its core seeks to prioritize individual lived experiences over standardized, "average" user personas (Treviranus, 2018). That principle was neither

explicitly taught nor introduced as a design requirement. Yet, it appeared organically within JC's final prototype, *[JC's] Life*, as a direct extension of the environment she had been designing within. Her decision to leave the emotion cards blank is one of the clearest examples. Rather than defining emotional categories, she created space for players to define their own. This is no simplistic design choice. It reflects a sophisticated understanding that experience cannot be standardized in advance. It directly aligns with the "one-size-fits-one" philosophy central to inclusive design. Importantly, this approach did not emerge from instruction. It emerged from access. JC was given the same freedom to define her experience during the sessions, and she reproduced that condition for others. This highly sophisticated approach to *acknowledging other perspectives* is a core CCD mindset that directly embodies the INCD "one-size-fits-one" philosophy, and she enacted both of them seamlessly. She did not assume she knew how a future player would feel and instead, she provided the infrastructure for them to define it themselves. This pattern spans the entire prototype.

The inclusion of an opt-out mechanic, where players could choose not to share and instead say, "That is an important feeling," directly mirrors the voluntary participation established in the workshops. The "Archer Penguin," which required players to stop and engage in singing and movement, reflects the spontaneous dance breaks that occurred throughout the sessions. What might initially read as playful or illogical mechanics instead function as embedded values prioritizing joy, emotional regulation, and embodied engagement. Similarly, the "feel-good flower" mechanic operationalizes the culture of verbal affirmation present in the research space. Players are prompted to speak positive affirmations aloud, reinforcing both self-recognition and mutual care. This was not introduced as a design principle. It was experienced, practiced, and then translated into the system itself. Even the inclusion of tools such as the "feelings garbage can" and calming parachutes demonstrates how emotional regulation, which was supported throughout the sessions, became an integrated component of the design outcome. These are not decorative additions. They are functional responses to the conditions JC experienced and deemed valuable.

Together, these mechanics demonstrate that the prototype is not simply a product of the process. It is a continuation of it. This is the critical finding.

When a child is positioned as a self-sufficient, playful leader within a thoughtfully facilitated environment, they do not just participate in design, they reproduce the conditions they were given. The research environment becomes a template, and the resulting artefact becomes evidence of what that environment made possible. An

inclusive process yields an inclusive product. This is where the relationship between CCD and INCD is most apparent. When the research process followed Feder's (2020) child-centred design framework, it inherently fulfilled the core principles of inclusive design. No additional layer of "inclusion" needed to be applied. It was already present, embedded in the way work was done.

JC's final prototype, [JC's] Life, exemplifies an *Inclusive Child-Centred approach* by demonstrating that when we stop designing *for* children and start facilitating *with* them, the distinction between these two frameworks disappears. CCD provides the methodological structure: playful, responsive, and grounded in participation. INCD provides the ethical orientation: centring lived experience and rejecting normative assumptions. When enacted together, they do not operate as separate frameworks, but as a unified approach to designing with, rather than for. They form an *Inclusive Child-Centred research methodology* guided by agency and equity.

The most significant contribution of this study, then, is not just demonstrating that children can engage in inclusive design thinking. It is showing that, when given appropriate conditions, they instinctively operationalize it. JC's final reflection captures this more clearly than any framework could. When asked what made her game different, she did not reference mechanics or structure. She said it was made "with love."

In child-centred design, the environment is the most powerful design tool. It shapes not only how children participate, but what they go on to create. This study demonstrates that when the environment is inclusive, the outcomes will be as well.

The process does not lead to inclusion.

The process *is* inclusion.

5.5 Limitations of the Study

While the qualitative findings provide a nuanced understanding of a child-led co-design process, conducting naturalistic research with youth presents inherent methodological challenges. The primary constraint of this study was the small sample size and participant attrition, which resulted in only one child, JC, completing the full series of co-design sessions. The uninterrupted, one-on-one focus on JC still yielded a rich, continuous narrative of creative evolution.

A technological failure resulted in the loss of audio data during the final session, requiring full reliance on thick-description field notes and immediate post-session memoing.

Although verbatim transcription was unavailable for that session, layered observational records supported continuity in the analytic process and preserved sufficient detail for interpretation.

