ABORDAR LA REFLEXIVIDAD EN LA INVESTIGACIÓN DEL DISEÑO CENTRADO EN EL SER HUMANO PARA BENEFICIAR LAS NECESIDADES Y SENSIBILIDADES DE LOS USUARIOS

TACKLING REFLEXIVITY IN HUMAN-CENTRED DESIGN RESEARCH TO BENEFIT USER NEEDS AND SENSITIVITIES

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LA INVESTIGACIÓN SOBRE LA LONGEVIDAD PONE DE RELIEVE LA COMPLEJIDAD DE EVALUAR LAS NECESIDADES FUTURAS DE LAS PERSONAS MAYORES Y EL IMPACTO DE LAS SOLUCIONES DE DISEÑO. EN ESPECIAL, EL POTENCIAL DE (AUTO)TRANSFORMACIÓN EN LAS RELACIONES O INTERACCIONES HUMANAS A TRAVÉS DEL DISEÑO (POR EJEMPLO, MEDIANTE LA TECNOLOGÍA) PONE DE RELIEVE LA IMPORTANCIA DE QUE LOS INVESTIGADORES DE DISEÑO SEAN MÁS CONSCIENTES DE SUS DECISIONES Y DEL IMPACTO DE SU TRABAJO. ADEMÁS, ES PRIMORDIAL ENCONTRAR FORMAS DE DEBATIR SU APLICACIÓN DESDE LA REFLEXIVIDAD. ESTAS NORMAS DE PRÁCTICAS AÚN FALTAN EN LAS COMUNIDADES DE INVESTIGACIÓN.

ESTE ARTÍCULO PRESENTA UN MÉTODO DE REFLEXIVIDAD "EN DESARROLLO" PARA EJECUTAR INVESTIGACIONES SOBRE LA EXPERIENCIA DE LOS USUARIOS CON PARTICIPANTES QUE PRESENTAN UNA GRAN DIVERSIDAD DE NECESIDADES Y SENSIBILIDADES. DURANTE UN PROYECTO DE DOCTORADO, ESTE MÉTODO EVOLUCIONÓ A PARTIR DE UNA INVESTIGACIÓN FUNDAMENTADA Y CUATRO ESTUDIOS DE CASOS EN UNA GUARDERÍA CON 120 PREESCOLARES DE AMBOS SEXOS, DE ENTRE 2,5 A 6 AÑOS. EL OBJETIVO ERA MEJORAR LA REFLEXIVIDAD DEL INVESTIGADOR A LA HORA DE DESARROLLAR ACTIVIDADES, HERRAMIENTAS Y ENTORNOS, DANDO PRIORIDAD AL DESCUBRIMIENTO DEL CONTEXTO Y LAS VULNERABILIDADES RELACIONALES, EMOCIONALES Y SOCIALES QUE REPERCUTEN EN EL BIENESTAR DEL USUARIO. LOS MATERIALES DE VIDEO Y AUDIO INDICAN QUE LA REFLEXIVIDAD DEL INVESTIGADOR RESPECTO A LAS SENSIBILIDADES Y LA CONCIENCIA DE LOS PARADIGMAS, SON ESTRATEGIAS DE DISEÑO BENEFICIOSAS PARA FOMENTAR LA MOTIVACIÓN, LA CAPACIDAD DE EXPRESIÓN Y EL DOMINIO AL DISEÑAR. ESTE ARTÍCULO OFRECE UNA HERRAMIENTA DE DIÁLOGO PARA PRACTICAR UNA REFLEXIVIDAD PRECISA. SU MARCO INNOVADOR PUEDE SUSCITAR DEBATES SOBRE CÓMO LOS MÉTODOS CENTRADOS EN EL NIÑO PUEDEN INFORMAR LOS ESTÁNDARES DE REFLEXIVIDAD, LAS PRÁCTICAS Y EL IMPACTO DEL DISEÑO PARA GRUPOS DE ADULTOS VULNERABLES, COMO LOS ADULTOS MAYORES.

PALABRAS CLAVE: METODOLOGÍA DEL DISEÑO, PROFESIONAL REFLEXIVO, INVESTIGACIÓN BASADA EN LA PRÁCTICA, DISEÑO PARA EL BIENESTAR, PARADIGMA PRAGMÁTICO EN LA PRÁCTICA

LONGEVITY RESEARCH HIGHLIGHTS COMPLEXITIES OF ASSESSING THE ELDERLY'S FUTURE NEEDS AND IMPACT OF DESIGN SOLUTIONS. ESPECIALLY, THE POTENTIAL FOR (SELF-) TRANSFORMATION WITHIN HUMAN RELATIONS OR INTERACTIONS THROUGH DESIGN WORK (E.G., THROUGH TECHNOLOGY) HIGHLIGHTS THE IMPORTANCE OF DESIGN (RESEARCHERS) BEING MORE AWARE OF THEIR DESIGN DECISIONS AND RESEARCH IMPACT AND FINDING WAYS TO DISCUSS THEIR APPLICATION OF REFLEXIVITY; STANDARDS OF PRACTICES STILL LACKING IN RESEARCH COMMUNITIES. THIS PAPER PRESENTS A 'WORK-IN-PROGRESS' REFLEXIVITY-METHOD FOR CONDUCTING FRONT-END USER EXPERIENCE RESEARCH WITH PARTICIPANTS CHARACTERISED BY HIGHLY DIVERSE USER NEEDS AND SENSITIVITIES. DURING A PHD PROJECT, THIS METHOD EVOLVED FROM GROUNDED RESEARCH AND FOUR CASE STUDIES WITH 120 MIXED-GENDER PRE-SCHOOLERS, 2.5—6-YEARS, AT A KINDERGARTEN. THE GOAL WAS TO IMPROVE A RESEARCHER'S REFLEXIVITY WHEN DEVELOPING ACTIVITIES, TOOLS, AND ENVIRONMENTS BY PRIORITISING CONTEXT-BASED DISCOVERY OF RELATIONAL, EMOTIONAL, AND SOCIAL VULNERABILITIES IMPACTING USER WELL-BEING. VIDEO AND AUDIO MATERIALS INDICATE THAT A RESEARCHER'S REFLEXIVITY CONCERNING SENSITIVITIES AND PARADIGM AWARENESS ARE BENEFICIAL DESIGN STRATEGIES TO ENCOURAGE MOTIVATION, EXPRESSION SKILLS, AND MASTERY. THIS PAPER OFFERS A DIALOGUE TOOL FOR PRACTISING PRECISE REFLEXIVITY. ITS INNOVATIVE FRAMEWORK MAY SPARK DISCUSSIONS ON HOW CHILD-CENTRED METHODS CAN INFORM REFLEXIVE STANDARDS, PRACTICES, AND THE IMPACT OF DESIGNING FOR VULNERABLE ADULT GROUPS, SUCH AS THE ELDERLY.

KEYWORDS: DESIGN METHODOLOGY, REFLECTIVE PRACTITIONER, PRACTICE-BASED RESEARCH, DESIGN FOR WELL-BEING, PRAGMATIC PARADIGM IN PRACTICE

INTRODUCCIÓN

La investigación de la longevidad tiene como objetivo determinar los mecanismos, relaciones, experiencias y condiciones que promueven actividades físicas y sociales, que conducen a la prolongación de la vida humana y promueve el "envejecimiento exitoso" (Rowe y Kahn, 2015), percibiendo el auto empoderamiento, la capacidad y el bienestar (Reynolds, 2018; Coughlin, 2009). La longevidad es un tema complejo que puede abordarse desde múltiples perspectivas. La ciencia biomédica se centra en factores humanos internos como la salud cerebral, las enfermedades crónicas, los genes, las dietas y los mecanismos de afrontamiento que afectan a la varianza interindividual de la longevidad (Attia, 2023; García-García, et al., 2023; McConatha, 2014). Por otro lado, los factores humanos externos, como el clima, la demografía, el manejo de la prevención de enfermedades y los factores de estrés, también pueden influir en la prolongación de la vida tardía de un ser humano (Robine, 2017; McMichael, 2012). En la literatura se encuentra una amplia gama de enfoques para abordar los beneficios y los retos de los baby boomers que entran en la edad de jubilación y viven vidas más largas (Butler, 2009; Christensen et al., 2006). Este documento aboga por un enfoque orientado a los valores para afrontar los retos de la longevidad y el creciente envejecimiento de la población.

La literatura sobre longevidad destaca la necesidad de desarrollar métodos que prioricen el bienestar, la seguridad y la supervivencia de las personas mayores, no solo a través de planes de acción a corto plazo o soluciones (de diseño), sino también mediante investigaciones y prácticas reflexivas. Estas consideran los posibles impactos a largo plazo de dichas soluciones en las personas, las interacciones sociales y el medio ambiente (incluido el clima) desde perspectivas "sensibles a los valores" (Friedman y Hendry, 2019). El problema identificado es que "las decisiones de diseño tienen un impacto significativo en la salud y el bienestar de los adultos mayores, [y su entorno], pero estas decisiones se toman a menudo en ausencia de pruebas científicas sólidas" (Engelen et al., 2022). Por lo tanto, este documento profundiza en el tema de la investigación de la experiencia del usuario y examina qué tipo de prácticas de diseño reflexivo pueden informar un enfoque que beneficie a grupos de participantes con necesidades y sensibilidades muy diversas, al tiempo que considera estos aspectos en la "validez ecológica" contextualizada (Kihlstrom, 2021).