Additionally this study was not designed to prove the relationship between CCD and INCD neutrally; it was designed to explore and document what that relationship looks like in practice. The findings are therefore understood as generative and transferable rather than conclusive.

5.6 Implications for the Field

The findings of this study point to the value of an intentionally child-centred approach, grounded in principles of inclusion, across the fields of design, research, and early childhood education. Central to this shift is an understanding of the research environment as actively produced by its participants and by the often-unseen structural conditions that shape interaction. Recognition of this dynamic indicates that the design research process is not only the creation of artefacts, but also the facilitation of conditions that enable meaningful, inclusive outcomes to emerge.

5.6.1 For Design Practice and Research

For design practitioners and researchers, the findings challenge conventional assumptions about how design processes are structured and who is positioned as a legitimate contributor within them. While participatory and co-design frameworks have increasingly emphasized user involvement, this study demonstrates that meaningful participation requires more than inclusion at specific stages. It requires a fundamental shift in how agency, authorship, and expertise are understood and enacted through every stage of the design research process. Positioning children as active problem framers and decision-makers disrupts the dominant models, where problems are typically defined prior to engagement. The findings suggest that when children are given control over both the framing and development of a project, the design process becomes more responsive, adaptive, and reflective of lived experience. This shift has broader implications for inclusive design practice, underscoring the importance of designing processes that accommodate rather than constrain variability.

A key implication emerging from this study is the need for what has been identified as Play Literacy within design practice. If play functions as a primary mode of thinking, communication, and decision-making for children, then designers must develop the capacity to recognize and engage with it as a legitimate form of inquiry. Developing this literacy requires designers to move beyond the usual, verbally driven methods and

embrace multimodal, iterative, and embodied forms of knowledge production. Additionally, the findings suggest that facilitation should be considered a core design skill for researchers hoping to collect qualitative lived-experience data. The ability to construct and maintain environments that support open-ended exploration, while remaining responsive to participant needs, is central to the success of child-centred and inclusive design processes.

5.6.2 For Early Childhood Education (ECE)

Within early childhood education, the findings reinforce the understanding that children learn most effectively through active engagement, particularly through building, making, and play-based exploration. This study demonstrates that when children are positioned as creators of their own tools learning has the opportunity to become more meaningful and more transferable. As part of this research, children developed self-regulation tools through the design and prototyping process. They constructed artefacts that reflected their own emotional experiences and needs. This process not only supported their understanding of emotional regulation but also enabled them to externalize and test those strategies in a tangible way. Learning was not delivered, but built. This approach has broader implications for classroom practice. If children are capable of designing tools to support emotional regulation, similar methodologies could be extended to other areas of learning. Students could be invited to develop their own worksheets, games, or activities that align with curricular goals, allowing them to engage directly with the material while shaping how that material is understood and applied.

Amplifying a child's needs and wants through co-creation aligns closely with both play-based pedagogy and inclusive education practices. It recognizes that children bring valuable perspectives to their own learning and that these perspectives can inform the outcomes and the structure of the learning process. Encouraging students to influence how knowledge is explored and expressed, educators can create environments that are more responsive, engaging, and equitable.

5.7 Recommendations for Future Research

While this study revealed a novel "Process-as-Prototype" effect within an Inclusive Child-Centred framework, further inquiry is needed to test its resilience across broader contexts:

- **Group vs. Solo Efforts:** Future studies should investigate how the ICC approach operates within larger, neurodiverse peer groups. Exploring how children negotiate

power and inclusion among themselves would provide deeper insight into collaborative inclusion.

- **High-Fidelity Evolution:** A longer-term study could follow a child-led design from the initial "tinkering" phase through to the production of a high-fidelity, market-ready artefact, testing if the Process-as-Prototype effect remains.
- **The Adult Variable:** Research is needed to explore how designers without pedagogical training can be effectively mentored in Play Literacy to ensure the democratization of this approach.