En investigaciones sobre el diseño de interacción humana, los investigadores suelen utilizar el término "reflexividad" para describir cómo su "paradigma pragmático" (Creswell, 2003, p. 11) ha informado su selección de diferentes técnicas, procesos o herramientas para construir prácticas reflexivas y analíticas válidas. La reflexividad suele estar vinculada con participar como "profesional reflexivo" en las metodologías de investigación durante investigaciones centradas en el ser humano (Schön, 1983). Este enfoque implica una reflexión más profunda sobre el "factor humano" en comparación con las orientaciones tradicionales de la investigación. Sin embargo, los investigadores no siempre tienen clara su definición de "paradigma pragmático", de cómo practican la reflexividad o cómo obtienen conocimientos a partir de ella. A menudo, los lectores se preguntan si hubo diálogos críticos con otros profesionales para evaluar su interpretación y sus mediciones de reflexividad. El objetivo de este artículo es desarrollar un marco conceptual que organice la reflexividad para una adecuada reflexión crítica contextual en

INTRODUCTION

Longevity research aims to investigate mechanisms, relationships, experiences, and conditions that promote physical and social activities, leading to extended human lifespans and promoting "successful ageing" (Rowe & Kahn, 2015), sensing self-empowerment, capacity, and well-being (Reynolds, 2018; Coughlin, 2009). Longevity is a complex topic that can be approached from multiple perspectives. Biomedical science focuses on internal human factors such as brain health, chronic diseases, genes, diets and coping mechanisms affecting the inter-individual longevity variance (Attia, 2023; García-García, et al., 2023; McConatha, 2014). On the other hand, external human factors, like climate-related issues, demographics, handling of disease prevention, and stressors, can also influence the lengthening of a human's late life (Robine, 2017; McMichael, 2012). A wide range of approaches are found in literature when it comes to addressing benefits and challenges of baby boomers entering retirement age and living longer lives (Butler, 2009; Christensen et al., 2006). This paper advocates a value-oriented approach to tackling challenges of longevity and increasing ageing population.

Literature on longevity highlights the need to develop methods that prioritise well-being, safety, and survival of the elderly, not only through short-term action plans or (design) solutions but also through reflective research and practices that take into account potential long-term impacts of such solutions on individuals, social interactions, and environment (including climate) from "value-sensitive" perspectives (Friedman & Hendry, 2019). The identified problem is that "design decisions have a significant impact on the health and well-being of older adults, [and their environment] but these decisions are often made in the absence of strong scientific evidence" (Engelen et al., 2022). Therefore, this paper delves into the topic of user experience research and examines what type of reflective design practices can inform an approach that benefits participant groups with highly diverse needs and sensitivities while also considering these aspects in context-situated "ecological validity" (Kihlstrom, 2021).

In research papers on human-interaction design, researchers often use the term "reflexivity" to describe how their "pragmatic paradigm" (Creswell, 2003, p. 11) informed their selection of different techniques, processes, or tools to construct valid reflective and analytical practices. Reflexivity is often linked to engaging in human-centered research as a "reflective practitioner" (Schön, 1983) in design research methodologies. This approach involves more in-depth reflection on the "human factor" compared to traditional research directions. However, researchers are not always clear about their definition of 'pragmatic paradigm', how they practice reflexivity or how they obtain knowledge from it. Readers are often left wondering if there were any critical dialogues with other practitioners to evaluate their interpretation and measure of reflexivity. Thus, the objective of this paper is to develop a conceptual framework that organises reflexivity for appropriate critical context reflection in front-end design processes for sensitive groups, such as the elderly. The paper explores how research and design practices [Annex 1 (A1)] can better address the specific needs of vulnerable participant/user groups, prioritising "physical, psychological, and emotional well-being" (Engineer, 2018) and brain health factors (García-García, et al., 2023).

los procesos de diseño *front-end* para grupos sensibles, como las personas mayores. El documento explora cómo las prácticas de investigación y diseño [Anexo 1 (A1)] pueden abordar mejor las necesidades específicas de los grupos de participantes/usuarios vulnerables, priorizando el "bienestar físico, psicológico y emocional" (Engineer, 2018) y los factores de salud cerebral (García-García, et al., 2023).

El objetivo de este artículo es explorar las prácticas reflexivas que resultan útiles para crear diseños de investigación que favorezcan el bienestar y la salud cerebral. Estos factores son importantes para promover la longevidad y el florecimiento individual en diferentes grupos de edad, como se destaca en la literatura. El Anexo 2 (A2) ofrece perspectivas y definiciones de estos factores que han informado este artículo. Basándose en un estudio de doctorado de tres años, este artículo propone que llevar a cabo una investigación centrada en el niño (CC por su sigla en inglés) para explorar la reflexividad en el desarrollo de soluciones respetuosas para los niños en edad preescolar, podría conducir a prácticas beneficiosas para otros grupos de usuarios sensibles, como los adultos mayores.

Las sensibilidades extremas expresadas durante la investigación hicieron imprescindible explorar cómo adoptar prácticas reflexivas más concretas para obtener resultados ecológicamente válidos. Si este enfoque funcionó con los niños en edad preescolar, un grupo especialmente sensible (Hart, 2018), también puede ser eficaz para abordar las necesidades de otras poblaciones sensibles. En el anexo 3 (A3) se explica cómo las comunidades de investigación sobre el diseño centrado en el niño (DCN) y la longevidad están interconectadas, ya que ambos campos se esfuerzan por mejorar las prácticas éticas, la tecnología, las herramientas y los entornos para favorecer el bienestar y el desarrollo de las personas. Es importante señalar que Kaspersen et al., (2024) demostraron en su investigación que los enfoques de la educación primaria pueden utilizarse para desarrollar prácticas de investigación y diseño para adultos. Además, Resnick (2007) subrayó que los métodos experimentales de CC pueden servir de inspiración para las prácticas de diseño de los adultos, reforzando los procesos de desarrollo necesarios para el futuro. Cuando pensamos en el futuro, el rápido ritmo de los avances tecnológicos plantea un reto importante para el bienestar durante una vida más larga, lo que exige una profunda introspección y un pensamiento crítico. Por ejemplo, en los últimos años en Europa han cobrado fuerzas iniciativas de transformación digital como las "estrategias de ciudades inteligentes". Sin embargo, con el aumento de la interconexión tecnológica, un problema central de la longevidad es la creciente vulnerabilidad [Anexo 4 (A4)]. Esto requiere soluciones reflexivas para apoyar el desarrollo del más alto nivel de capacidades en los adultos mayores. Por ejemplo, el empoderamiento digital.

The focus of this paper's study is to explore the reflective practices that are helpful in creating research designs to support well-being and brain health. These factors are important for promoting longevity and individual flourishing across different age groups, as highlighted in the literature. Annex 2 (A2) offers perspectives and definitions of these factors that have informed this paper. Based on a three-year PhD study, this article proposes that conducting child-centered (CC) research to explore reflexivity in developing respectful solutions for pre-schoolers could lead to practices beneficial for other sensitive user groups, such as the elderly.

The extreme sensitivities expressed during research made it essential to explore how to adopt more concrete reflective practices to obtain ecologically valid results. If this approach worked for pre-schoolers, a particularly sensitive group (Hart, 2018), it may also be effective in addressing needs of other sensitive populations. Annex 3 (A3) elaborates on how Child-Centered Design (CCD) and longevity research communities are interconnected, as both fields strive to enhance ethical practices, technology, tools, and environments to support individuals' well-being and development. However, it is worth noting that Kaspersen et al., (2024) demonstrated in their research that primary education approaches can be used to develop research and design practices for adults. Additionally, Resnick (2007) emphasised that experimental CC-methods can serve as inspiration for adult design practices, strengthening developmental processes necessary for the future. When we consider the future, the rapid pace of technological advancements poses a significant challenge to well-being during longer lifespans, necessitating deep introspection and critical thinking. For example, in recent years, digital transformation initiatives such as "smart city strategies" have been gaining traction in Europe. However, with increasing technological interconnectedness, a core identified problem of longevity is the rising vulnerability [Annex 4 (A4)] and requires reflexive solutions to support the elderly's highest capacities possible—digital empowerment being a key one.

FIGURA 1. A diario, los dispositivos tecnológicos ayudan a las personas mayores.
FIGURA 1. Daily, technological devices help the elderly.

En la Figura 1, se muestra a una persona mayor con una pequeña herramienta sobre la mesa que le ayuda a utilizar el teléfono móvil para estar conectada con el mundo. Tiene dificultades para pulsar botones y navegar por el dispositivo. A pesar de contar con la herramienta, a menudo le cuesta utilizarla con eficacia, lo que le produce frustración. La autora ha observado problemas similares en residencias de ancianos y centros asistenciales, donde la tecnología y diversos dispositivos se utilizan para apoyar las capacidades corporales, servir de audífonos o vigilar la salud salvaguardando el bienestar de los residentes.

Estos ejemplos ilustran que los rápidos avances tecnológicos y los posibles usos futuros requieren profesionales reflexivos. Esto implica tener en cuenta perspectivas innovadoras, sensoriales y relacionadas con los valores, así como emplear métodos de experiencia de usuario para capacitar a diseñadores, investigadores y usuarios, sobre todo a las personas mayores. El objetivo es fomentar la exploración y el debate de perspectivas, diseños o planes de acción de manera reflexiva, con el fin de lograr resultados que se alineen con la perspectiva pragmatista, que afirma que "el valor del conocimiento no reside en su calidad intrínseca, sino en su uso" (Stappers & Giaccardi, 2017, p. 64). Se trata de proporcionar marcos que permitan explorar las destrezas y conocimientos necesarios para afrontar el futuro, al tiempo que

In Figure 1, an elderly person is shown with a small tool on the table to assist her in using a mobile phone to stay connected with the world. She experiences difficulty with pressing buttons and navigating the device. Despite the tool, she still often struggles to use it effectively, which leads to frustration. The author has observed similar challenges in elderly homes and care facilities, where technology and various devices are used to support body capabilities, serve as hearing aids, or health monitoring to safeguard the residents' well-being.

These examples illustrate that rapid technological advancements and potential future uses require reflective practitioners. This involves considering innovative, sensory, and value-related perspectives, as well as employing user experience methods to empower designers, researchers, and users, particularly the elderly. The goal is to encourage exploration and discussion of perspectives, designs, or action plans in a reflective manner, in order to achieve outcomes that align with the pragmatist's perspective, which states that "the value of knowledge lies not in its intrinsic quality, but in its use" (Stappers & Giaccardi, 2017, p. 64). This involves providing frameworks that enable exploration of skills and knowledge necessary to face the future while being highly reflexive to diverse contexts, physical abilities, and cognitive skills.

se reflexiona sobre los diversos contextos, capacidades físicas y destrezas cognitivas.

La contribución de este documento radica en proporcionar una mayor claridad y precisión de la reflexividad en la práctica para facilitar las discusiones escritas y orales en los diálogos curriculares. En concreto, este estudio ofrece una definición y una aplicación más precisas de la reflexividad, basadas en percepciones emergentes fundamentadas (Charmaz, 2014) recogidas durante cuatro estudios de caso y varias exploraciones de diseño generativo con 120 preescolares de entre 2,5 y 6 años en un jardín de infancia (Södergren, 2023). Hay pocos investigadores que describan explícitamente los procesos a través de los cuales llegaron al conocimiento y muestran su "erudición" de la práctica a los demás (Pink, 2015, A1). El proyecto de doctorado constó de cuatro fases centradas en la exploración de la reflexividad. Este enfoque ayudó a la autora a obtener contribuciones que pudieran ser revisadas y evaluadas por distintos académicos y publicadas. Además, dio lugar a la creación de una herramienta de diálogo desarrollada a lo largo de tres años y presentada en este documento. Esta herramienta no era adecuada para su publicación en el formato de doctorado. Como método de diseño, permitió visualizar áreas que requerían pensamiento crítico. También ayudó a los niveles de evaluación del investigador como profesional reflexivo durante los esfuerzos de investigación, especialmente al tratar con participantes adultos y niños muy diversos con distintas sensibilidades y necesidades (como parte del diseño del estudio).

Aunque la herramienta se basa en la bibliografía existente y en datos cualitativos y cuantitativos, es fundamental señalar que se originó a partir de un estudio de doctorado de tres años (Södergren, 2023), utilizando bibliografía externa y que solo se puso a prueba al investigar con niños en edad preescolar. No se ha probado con personas mayores u otros segmentos con necesidades y sensibilidades diversas. Sin embargo, como se ha mencionado anteriormente, Kaspersen et al. (2024) muestran que los enfoques de la educación primaria pueden aplicarse en el desarrollo de prácticas de investigación y diseño para adultos. Por lo tanto, este artículo presenta la herramienta como un enfoque innovador para la investigación de la longevidad, con el objetivo de mejorar la concientización sobre las sensibilidades y el bienestar de los participantes al tiempo que se avanza en la investigación, los planes de acción o las soluciones de diseño. La autora presenta esta "perspectiva de trabajo en proceso" para alejarse de forma transparente del papel subjetivo del investigador del diseño. Esto abre "la sala de máquinas del estudio" para invitar a otros investigadores a realizar un trabajo repetitivo y comparativo con el fin de debatir, perfeccionar y ajustar los resultados de este artículo y la validez de la herramienta. Esto es especialmente relevante a la hora de dialogar, diseñar o implicar a las personas mayores, que muestran sensibilidades y necesidades diferentes a las de los niños en edad preescolar.

Dicha investigación podría evaluar la eficacia de estas prácticas y las limitaciones, retos y utilidad de la herramienta de diálogo presentada. A pesar de las limitaciones de este estudio, compartir estas prácticas puede inspirar a otros investigadores a mejorar la reflexividad y la precisión cuando trabajen con grupos de participantes vulnerables; de forma similar a los modelos y herramientas de diálogo existentes utilizados para explorar el comportamiento, la interacción y las funciones corporales que requieren un alto grado de sensibilidad. La herramienta de

The contribution of this paper lies in providing improved clarity and precision of reflexivity-in-practice to facilitate written and oral discussions in curriculum dialogues. Specifically, this study offers a more precise definition and application of reflexivity, based on emerging grounded insights (Charmaz, 2014) collected during four case studies and various generative design explorations with 120 pre-schoolers aged 2.5-6 years at a kindergarten (Södergren, 2023). There is a shortage of researchers describing explicitly the processes through which researchers came to knowledge and show their 'scholarship' of practice to others (Pink, 2015, A1). The PhD project consisted of four phases focusing on exploring reflexivity. This approach helped the author obtain contributions that could be peer-reviewed and evaluated by different scholars and published. Additionally, it led to the acquisition of a dialogue tool developed over three years and presented in this paper, which was not suitable for publication in the PhD format. As a design method, it visualised areas that required critical thinking. It also assisted the researcher's evaluation levels as a reflective practitioner during research endeavours, especially when dealing with highly diverse adult and child participants with various sensitivities and needs as part of a research design.

Even though the tool itself is based on existing literature and qualitative and quantitative data, it is critical to note it is only based on a three-year PhD study (Södergren, 2023), external literature and was only tested when researching with pre-schoolers. It has not been tested with the elderly or other segments with varying needs and sensitivities. However, as mentioned above, Kaspersen et al. (2024) show that primary education approaches can be applied in developing research and design practices for adults. Therefore, this paper presents the tool as an innovative approach for longevity research, aiming to enhance awareness of participant sensitivities and well-being whilst advancing research, action plans, or design solutions. The author presents this "work-in-process perspective" to transparently step away from a design researcher's subjective role. This opens up "the research machine room" to invite other researchers to conduct repetitive, comparative work to discuss, refine, and adjust this paper's results and the tool's validity. This is especially relevant when dialoguing, designing, or involving the elderly, who demonstrate different sensitivities and needs compared to pre-schoolers.

Such research could evaluate the effectiveness of these practices and the limitations, challenges, and usefulness of the dialogue tool presented. Despite the limitations of this study, sharing these practices may inspire other researchers to improve reflexivity and accuracy when working with vulnerable participant groups; similar to existing models and dialogue tools used to explore behaviour, interaction, and bodily functions that require a high degree of sensitivity. The dialogue tool presented may promote critical reflection and spark discussions on developing a more precise framework for documenting reflexivity practices in projects involving sensitive and diverse age groups. In addition, the tool might provide researchers with a structure to write more precise methodology sections that can enable interdisciplinary dialogue about applying reflexivity when exploring action plans and solutions.

diálogo presentada puede promover la reflexión crítica y suscitar debates sobre el desarrollo de un marco más preciso para documentar las prácticas de reflexividad en proyectos en los que participen grupos de edad sensibles y diversos. Además, podría proporcionar a los investigadores una estructura para redactar secciones metodológicas más precisas que permitan el diálogo interdisciplinar sobre la aplicación de la reflexividad al explorar planes de acción y soluciones.