5.8 A Reflection-Driven Process: The Researcher as Participant in the Work of Play

In accordance with Feder's (2020) reflection-driven mindset, this study recognizes that the researcher is not a detached observer but an active participant whose internal state directly influences the co-design environment. I navigated my own internal tension between a professional identity as a Designer with a background in Early Childhood and my evolving role in design research. As an individual, I lean toward control and predictable outcomes; as an educator, I am trained to scaffold toward specific developmental milestones. However, to truly enact an Inclusive Child-Centred approach, I had to engage in a radical "unlearning" of these instincts, choosing instead to embrace the openness and unpredictability of a child-led process. I like knowing what's going to happen next, and I tend to feel most comfortable when outcomes are somewhat predictable. At the same time, one of the most important things I've learned from working with children is that the most interesting moments rarely happen according to plan. They show up unexpectedly, often in ways that are subtle, funny, and genuinely insightful. Going into this study, I intentionally wanted the process to make space for those kinds of moments. I also wanted it to speak to designers who may not come from an Early Childhood Education background, and to gently shift how they think about working with children. I wanted the process to feel approachable, collaborative, and, most importantly, enjoyable. And to do this, everything had to centre on play.

Beyond the formal data, the research fostered a strong sense of community within the workshops. While the artefacts produced were part of the intended outcomes, the more impactful dimensions of the process were found in the relational dynamics that developed over time. My willingness to be guided, corrected, out-danced, and occasionally redirected by the children created space for them to step into their own expertise with confidence. In these moments, participation extended beyond task completion into a shared environment of mutual respect, humour, and trust. What came from these workshops were not just prototypes and data points, but genuine human experiences. Moments of shared silliness and mutual vulnerability were the very conditions that

allowed the Inclusive Child-Centred approach to succeed. In the moments where I felt the least like an "expert" the research became the most rich.

The card I received and the bracelet that was made for me during the research workshops are more than keepsakes. They reflect the kindness, thoughtfulness and care the children brought to the space. These gestures serve as reminders of the relational nature of this field. More broadly, they point to something that cannot always be captured through formal outputs alone: the presence of community, generosity, and shared humanity within the co-design process. Working alongside children reinforced that these environments are not solely about producing artefacts, but about building relationships grounded in trust and mutual respect. This experience was not only professionally significant but personally meaningful, affirming the value of engaging with children as thoughtful, capable, and collaborative participants.

6. Conclusion

We often speak of children as the "designers of tomorrow," yet this study proves they are the expert designers of today. When this research began, I thought I was studying whether child-centred design could function as a child-specific expression of inclusive design. What I found was something both simpler and more demanding than that: that inclusion is not a principle you apply to a process, it is a condition you either create or you don't, moment by moment, in how you hold space for another person.

The most significant finding was not in the artefacts produced, but in what those artefacts revealed about the research environment that produced them. JC's board game, [JC's] Life, was a physical record of how she had been treated. The opt-out mechanic, the feel-good flower, the mandatory dance breaks, the blank emotion cards: each mechanic was a direct translation of the session's ethics into design logic. She did not design a game about emotional safety in the abstract. She designed the room she had been given and gave it to others. That is what the Process-as-Prototype effect ultimately means. Not that children absorb methodology, but that they absorb *care*, and then they build with it. If the conditions of a design process are genuinely inseparable from its outcomes, then the question every designer must answer before reaching for a method is a relational one: *what kind of space am I creating for the person across from me?* Not what tools, not what framework, not what answers you seek, but what kind of space can I *honour*?

To design inclusively with children is to accept that their methods won't always look like ours, and nor should they. When we relinquish the structures of expectation and instead

offer an environment of curiosity and agency, children take the expression of that care and design new realities from it. As we grow older, we are conditioned to view play as a temporary escape from reality. But as JC and the other children in this study have shown, play is not a retreat from the world. Play is the space in which the world is tested, negotiated, and actively remade, day by day, with every interaction. When we learn to facilitate the right kind of space for their childhood to thrive, we will find that building a better child-led design practice is not about mastering a new set of principles or methods at all. Because at its core, childhood is about participating in what only children do best, the deeply serious, profoundly transformative, and unapologetically joyful *work of play*.

7. Glossary of Key Terms

Child-Centred Design (CCD): A methodological framework, conceptualized by Karen Feder (2020), that reconceptualizes the design process as an open-ended practice of play and exploration, prioritizing a child's unique ways of being.