METODOLOGÍA

ESTUDIO DE DOCTORADO COMO TELÓN DE FONDO Y DISEÑO GENERAL DE LA INVESTIGACIÓN

Se llevó a cabo un estudio de doctorado de tres años para explorar la reflexividad y la práctica reflexiva en grupos mixtos de preescolares de 2,5–6 años en una guardería Reggio Emilia. El diseño de la investigación empleó un enfoque de teoría fundamentada (Charmaz, 2014) y de sensibilidad a los valores (Friedman & Hendry, 2019) para investigar y diseñar un proceso de codiseño adecuado para preescolares de 2,5 a 6 años, un área poco investigada. La máxima prioridad de este proceso fue promover los factores de salud cerebral y el bienestar de estos participantes altamente sensibles [Anexo 2, (A2)], al tiempo que se obtenían resultados beneficiosos de la investigación. Se animó a los preescolares a desarrollar habilidades de diseño independientes con una intervención mínima de los adultos y con la libertad para tomar decisiones intuitivas en relación con el compromiso corporal, las actividades, el proceso y la selección de materiales. Este enfoque pretendía cristalizar el potencial preescolar de las prácticas de codiseño de los adultos utilizando un enfoque de investigación de diseño generativo (Sanders, 2008).

SELECCIÓN DE PARTICIPANTES, CONTEXTO Y MÉTODOS DE RECOLECCIÓN DE DATOS

El proyecto de doctorado consistió principalmente en la investigación en una guardería, complementada con estudios iniciales de observación *in situ* en entornos informales como patios de recreo, otras guarderías y familias. La atención se centró en los niños en edad preescolar, al tiempo que se observaba la influencia de los cuidadores, los transeúntes y los investigadores en la autonomía, el bienestar y el desarrollo de los niños. En los cuatro estudios de caso, los educadores seleccionaron un grupo de preescolares de ambos sexos y capacidades diferentes para adaptarlo al horario y al programa. La recolección de datos se ajustó a la legislación, los reglamentos y las normas éticas de Dinamarca y los jardines de infancia. Se siguieron las normas de protección de datos y se obtuvo el consentimiento informado de los padres. Todos los niños en edad preescolar fueron anonimizados. Las técnicas de recopilación de datos de métodos mixtos incluyeron grabaciones de audio y vídeo con cámaras GoPro ocultas, fotografía discreta, toma de notas, diversas indagaciones contextuales y métodos de diseño para realizar estudios de comportamiento sensoriales y etnográficos (Charmaz, 2014; Pink, 2015; Martin & Hanington, 2012). El objetivo de la definición de variables de comportamiento para investigar la interacción (Rabeling, 2010) fue "objetivizar" (Arbnor y Bjerke, 1997, p. 1) los resultados de la investigación, visualizarlos numéricamente y mejorar la reflexión crítica sobre la implicación subjetiva del investigador.

METHODOLOGY

PHD STUDY AS BACKDROP AND OVERALL RESEARCH DESIGN

A three-year PhD study was conducted to explore reflexivity and reflective practice in mixed-gender groups of pre-schoolers aged 2.5–6 years at a Reggio Emilia kindergarten. The research design employed a grounded theory approach (Charmaz, 2014) and a value sensitive approach (Friedman & Hendry, 2019) to investigate and design a co-design process suitable for pre-schoolers aged 2.5 to 6 years, an area under-researched. Top priority of this process was to promote brain health factors and well-being of these highly-sensitive participants [Annex 2, (A2)] while obtaining beneficial research outcomes. Pre-schoolers were encouraged to develop independent design skills with minimal adult intervention and had freedom to make intuitive choices regarding body engagement, activities, process, and selection of materials. This approach aimed to crystallise pre-school potential for adult co-design practices using a generative design research approach (Sanders, 2008).

SELECTION OF PARTICIPANTS, RESEARCH SETTING AND DATA COLLECTION METHODS

The PhD project primarily involved researching in a kindergarten, supplemented by initial in-situ observational studies in informal settings such as playgrounds, other kindergartens, and families. The focus was on pre-schoolers, while also observing the influence of caretakers, bystanders, and researchers on a child's empowerment, well-being, and development. For four case studies, a mixed-gender and mixed-ability group of pre-schoolers was selected by educators to fit schedule and program. Data collection efforts were in line with legislation, regulations, and ethical norms of Denmark and kindergarten. Data protection regulations were followed and informed parent consent was obtained. All pre-schoolers were anonymised. Mixed-method data collection techniques included audio and video recordings from hidden GoPro cameras, discreet photography, note-taking, various contextual inquiries and design methods to conduct sensory-ethnographic behavioural studies (Charmaz, 2014; Pink, 2015; Martin & Hanington, 2012). Defining behavioural variables to investigate interaction (Rabeling, 2010) was aimed to "objectivise" (Arbnor & Bjerke, 1997, p. 1) research findings, visualise these in numeric display, and enhance critical reflection of subjective researcher involvement.

DATA ANALYSIS, INTERPRETATION AND VALIDITY

The data analysis followed grounded theory methods (Charmaz, 2014), using "*storyline*" analytical technique (Birks & Mill, 2019) and a specific procedural structure (Tweed & Charmaz, 2011, p. 133). This approach helped extract insights from complex qualitative data, and results related to reflexivity are presented in this paper. Qualitative and quantitative quality control criteria were considered (Heldbjerg, 2006; Creswell, 1998, p. 201–203). The process of collecting data amid interpersonal relationships aimed to uphold the quality criterion of 'sincerity' (Södergren, 2024) and focused on being mindful of limiting biases (Chiovitti & Piran, 2003), while prioritising awareness of potential sensitivities or needs of participants. Practical implementation of these criteria significantly influenced the tool presented in this paper.

ANÁLISIS, INTERPRETACIÓN Y VALIDEZ DE LOS DATOS

El análisis de los datos siguió los métodos de la teoría fundamentada (Charmaz, 2014), utilizando la técnica analítica *"storyline"* (Birks & Mill, 2019) y una estructura procedimental específica (Tweed & Charmaz, 2011, p. 133). Este enfoque ayudó a extraer ideas clave de datos cualitativos complejos. En este documento se presentan los resultados relacionados con la reflexividad. Se tuvieron en cuenta criterios de control de calidad cualitativos y cuantitativos (Heldbjerg, 2006; Creswell, 1998, p. 201–203). El proceso de recopilación de datos acerca de relaciones interpersonales buscó mantener el criterio de calidad de "sinceridad" (Södergren, 2024) y se centró en ser consciente de los sesgos limitadores (Chiovitti & Piran, 2003), al tiempo que dio prioridad a la concientización sobre las posibles sensibilidades o necesidades de los participantes. La aplicación práctica de estos criterios influyó significativamente en la herramienta presentada en este artículo.

PUNTOS DE REFLEXIVIDAD IDENTIFICADOS EN EL ENFOQUE GENERAL DE LA INVESTIGACIÓN DOCTORAL

Durante las fases iniciales del proyecto de doctorado, se hizo evidente que los niños preescolares muestran sensibilidades y necesidades muy diversas relacionadas con su edad que se expresan a través de un comportamiento impredecible. Fue necesario explorar y desarrollar un método subyacente apropiado y ético que corriera paralelo a la investigación principal. Este enfoque permitió al investigador encarnar el papel de un profesional reflexivo, creando herramientas, actividades y un entorno de diseño de la investigación que abordara las distintas necesidades y sensibilidades tanto de los adultos como de los niños a medida que iban surgiendo. Pedagogos y espectadores expresaron sensibilidades que la autora debió tener en cuenta, como la falta de recursos o la presión del tiempo. Los niños en edad preescolar mostraron que incluso las pequeñas interacciones con los adultos podían abrumarlos, limitando su libertad para tomar decisiones sobre cómo expresarse, por ejemplo, durante el recreo. Por lo tanto, se analizaron los datos iniciales de los estudios *in situ* para identificar los momentos en los que se producían "puntos de reflexividad" específicos relacionados con las sensibilidades para resguardar la exactitud de los resultados del doctorado. El objetivo fue estudiar cómo los investigadores pueden mejorar su reflexividad "en la práctica", reconociendo los sesgos asociados con estos puntos cuando interactúan y prestan asistencia a participantes muy diversos y sensibles. El cuadro 1 resume los "puntos de reflexividad" identificados y aplicados.

REFLEXIVITY POINTS IDENTIFIED IN GENERAL PHD RESEARCH APPROACH

During the initial stages of the PhD project, it became apparent that pre-schoolers exhibit highly diverse age-related sensitivities and needs expressed through unpredictable behaviour. It was necessary to explore and develop an appropriate and ethical undercurrent method that ran parallel to the main research. This approach allowed the researcher to embody the role of a reflective practitioner, creating tools, activities, and a research design environment that addressed varying needs and sensitivities of both adults and children as they emerged. Pedagogues and bystanders expressed sensitivities that the author had to consider, such as a lack of resources or time pressure. Pre-schoolers showed that even small interactions with adults could overwhelm them, limiting their freedom to make choices about how they express themselves, such as during playtime. Therefore, initial data from in-situ studies were analysed to identify moments where specific 'reflexivity points' connected to sensitivities occurred in a research design risking the accuracy of PhD results. The purpose was to investigate how researchers can improve 'in-practice' their reflexivity by recognising biases related to these points when interacting with and assisting highly diverse, sensitive participants. Table 1 summarises the 'reflexivity points' identified and applied.