Co-Design: A collaborative research approach that recognizes children as experts capable of ideating and evaluating, giving them the space to influence project direction, meaning, and outcomes through hands-on engagement.

Inclusive Design (INCD): A design philosophy that considers the full range of human diversity (including ability, age, and culture) and ensures that those most impacted by design decisions are actively involved in shaping them.

Play Literacy: A facilitation skill championed in this study; it involves a practical understanding of how play operates as a mode of thinking and communicating, and the capacity to recognize, interpret, and respond to it in real time.

Process-as-Prototype Effect: A primary finding of this research defining the phenomenon where the values, structures, and social conditions of the co-design environment are directly replicated within the child's final design outcome.

Tinkering: An activity at the intersection of play and making where children continuously try out ideas, make adjustments, and refine plans without a fixed end-goal, functioning as a valid, multimodal form of design thinking.

Zone of Proximal Development (ZPD): Lev Vygotsky's theory describing the space between what a learner can achieve independently and what they can achieve with guidance; in co-design, it is the space where a facilitator acts as a supportive "scaffold" for the child.

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Appendix A. Child Assent Form

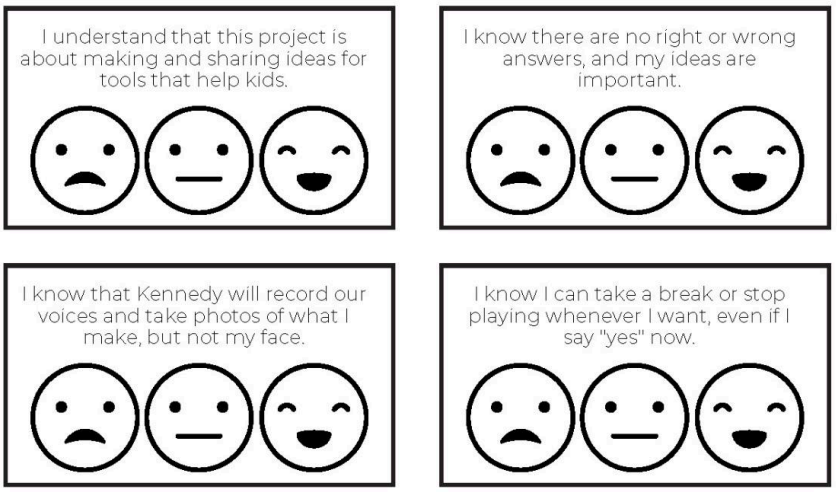
Child Assent Form

Hi! I'd like you to help make tools that help kids calm down, focus, and feel better. You will be part of fun play and design sessions where you can draw, build, and share your ideas.

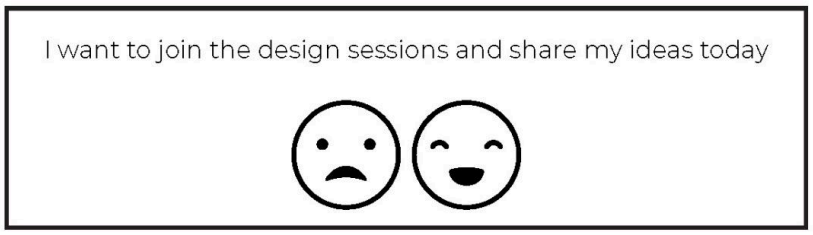
Step 1: Read each statement.
Step 2: Circle or colour the face that shows how you feel.

Emotional Check-In

Before we start, circle or color the face that shows how you are feeling right now. This helps me know how you feel about being here today!



The Big Decision



Write Your Name Fancy Here: _____ Date: _____

Appendix B. Co-Design Session Structure Outline

Session Overview

- **Number of sessions:** 3
- **Total time:** ~3.25 hours
- **Participants:** 3–6 children, ages 5–9
- **Researcher/facilitator:** Kennedy Kozak (BDes, ECE 1)

This study involves three co-design sessions with children aged 5–9, designed to explore how child-centered design (CCD) approaches influence both the framing of design problems and the solutions produced.