TABLA 1. Ejemplo de códigos utilizados para analizar las entrevistas semiestructuradas a expertos.
TABLE 1. Example of codes used to analyse the semi-structured expert interviews.

PUNTOS DE REFLEXIVIDAD **REFLEXIVITY POINTS**
Cuando se trate de participantes caracterizados por una gran diversidad de necesidades y sensibilidades. When involving participants characterised by high diversity in needs and sensitivities.
PASO 1 **STEP 1**
Identificación de la sensibilidad y las necesidades expresadas en el comportamiento de los participantes. Identification of core sensitivity and need expressed in participant behaviour.
PASO 2 **STEP 2**
Identificar qué aspectos fundamentales de la experiencia del usuario y/o de la "construcción de la experiencia corporal" (Södergren, 2023) pueden desencadenar esta vulnerabilidad. Identify what core issues in user experience and/or "body experience construction" (Södergren, 2023) may trigger this vulnerability.
PASO 3 **STEP 3**
Identificación de las expresiones de comportamiento típicas para las sensibilidades y necesidades identificadas. Identification of behavioural expressions typical for identified sensitivities and needs.
PASO 4 **STEP 4**
Identificación de los signos comunes de estas sensibilidades, necesidades y sus expresiones conductuales típicas en el contexto inmediato. Identification of typical signs of these sensitivities, needs and their typical behavioural expressions in immediate context.
PASO 5 **STEP 5**
Definición de un enfoque central para explorar sensibilidades y necesidades en relación con un fenómeno identificado en la experiencia del usuario. Definition of a core focus to explore sensitivities and needs in relation to a phenomenon identified in user experience.
PASO 6 **STEP 6**
Formular preguntas de investigación (de diseño) que se ajusten a la exploración de soluciones de diseño/planes de acción para satisfacer sensibilidades y necesidades. Formulating (design) research questions that align to exploring design solutions/ action plans to meet sensitivities and needs.
PASO 7 **STEP 7**
El perfeccionamiento del enfoque de la investigación (de diseño) implica la definición exacta del participante objetivo (quién), el comportamiento objetivo (qué) y el entorno objetivo (dónde). Refinement of (design) research focus involves defining the exact target participant (who), target behavior (what), and target environment (where).
PASO 8 **STEP 8**
Definir valores específicos basados en el descubrimiento del contexto de la experiencia de usuario de los participantes que deben tenerse en cuenta dadas las sensibilidades/necesidades en los procesos de desarrollo (del diseño), los planes de acción o la participación de los usuarios. Define specific values based on context-discovery of participants' user experience that are to be targeted when considering sensitivities/needs in (design) development processes, action plans or user involvement.
PASO 9 – DURANTE LOS PROCESOS DE DISEÑO FRONT-END U OTRAS ACTIVIDADES QUE IMPLIQUEN A LOS PARTICIPANTES: **STEP 9 – DURING FRONT-END DESIGN PROCESSES OR OTHER PARTICIPANT INVOLVING ACTIVITIES:**
Explorar cómo los diseños consideran a los usuarios vulnerables y si acogen o dificultan sensibilidades y necesidades. Exploring how designs involve vulnerable users and whether they embrace or hinder sensitivities and needs.
PASO 10 – REFLEXIÓN RETROSPECTIVA TRAS CUALQUIER REUNIÓN FORMAL O INFORMAL CON LOS PARTICIPANTES: **STEP 10 – RETROSPECTIVE REFLECTION AFTER ANY FORMAL OR INFORMAL MEETING WITH PARTICIPANTS:**
Considerar los resultados, la eficacia y la eficiencia de la satisfacción de las diversas necesidades, salvaguardando al mismo tiempo el bienestar, la autonomía y la toma de decisiones intuitiva. Consider the outcomes, effectiveness and efficiency of meeting diverse needs while safeguarding well-being, autonomy, and intuitive decision-making.

ADAPTACIÓN DE LOS PUNTOS DE REFLEXIVIDAD EN PRÁCTICAS CONCRETAS

Los resultados de este artículo surgieron de la exploración de estos puntos en cuatro fases paralelas a la investigación principal, garantizando que el diseño de la investigación se ajustara a las necesidades y sensibilidades de los participantes. Aunque los pasos se presentan de una manera un tanto lineal, la aparición de ideas durante las cuatro fases fue entrelazada, algo típico de los enfoques teóricos fundamentados. Además, la autora combinó las actividades de codificación fundamentada con la revisión bibliográfica "no comprometida" para obtener una comprensión conceptual de los temas emergentes (Charmaz, 2014).

Durante la fase preliminar [Anexo 5 (A5)], tras recopilar datos cualitativos y combinar las percepciones con el *Análisis de la Estructura de la Identidad* [ASI; Weinreich & Saunderson, 2013; Anexo 6 (A6)], se identificó un área principal que requería atención analítica. Esta área se refería a las *experiencias subjetivas que expresaban sensibilidades*. Como resultado, la autora exploró el significado y las prácticas de la reflexividad para fomentar la expresión de una auténtica identidad propia a pesar de estas sensibilidades. Las ideas relacionadas con este ámbito se abordaron y perfeccionaron mediante actividades de codificación. *En la primera fase*, la autora se centró en *comprender precisa y conceptualmente el término reflexividad*. Para ello, se sintetizaron los conocimientos adquiridos a partir de los esfuerzos de "muestreo teórico" (Corbin y Strauss, 2015, p. 187), que luego se transformaron en prácticas concretas de reflexividad primaria aplicadas a lo largo del doctorado. Durante la *segunda fase focalizada*, la autora analizó los datos cualitativos emergentes e *identificó cuatro áreas de enfoque reflexivo* que promovían la reflexividad.

Las cuatro prácticas de reflexividad y áreas de enfoque definidas anteriormente resultaron inadecuadas para abordar las diversas necesidades de los participantes. Como resultado, fue necesario explorar un rol de participante que pudiera apoyar de manera óptima el bienestar, el empoderamiento y el dominio natural de una situación, dada la naturaleza altamente sensible y diversa de los participantes. Por lo tanto, en la *tercera fase* focalizada, la autora combinó las *cuatro prácticas de reflexividad* y las *áreas de enfoque* una vez más con el "muestreo teórico", utilizando teorías que reconocen que los individuos de todas las edades están rodeados de redes de relaciones socio-materiales que interactúan constantemente y provocan cambios. La autora sintetizó las ideas y refinó la comprensión general de la reflexividad en conjunción con la Teoría de las Asequibilidades (Gibson, 1986), la Dialogicalidad del Yo (Märtsin, 2012) y el marco de las Cuatro A "actor, acción, artefacto, audiencia y asequibilidades" [Glăveanu, 2013; Anexo 7 (A7)]. Durante la última fase, estas ideas se integraron en una herramienta de diseño denominada *Niveles de reflexividad*. El doctorado no incluyó esta aplicación. Sin embargo, la herramienta de diálogo mejoró el informe de las prácticas de investigación, centrándose en las conexiones entre las prácticas de diseño, las experiencias de los usuarios y el desarrollo del conocimiento en el análisis cruzado del doctorado (Södergren, 2023). Aunque la herramienta se basa en tres años de investigación sobre su diseño y en la bibliografía existente, su principal limitación es que solo se ha probado con preescolares y no con otros grupos de edad, como los adultos mayores. A pesar de este inconveniente, la experiencia laboral de la autora en centros de atención a personas mayores, junto con la

REFINEMENT OF REFLEXIVITY POINTS INTO CONCRETE PRACTICES

This paper's results emerged from exploring these points in four phases that ran parallel to the main research, ensuring the research design matched participants' needs and sensitivities. Although the steps are presented in a somewhat linear manner, the emergence of insights during the four phases was intertwined, typical for grounded theoretical approaches. In addition, the author combined grounded coding activities with "uncommitted" literature review to gain a conceptual understanding of topic themes that emerged (Charmaz, 2014).

During the preliminary phase [Annex 5 (A5)], after collecting qualitative data and combining insights with the Identity Structure Analysis [ISA; Weinreich & Saunderson, 2013; Annex 6 (A6)], one primary area was identified that required analytical attention. This area pertained to subjective experiences that expressed sensitivities. As a result, the author explored the meaning and practices of reflexivity to encourage expression of authentic self-hood despite these sensitivities. Insights related to this area were approached and refined through coding activities. In the first focused phase, the author concentrated on gaining a more precise conceptual understanding of the term reflexivity. This was done by synthesising knowledge gained from "theoretical sampling" efforts (Corbin & Strauss, 2015, p. 187), which were then transformed into concrete primary reflexivity practices applied throughout the PhD. During the second focused phase, the author analysed emerging qualitative data and identified four reflective focus areas promoting reflexivity.