Through the sessions, children are positioned as experts on their own experiences and active designers. They are invited to share their perspectives, identify challenges related to self-regulation, and develop tangible tools to address these challenges. Each session is structured to support developmentally appropriate engagement, encourage multiple forms of expression (drawing, building, acting, and discussion), and maintain flexibility in pacing to accommodate children's comfort and attention spans.

Session Breakdown

1. Welcome & Warm-Up Activity (15 minutes)

- **Objectives:** Facilitate a safe space to discuss emotions with children. Introduce the project.

- **Discussion:** Introduce the research project and what the children will be doing over the next 3 sessions.
    - Explain the job of a designer and encourage them to think like designers and ask questions.
    - Explain their role in the research and how it could impact kids just like them.
    - Frame iteration as an ongoing conversation through design choices and changes.

- **Activity:** "Set the Scene"
    - Children will be encouraged to act out how different situations may make them feel. This introduces the concept of emotion-recognition and how self-regulation plays a role in that. It also encourages the children to be comfortable with one another and the researcher.
        - *"Let's play a quick game! I'll say a situation, and you show me with your body how it might feel."*
            - ***Prompts may include:***
                - *You just won the big soccer game.*
                - *Your grown up says you can have dessert for dinner.*
                - *The store doesn't have the toy you wanted.*
                - *Your friend is bugging you, but you are busy.*
- **Facilitation Tips:**
    - Allow **non-verbal responses** (using props, sounds, or body language.)
    - Ensure **no right or wrong answers**, it's about personal experience.
    - Ease the **transition from gross motor to discussion** by communicating the timeline clearly (visual support encouraged.)

2. Group Discussion: What is Self-Regulation, Child's Definition (10 minutes)

- **Objective:** Discover what the children already know about self-regulation, what tools they use, and their impact.

- **Discussion Prompts:**
  - *“What do you think self-regulation is?”*
  - *“Can you think of a time where you noticed you were getting angry, sad, or upset, before it happened?”*
  - *”What helps you focus?”*
  - *“Are there things that help you calm-down or focus?”*

- **Facilitation Tips:**
  - Refrain from guiding the children towards a specific answer or idea.
  - Use a visual space to note down their ideas.
    Keep the conversation child-led
  - Summarize responses neutrally

3. Co-Designing: (30 minutes)

- **Objective:** Allow the children to frame and design their own self-regulation strategies.

- **Activity:** “Invent a Tool”
  *Give each child **open-ended art supplies** (paper, crayons, modeling clay, stickers, etc.).*
  - *Prompt:*
    - *“Imagine you could make the perfect tool that helps you when you need to calm down or focus.”*
    - *“What would it look like? What would it do? Where would you use it?”*
    - *Allow children to **draw, build, or describe their tool**.*

- **Facilitation Tips:**
  - **Avoid guiding them** toward specific solutions, let them define what works for them.
  - **Ask exploratory questions:**
    - *“How does your tool work?”*
    - *“Who else could use it?”*
    - *“Would it help you in school? At home?*

4. Sharing & Reflection (15 minutes)

- **Objective:** Give children space to share their ideas and validate their perspectives.

- **Activity:** “Show and Tell - Children”
    - Each child presents their tool.
    - Others can ask questions or give positive feedback.
    - **End with a reflection prompt:**
        - *“What was your favorite part of today?”*
        - *“Did you learn anything new about yourself?”*
        - *“If you could change one thing about how people help kids with focus or emotions, what would it be?”*

- **Facilitation Tips:**
    - End by **encouraging children to keep thinking about their solution** so we can come back and continue it next time.
    - Use **neutral and supportive** language.
    - Encourage the children to **explain the choices** they made.

Materials & Tools Needed
Large paper & markers (for group brainstorming)
Art supplies (crayons, stickers, colored paper, glue, modeling clay, etc.)
Emotion cards or emoji stickers

Ethical Considerations

- **Confidentiality:** Assure them that what they share stays within the group (unless safety concerns arise).
- **Consent & Comfort:** Ensure children understand they can skip any activity they don’t want to do.
- **Non-Verbal Participation:** Allow different forms of expression (drawing, gestures, storytelling).
- **Trauma-Sensitive Approach:** If emotions get overwhelming, have a calming space available.

Expected Outcomes

- An understanding of self-regulation through child-perspective
- A collection of designs reflecting how children see and interact with the idea of self-regulation
- Insights into the language and strategies children use.