The previously defined four reflexivity practices and focus areas were found to be inadequate in addressing the diverse needs of the participants. As a result, it was necessary to explore a participant role that could optimally support well-being, empowerment, and natural mastery of a situation, given the highly sensitive and diverse nature of the participants. Therefore, in the third focused phase, the author combined the four reflexivity practices and focus areas once again with 'theoretical sampling' using theories that recognise individuals of all ages are surrounded by networks of socio-material relationships that constantly interact and cause change. The author synthesised insights and refined the overall understanding of reflexivity in conjunction with Theory of Affordances (Gibson, 1986), Dialogicality of Self (Märtsin, 2012) and Four A's framework "actor, action, artifact, audience and affordances" [Glăveanu, 2013; Annex 7 (A7)]. During the last phase, these insights were integrated into a design tool called Levels of Reflexivity. The PhD did not include these insights. However, the dialogue tool improved the reporting of research practices, focusing on the connections between design practices, user experiences, and knowledge development in the PhD cross-analysis (Södergren, 2023). Although the tool is based on three years of design research and existing literature, its major limitation is that it has only been tested with pre-schoolers and not with other age groups, such as the elderly. Despite this drawback, the author's work experience in elderly care facilities, along with previous work experience with dialogue tools, tentatively indicates the potential usefulness of the 'Levels of Reflexivity' method. Consequently, further research is needed to critically evaluate its effectiveness for the elderly and other demographics.

experiencia profesional previa con herramientas de diálogo, indica provisionalmente la utilidad potencial del método "*Niveles de reflexividad*". Es necesario seguir investigando para evaluar críticamente su eficacia para las personas mayores y otros grupos demográficos.

RESULTADOS Y DISCUSIÓN

PRIMERA FASE FOCALIZADA: COMPRENSIÓN CONCEPTUAL EMERGENTE DE LA REFLEXIVIDAD EN LA PRÁCTICA

Los esfuerzos de recopilación de datos emergentes pusieron de relieve el impacto de las sensibilidades subjetivas expresadas en las reacciones y el rendimiento durante las exploraciones preliminares de diseño y los estudios de caso I y II. Los detalles de la fase preliminar se muestran en el anexo A5. El alto impacto de las sensibilidades de los participantes exigió aplicar un proceso de "muestreo teórico", como revisión bibliográfica "no comprometida". El objetivo fue identificar prácticas reflexivas útiles para implicar a preescolares muy sensibles en diferentes actividades y, al mismo tiempo, aclarar las implicancias del término reflexividad. La revisión reveló que existen definiciones de actuar con reflexividad como un profesional reflexivo (Stilgoe et al., 2012, p. 1571); sin embargo, sus implicancias prácticas y aplicaciones son algo confusas. Por ejemplo en la siguiente descripción: "La reflexividad puede definirse como un proceso de autodefinición que depende del seguimiento de la información sobre posibles trayectorias vitales y de la reflexión sobre la misma… en realidad, es constitutiva de lo que la gente hace y de cómo lo hace" (Elliot, 2020, p. 43). Otros, en cambio, interpretan la reflexividad como una actividad que ocurre en un acontecimiento concreto sobre una experiencia específica como un tipo de autorreflexión del yo "sobre sí mismo (espejo de sí mismo)" (Wagoner et al., 2012, p. 111). Dado que, dentro de conocimientos adquiridos durante el muestreo teórico no existen directrices o normas comunes para operacionalizar la reflexividad en la práctica, la autora tuvo que explorar las aplicaciones prácticas de la misma. En la sección A8 se ofrece una descripción exhaustiva de los esfuerzos de muestreo teórico que dieron forma al trabajo práctico durante el doctorado. La tabla 2 ofrece una representación visual simplificada de la finalidad y los beneficios de las prácticas de reflexividad aplicadas en su diseño de investigación. Las Figuras 2 a 5 ilustran, a través de fotografías de ejemplo recogidas durante el estudio, cómo se aplicó la reflexividad en la práctica cuando participaron niños en edad preescolar.

RESULTS AND DISCUSSIONS

FIRST FOCUSED PHASE: EMERGING CONCEPTUAL UNDERSTANDING OF REFLEXIVITY–IN–PRACTICE

Emerging data collection efforts highlighted the impact of subjective sensitivities expressed in reactions and performance during preliminary design explorations and case studies I and II. Details of the preliminary phase are shown in A5. The high impact of participant sensitivities required implementing a 'theoretical sampling' process, as 'uncommitted' literature review. The goal was to identify useful reflective practices for involving highly sensitive pre-schoolers in different activities while simultaneously clarifying the implications of the term reflexivity. The review revealed that definitions of acting with reflexivity as a reflective practitioner exist (Stilgoe et al., 2012, p. 1571), yet its practical implications and applications are somewhat unclear, as seen in the following description: "Reflexivity can be defined as a self-defining process that depends upon the monitoring of, and reflection upon, information about possible trajectories of life… it is actually constitutive of what people do and how they do it" (Elliot, 2020, p. 43). Others interpret reflexivity instead as an activity that happens in a particular event on a specific experience as a type of self-reflection from self 'upon itself (self-mirror)' (Wagoner et al., 2012, p. 111). Since, based on insights gained during theoretical sampling, no common guidelines or standards for operationalising reflexivity in practice exist, the author had to explore practical applications of it. A8 provides a thorough overview of the theoretical sampling efforts that shaped the practical work during the PhD. Table 2 provides a simplified visual representation of purpose and benefits of reflexivity practices applied in its research design. Figure 2 to Figure 5 illustrate, through exemplary photography collected during the study, how reflexivity-in-practice was applied when involving pre-schoolers.

PRÁCTICA DE REFLEXIÓN–EN–ACCIÓN CONCRETA (BASADO EN UN MUESTREO TEÓRICO) CONCRETE REFLECTION–IN–ACTION PRACTICE (BASED ON THEORETICAL SAMPLING)	PROPÓSITO DE LA PRÁCTICA DE REFLEXIVIDAD PURPOSE OF REFLEXIVITY–PRACTICE	BENEFICIOS PARA LAS PRÁCTICAS DE INVESTIGACIÓN CON PARTICIPANTES CARACTERIZADOS POR UNA GRAN DIVERSIDAD DE NECESIDADES Y SENSIBILIDADES. (INDICADO POR LOS RESULTADOS DEL DOCTORADO) BENEFITS FOR RESEARCH PRACTICES WITH PARTICIPANTS CHARACTERISED BY HIGH DIVERSITY IN NEEDS AND SENSITIVITIES (INDICATED BY PH.D. RESULTS)
1. Atención a posibles "señales" en la interacción **1.** Attention to potential 'signposts' in interaction	Las actividades de codificación con in vivo permitieron identificar variables basadas en la observación de la "falta" o la "sorpresa" durante la interacción, estimulando la reflexividad. In–vivo coding activities detailed the identification of variables based on observation of 'lack' or 'surprise' during interaction, stimulating reflexivity.	• Dos orientaciones prácticas para aplicar la reflexividad. • Estos dos principios ofrecen una orientación clara durante el proceso de reflexión sobre dinámicas socio–materiales complejas y entrelazadas, facilitando la navegación a través del descubrimiento reflexivo de detalles específicos en medio de necesidades y sensibilidades diversas. • Estas directrices pueden ayudar a profesionales del diseño, investigadores o equipos de desarrollo colaborativo de front–end a involucrar a partes interesadas y usuarios externos en debates y exploraciones. Las sesiones de retroalimentación que siguen estas directrices pueden revelar necesidades inesperadas o sensibilidades específicas no evidentes en otros procesos. • Two practical guidelines to help implement reflexivity into practice. • These two principles offer clear direction during the process of reflecting on complex, intertwined socio–material dynamics, making it easier to navigate through reflective discovery of specific details amidst diverse needs and sensitivities. • These guidelines can help design practitioners, researchers, or collaborative front–end development teams to engage external stakeholders and users in discussions and exploration. Feedback sessions following these guidelines can reveal unexpected needs or specific sensitivities not evident in other processes.
2. Diversos tipos de procesos de diseño generativo y experimentación con materiales **2.** Various forms of generative design processes and material experimentation	La puesta en práctica de estos procesos tuvo el efecto de incitar al investigador, participante o usuario a entablar diálogos orales abiertos y al descubrimiento reflexivo mediante el uso de la "reflexión en acción" con materiales y tareas abiertas integradas en la narración de historias. Implementation of these processes had the effect of prompting a researcher, participant, or user to engage in open oral dialogues and reflective discovery through the use of 'reflection–in–action' with materials and open–ended tasks embedded in storytelling.	• Los procesos de diseño, en particular los de codiseño participativo front–end, permiten tanto a los usuarios como a los investigadores y otras partes interesadas participar en un juicio reflexivo sobre un tema específico de interés. • Los procesos de diseño generativo implican crear una secuencia de interacciones específicas para el contexto, el problema o el "escenario de uso". Este enfoque fomenta una perspectiva holística al promover la reflexión sobre materiales, actividades, herramientas, escenarios y otros factores relevantes relacionados con el tema y sus usuarios o participantes. En última instancia, conduce a una mayor concientización, juicio reflexivo y comprensión. • Durante estos procesos, el juicio reflexivo permite a todos los participantes (usuarios, profesionales, investigadores y otras partes interesadas) realizar una autorreflexión crítica. A lo largo de la investigación, es importante tener en cuenta los sesgos de construcción de paradigmas y las inclinaciones teóricas del investigador (Schwandt, 1997). Cuando se lleva a cabo una investigación generativa, la codificación con in vivo puede mejorar la validez ecológica y ayudar al investigador a comprender mejor las necesidades y sensibilidades al requerir descripciones claras de los procedimientos de recolección de datos. • Design processes, particularly the participatory front–end co–design processes, allow both users, researchers and other stakeholders to engage in reflective judgement regarding a specific topic of interest. • Generative design processes involve creating a sequence of interactions that are specific to the context, problem, or "scenario of use." This approach encourages a holistic perspective by promoting reflection on materials, activities, tools, settings, and other relevant factors related to the topic and its users or participants. Ultimately, it leads to greater awareness, reflective judgement, and understanding. • During these processes, reflective judgment allows all participants (users, practitioners, researchers, and other stakeholders) to engage in critical self–reflection. Throughout research, it is important to consider a researcher's paradigm–constructing biases and theoretical inclinations (Schwandt, 1997). When conducting generative research, in–vivo coding can enhance ecological validity and help the researcher better understand the needs and sensitivities by requiring clear procedural descriptions of data collection efforts.

PRÁCTICA DE REFLEXIÓN-EN-ACCIÓN CONCRETA (BASADO EN UN MUESTREO TEÓRICO) CONCRETE REFLECTION-IN-ACTION PRACTICE (BASED ON THEORETICAL SAMPLING)	PROPÓSITO DE LA PRÁCTICA DE REFLEXIVIDAD PURPOSE OF REFLEXIVITY-PRACTICE	BENEFICIOS PARA LAS PRÁCTICAS DE INVESTIGACIÓN CON PARTICIPANTES CARACTERIZADOS POR UNA GRAN DIVERSIDAD DE NECESIDADES Y SENSIBILIDADES. (INDICADO POR LOS RESULTADOS DEL DOCTORADO) BENEFITS FOR RESEARCH PRACTICES WITH PARTICIPANTS CHARACTERISED BY HIGH DIVERSITY IN NEEDS AND SENSITIVITIES (INDICATED BY PH.D. RESULTS)
3. Producción de diversas formas de externalización, como visualizaciones o pruebas tangibles. **3.** Production of various forms of externalisations, such as visualisations or tangible evidence	Captar la comprensión conceptual a través de dibujos, diagramas, representaciones gráficas digitales, prototipos u otras pruebas tangibles (creadas por el usuario o el investigador) mientras se reflexiona sobre los principales temas, categorías e interconexiones de las secuencias de interacción y las relaciones con entidades vivas y no vivas. Being trained in different disciplines also means viewing the world, and projects topics differently. All experts shared barriers relating to communication, and when involving participants this becomes even more challenging for some disciplines.	• La literatura muestra que la producción de estos se logra fácilmente y en convivencia por una amplia gama de grupos etarios (Sanders & Stappers, 2012) y es beneficioso cuando se pretende incluir una amplia diversidad de participantes con necesidades relacionadas con su edad, sensibilidades y diversidad. • Las visualizaciones y las pruebas tangibles son herramientas generativas que estimulan la conciencia reflexiva individual y colaborativa. • Pueden utilizarse como vehículos para obtener una comprensión más profunda de la experiencia del usuario, especialmente cuando se lleva a cabo una investigación fundamentada relacionada con las necesidades y sensibilidades. • Permiten evaluar e interpretar el impacto que tienen las transformaciones en los materiales, diseños, participantes o entornos. • Literature shows that production of these is easily and convivially achieved by a broad range of age groups (Sanders & Stappers, 2012) and is beneficial when aimed to include a wide diversity of participants with age-related needs, sensitivities, and diversity. • Visualisations and tangible evidence are generative tools that stimulate individual and collaborative reflective awareness. • Can be used as vehicles to gain a deeper understanding of user experience, especially when conducting grounded research related to needs and sensitivities. • Enable the evaluation and interpretation of the impact that transformations in materials, designs, participants, or settings.
4. Prácticas de codiseño **4.** Co-design practices	Las prácticas repetitivas de codiseño han contribuido a centrar la atención en los factores de bienestar y salud cerebral relacionados con los valores. Esto ha permitido obtener una visión continua y fundamentada de las necesidades y sensibilidades de los participantes, que ha servido de base para priorizar estos factores y estimular la resolución de problemas y la toma de decisiones de forma autónoma. También ayudó a mantener el compromiso auténtico de los participantes de una manera inclusiva, independientemente de la gran diversidad de necesidades y sensibilidades. Repetitive co-design practices have helped to establish a focus on value-related well-being and brain health factors. This has allowed for continuous grounded insights into participant needs and sensitivities, informing how to prioritise these factors and stimulate their self-reliant problem-solving and decision-making. It also helped to maintain participants' authentic engagement in an inclusive manner, regardless of highly diverse needs and sensitivities.	• Las prácticas de codiseño estimulan la expresión de las competencias reflexivas tanto del usuario como del investigador a través de compromisos sociales y materiales que permiten un análisis en profundidad de las necesidades y sensibilidades. • Permiten la reflexividad a nivel de todo el cuerpo, lo que ayuda a comprender las capacidades cognitivas del usuario y cómo las experiencias subjetivas pueden transformar su realidad actual. Esto incluye examinar el material, los objetos, las situaciones, las actividades y otras relaciones sociomateriales que conforman sus experiencias. • Co-design practices stimulate the expression of both the user's and researcher's reflexive competencies through social and material engagements, enabling in-depth analysis of needs and sensitivities. • Enable reflexivity in terms of full-body sensing, which helps in understanding a user's cognitive abilities and how subjective experiences can transform their current reality. This includes examining the material, objects, situations, activities, and other socio-material relations that shape their experiences.

FIGURA 2. Falta de "señales": ausencia de otros niños durante el juego.
FIGURE 2. 'Signpost' lack: absence of other children during play.

FIGURA 3. Diversos procesos de diseño generativo y experimentación con materiales.
FIGURE 3. Various generative design processes and material experimentation.

FIGURA 4. Pruebas tangibles analizables.
FIGURE 4. Analysable tangible evidence.

La Figura 2 indica que la identificación de una "carencia" en un determinado contexto podría conducir a una exploración analítica sobre si un niño está experimentando soledad, exclusión, inclusión o simplemente necesita descansar en el jardín de infancia. Este ejemplo ilustra cómo la primera práctica de reflexividad pudo identificar temas significativos durante las interacciones repercutiendo en el bienestar individual. La figura 3 muestra que las exploraciones materiales y los procesos de diseño generativo permitieron analizar las experiencias de los usuarios en cuanto a expresión de habilidades, imaginación creativa y bienestar general.

La Figura 4 muestra pruebas tangibles creadas por un niño en edad preescolar como resultado de las prácticas de codiseño. La figura 5 ilustra la modificación del diseño de la investigación desde los estudios de caso 01 y 02 a los estudios de caso 03 y 04. Esto apuntó a adaptarse a las necesidades y sensibilidades específicas de los niños en edad preescolar, como se detalla en otra parte (Södergren, 2023).

SEGUNDA FASE FOCALIZADA: CONDENSACIÓN EN CUATRO FOCOS DE REFLEXIÓN

El proceso de investigación refinó los métodos de reflexión en la práctica mencionados anteriormente, condensándolos en cuatro áreas de reflexión dentro de estas prácticas. Estas áreas de interés se utilizaron a lo largo del proyecto para mejorar la precisión de las prácticas de reflexividad en relación con las sensibilidades, las necesidades y el diseño adecuado para los sensibles participantes.

En primer lugar, se utilizaron diversos *resultados visuales y tangibles*, creados por la autora al momento de tomar notas o por los participantes. Estos incluyeron dibujos que representaban concepciones, actividades de creación de prototipos y materiales preescolares que evidenciaban la reflexividad. Estas visualizaciones se utilizaron como herramientas para aumentar la *conciencia reflexiva* de todos los implicados. Además, se utilizaron varios métodos de diseño visual, como herramientas de diálogo e imágenes de dibujos animados de niños, para aplicar la técnica de "personas" (Pruitt & Grudin, 2003; Figura 5). Estos métodos crearon *enfoques reflexivos* combinando textos, fotografías y palabras orales. Estas representaciones tangibles sirvieron de apoyo a las prácticas de análisis y evaluación, además de facilitar los debates con otros investigadores.

En segundo lugar, en todos los diseños de los estudios de caso se aplicó la *investigación de diseño generativo*, que permitió realizar juicios reflexivos estrechamente relacionados con el "lugar de ubicación ("Aufenthalt") de los conceptos empíricos" (Genova, 1992, p. 56) a través de exploraciones con prototipos, materiales o entornos (Figura 6).