Session 2: Iteration and Comparison
Goal: Allow children to refine their strategies based on their own experiences and peer feedback.

Session Length: ~60 minutes
Participants: [X] amount of children, ages 5–9.
Facilitators: Kennedy Kozak (BDes, ECE 1)

Session Breakdown

1. Welcome & Warm-Up Discussion (5 minutes)

- **Objective:** Help the children recall their previous designs and get them thinking about self-regulation again.

- **Activity:** Show the children notes, pictures, or models of what they created in the initial co-design session.
    - **Ask the children:**
        - *"What do you remember about your design"*
        - *"Did anything happen over the last [time frame] that inspired you or made you think about our last session?"*
        - *"Is there anything you would change now? "*

- **Facilitation Tips:**
    - Allow the children to **explore their ideas** from last time.
    - Encourage the group to be **open to changing** or growing their ideas as we continue.

2. Group Discussion: (10 minutes)

- **Objective:** Encourage children to analyze and compare their own and each other's strategies to spot patterns, similarities, and new possibilities.

- **Activity:**
    - Present each child's design for the group to see.
    - Children take on the role of "Design Detectives" to answer questions like:
        - "What is similar between your ideas?"
        - "What is different?"
        - "Is there something you like from someone else's idea that could inspire your own?"

- **Tips:**
    - Emphasize that children are detectives of their own and each other's thinking, not evaluating or judging.
    - Encourage curiosity and open-ended exploration, not competition.

3. Co-Designing: (30 minutes)

- **Objective:** Get the children to refine the design and suggest improvements.

- **Activity:** "Fix-It Feedback"
    - Give the children blank versions of the prototype and allow them to sketch, act out, or manipulate the prototype.

- **Facilitation Tips:**
    - Answer any questions without giving guidance or direction. **Remain neutral** and allow the children to explore.
    - Remind the children **there is no "impossible,"** and as designers they get to create whatever works for them.

4. Sharing & Reflection (15 minutes)

- **Objective:** Give children space to share their ideas and validate their perspectives.
- **Activity:** "Show and Tell"
    - Each child presents their tool and what they changed, added, or removed.
    - Others can ask questions or give positive feedback.
    - **Prompts:**
        - "What is the most important change you made and why"
        - "What should we add next time?"
        - "How and when would you use this tool?"

- **Facilitation Tips:**
    - Use **neutral and supportive** language.
    - Encourage the children to **explain the choices** they made.

Materials & Tools Needed

Large paper & markers (for group brainstorming)
Art supplies (crayons, stickers, colored paper, glue, modeling clay, etc.)
Emotion cards or emoji stickers
Whiteboard or poster paper for facilitator notes

Ethical Considerations

Preventing Feelings of Exclusion or Disempowerment: Children may feel ignored, disappointed, or discouraged if their ideas are not visible in the prototype. Be transparent that not every idea may be visible in the prototype, but did play a role in its creation. Offer a "*Not Lost, Just Later"* list where unused ideas can be written down and considered for future iteration.

Valued Feedback: Ensure children understand their feedback is valued, and there are no "wrong" ideas.

Emotional Impact: Some children may feel discouraged if their designs were not incorporated. Reaffirm that all contributions shape the final product.

Inclusivity: Encourage turn-taking and respect during discussions to ensure all voices are heard.

Expected Outcomes

- Children will refine the prototype with hands-on feedback.
- Their feedback will be coded and analyzed for the next iteration.
- Session 3 will focus on deeper testing and personalization.

Session 3 PT1: Prototyping and Refinement

Goal: Develop children's strategies into tangible solutions and personalize them further.

Session Length: ~60 minutes

Participants: [X] amount of children, ages 5–9.

Facilitators: Kennedy Kozak (BDes, ECE 1)

Session Breakdown

1. Welcome & Warm-Up Activity (5 minutes)

- **Objective:** Prepare the children for their final co-design creation session

- **Activity:** "Show and Share"
    - Children will be encouraged to share their ideas from the previous session and discuss how they have evolved since the first session.
    - **Prompts:**
        - *What changed the most?*
        - *Did anything unexpected happen?*
        - *Has this project changed anything in your normal life?*

- **Facilitation Tips:**
    - Prepare the children to start "finishing" their ideas by discussing how the final session will be testing the new prototype we designed together.

2. Group Discussion: (10 minutes)

- **Objective:** Examine how the co-designed prototype reflects the children's experiences and input into the solution.

- **Activity: "Keep, Change, Add"**
    - Children discuss each other's strategies and identify what works, what to change, and new additions.

- **Facilitation Tips:**
    - **Use "I wonder" statements:** If a child is stuck, prompt them with, "I wonder what would happen if..." to spark new ideas.

    - **Encourage the children to reason** about what will stay or change and why.
    - Use **group ideation** as a way to mitigate idea fatigue.

3. Co-Design Sprint: (30 minutes)

- **Objective:** Develop ideas for the final iteration of the prototype.

- **Activity:** "Super Designers"
    - Have the children take on the role of "Super Designer" and get the children to iterate the self-regulation solution for a final time.
    - Use the idea of being a superhero to give them the push to be creative, strong, and different. Encouraging them to design something to help themselves and other children.
    - Allow the children to sketch, act out, colour, or create their final additions to the prototype.

- **Facilitation Tips:**
    - At this point the children may feel burnt out or out of ideas, allow them to design as little or as much as they feel they can do.
    - Offer the group suggestions for **what to do when they feel "out of ideas"**
    - Remind them that this activity is meant to be just as fun as it is helpful and **encourage play.**

4. Sharing & Reflection (15 minutes)

- **Objective:** Capture final reflections about the co-design process and what they want to see in the final iteration.

- **Activity:** "Show and Tell"
    - Each child presents their final ideas and what they changed, added, or removed.
    - Others can ask questions or give positive feedback.
        - **Prompts:**
            - *"What is the most important change you made and why"*
            - *"What do you want to see most in the final prototype"*
            - *"How can you see yourself or other children using this?"*
- **Facilitation Tips:**
    - **Acknowledge individual growth:** If a child was hesitant early on but became more engaged, celebrate that progress.

    - **Be patient with responses:** Some may need more time to process and articulate their thoughts.

Materials & Tools Needed

Large paper & markers (for group brainstorming)
Art supplies (crayons, stickers, colored paper, glue, modeling clay, etc.)
Emotion cards or emoji stickers
Whiteboard or poster paper for facilitator notes

Ethical Considerations

Decision-Making Support: Support children who may struggle with making final decisions or feel overwhelmed by changes.

Safe Expression: Ensure a positive and playful environment where children feel safe to express creativity.

Expected Outcomes

- Nearly finalized child-led strategies
- Documentation of iterative thinking and reasoning
- Evidence of children's influence on design outcomes

Session 3 PT 2: Final Reflection

Goal: Reflect on the child-centered process and analyze how participation shaped strategies.

Session Length: ~30 minutes

Participants: [X] amount of children, ages 5–9.

Facilitators: Kennedy Kozak (BDes, ECE 1)

Session Breakdown

- **Objective:** Celebrate the journey
    - Show a **visual timeline** of the design process.
    - Ask: *“Who remembers where we started? How did we get here?”*

2. Group Discussion: (30 minutes)

- **Objective:** Let children engage freely with the solution.
    - Observe natural engagement with final strategies

- **Discussion Prompts:**
    - *“How does this feel compared to what we imagined?”*
    - *“Do you feel like your ideas are in this?”*
    - *“What’s your favorite part? Least favorite?”*
    - *"Does this help with self-regulation? Why or why not?"*
    - “If we could keep designing, what would be next?”

- **Facilitation Tips:**
    - This is a time to celebrate the hard work and effort of the group.
    - Note any additional ideas that may come up during the final review.

3. Celebration and Thank You: (5 minutes)

- **Objective:** Acknowledge the children’s dedication to becoming designers and show appreciation for their effort and time spent
    - Offer a token of appreciation and a certificate of achievement!

Materials & Tools Needed

Certificate of achievement for participants.

Expected Outcomes

- Children see themselves as designers
- Full data collection for research questions
- Insights into how CCD shapes problem framing and solutions from a child-led perspective

Appendix C. Co-Designer Certificate of Contribution