Como se muestra en la Figura 6, los enfoques generativos facilitaron actividades de investigación estrechamente relacionadas con experiencias socio-materiales y sensoriales. Propiciaron una "confrontación exploratoria inmediata con situaciones del mundo real" (Stappers & Giaccardi, 2017, p. 9), que suscitó un dualismo del juicio reflexivo de mente y cuerpo, de "sentir y saber", expresado a través de expresiones orales, materiales o corporales analizables. La adopción de expresiones impredecibles durante las exploraciones de diseño generativo permitió un mejor análisis de la dinámica sensorial corporal, el movimiento y la emoción. Esto, a su vez, produjo fructíferos resultados en el doctorado (Södergren, 2023). En tercer lugar, durante el proceso de investigación, la autora desarrolló temas principales que

Figure 2 indicates that identifying a 'lack' in a certain context could lead to an analytical exploration of whether a child is experiencing loneliness, exclusion, inclusion, or simply needing rest in kindergarten. This example illustrates how the first reflexivity practice could identify significant topics during interactions that impacted individual well-being. Figure 3 shows that material explorations and generative design processes enabled the analysis of user experiences in expressing skills, creative imagination, and overall well-being.

Figure 4 displays tangible evidence created by a pre-schooler as a result of co-design practices. Figure 5 illustrates the modification of the research design from case studies 01 and 02 to case studies 03 and 04 to accommodate the specific needs and sensitivities of pre-schoolers, as detailed elsewhere (Södergren, 2023).

SECOND FOCUSED PHASE: CONDENSATION INTO FOUR REFLECTIVE FOCUS AREAS

The research process refined the reflexive-in-practice methods mentioned above, condensing them into four reflective focus areas within these practices. These focus areas were utilised throughout the project to enhance the precision of reflexivity practices regarding sensitivities, needs, and appropriate design for sensitive pre-school participants.

Firstly, various visual and tangible outcomes were utilised, either created during the author's note-taking or by participants. These included drawings depicting conceptual understandings, prototyping activities, and pre-school materials evidencing reflexivity. These visualisations were used as tools to increase reflexive awareness among all involved. In addition, various visual design methods were utilised, such as dialogue tools and cartoon images of children, to implement the 'personas' technique (Pruitt & Grudin, 2003; Figure 5). These methods created reflexive approaches which combined text, photographs, and oral words. These tangible representations supported analysis and evaluation practices, as well as facilitated discussions with other researchers.

Secondly, in all case study designs, generative design research was implemented, which enabled reflective judgments that were closely related to the "dwelling place('Aufenthalt')—of empirical concepts" (Genova, 1992, p. 56) through explorations with prototypes, materials, or environments (Figure 6).

Seen in Figure 6 , generative approaches facilitated research activities closely related to socio-material and sensory experiences. They scaffolded an immediate 'explorative confrontation with real-world situations' (Stappers & Giaccardi, 2017, p. 9), which stirred heightened reflective judgement dualism of both mind and body, of 'sensing and knowing'; expressed through analysable oral, material or body expressions. The embrace of unpredictable expressions during generative design explorations allowed for a better analysis of body-sensory dynamics, motion, and emotion. This, in turn, produced fruitful PhD outcomes (Södergren, 2023). Thirdly, during the research process, the author developed main themes that helped frame the issues at hand (Charmaz, 2014; Stappers & Giaccardi, 2017). Themes were based on the emerging research questions, and the above-mentioned reflexivity points (Table 1). Together, these created hypothetical guidelines for coding activities. These guidelines were essential in facilitating reflexive awareness within visualisations and design explorations, and in extracting evidence related to "social relations, self-understandings, and symbolic orders" (Strydom, 2011, p. 128). They also helped structure "on-the-spot logic"

FIGURA 5. Herramienta de diálogo aplicada durante la investigación.
FIGURE 5. Dialogue tool implemented during research.

FIGURA 6. Análisis de las experiencias de descubrimiento de los preescolares.
FIGURE 6. Analysing pre-schoolers' discovery experiences.

ayudaron a enmarcar los temas tratados (Charmaz, 2014; Stappers & Giaccardi, 2017). Los temas se basaron en las preguntas de investigación emergentes y en los puntos de reflexividad mencionados anteriormente (Tabla 1). En conjunto, estos temas crearon *directrices hipotéticas* para las actividades de codificación. Estas directrices fueron esenciales para facilitar la conciencia reflexiva dentro de las visualizaciones y las exploraciones de diseño, y para extraer pruebas relacionadas con "las relaciones sociales, las autocomprensiones y los órdenes simbólicos". También ayudaron a estructurar la "lógica en terreno" (Schön, 1987, p. 68) de los datos fundamentados y permitieron identificar cuándo se habían comprendido plenamente las percepciones. En cuarto lugar, al formular *definiciones durante el trabajo*, la autora pudo aumentar la reflexividad durante el desarrollo del conocimiento organizando las ideas en consonancia con la bibliografía existente. La elaboración de un glosario de términos clave basado en las publicaciones existentes garantizó la precisión, añadió reflexividad durante la redacción y minimizó la ambigüedad de significado y aplicación práctica durante el doctorado.

TERCERA FASE FOCALIZADA: HERRAMIENTA DE DIÁLOGO QUE APOYA LA REFLEXIVIDAD EN LA PRÁCTICA

Junto con el análisis cualitativo de los datos, se utilizó el muestreo teórico para analizar el concepto de reflexividad en la práctica en conjunción con la Teoría de las Asequibilidades (Gibson, 1986), la Dialogicalidad del Yo (Märtsin, 2012) y el marco de las cinco A (Glăveanu, 2013; A6). El estudio también examinó cómo los preescolares expresaban vitalidad dentro de una red de relaciones durante los procesos creativos (Glăveanu, 2013; Latour, 2005; Stern, 2010; Seligman, 2018). Durante la tercera fase enfocada, los muestreos teóricos combinados con la atención a las percepciones emergentes del análisis de datos cualitativos, en conjunto con la información de las fases previas, condujeron a la identificación de tres resultados centrales.

En primer lugar, la constatación de que el "paradigma pragmático" como columna vertebral de la metodología de la autora (Creswell, 2003, p. 9; Sonne- Ragnas, 2021, p. 60) opera no en un nivel, sino en cuatro niveles diferentes en sus prácticas reflexivas cuando implica a participantes sensibles. En otras palabras, cuando la autora observó el comportamiento humano, no bastó con afirmar que se empleaba un paradigma pragmático como "profesional reflexivo". Esto se evidenció por el foco en participantes sensibles de este estudio. Sus sensibilidades exigieron una aclaración sobre quién, dónde y cómo este planteamiento reflejaba el razonamiento de elegir técnicas o métodos para respetar adecuadamente a los individuos y obtener al mismo tiempo resultados con "validez ecológica". Como se ve en la Figura 8, se utilizó una subdivisión en cuatro niveles para realizar un análisis detallado de la experiencia del usuario en las distintas capas durante el doctorado. Este enfoque permitió aplicar métodos de investigación personalizados basados en una reflexividad específica enfocada en la experiencia de los participantes en contexto. La visualización aclaró la situación de la experiencia del usuario, lo que permitió a la autora tomar decisiones de investigación concretas y entablar debates reflexivos con otros expertos para evaluar la idoneidad de las técnicas elegidas.

En segundo lugar, quedó claro que no basta con conocer las leyes y normativas relacionadas con los derechos de las personas que participan en procesos de investigación o colaboración. Los participantes vulnerables requirieron una mayor reflexividad.

(Schön, 1987, p. 68) of grounded data and allowed identifying when insights had been fully understood. Fourth, by formulating working definitions, the author could increase reflexivity during knowledge development by organising insights aligned with existing literature. Constructing a glossary of key terms based on existing publications ensured precision, added reflexivity during writing efforts, and minimised ambiguity in meaning and practical application during the PhD.

THIRD FOCUSED PHASE: DIALOGUE TOOL ASSISTING REFLEXIVITY–IN–PRACTICE

Together with qualitative data analysis, theoretical sampling was used to analyse the concept of reflexivity-in-practice in conjunction with Theory of Affordances (Gibson, 1986), Dialogicality of Self (Märtsin, 2012) and five A's framework (Glăveanu, 2013; A6). The study also examined how pre-schoolers expressed vitality within a network of relationships during creative processes (Glăveanu, 2013; Latour, 2005; Stern, 2010; Seligman, 2018). During the third focused phase, theoretical samplings combined with attention to emerging qualitative data analysis insights, also from the previous three phases, led to the identification of three central results.

Firstly, the matter that the "pragmatic paradigm" as backbone of the author's methodology (Creswell, 2003, p. 9; Sonne-Ragnas, 2021, p. 60) was operating not on one level, but on four different levels in its reflective practices when aiming to involve sensitive participants. In other words, when the author observed human behaviour, it was not enough to simply state that a pragmatic paradigm as a 'reflective practitioner' was employed. This was especially true when focusing on sensitive participants, as in this study. Their sensitivities necessitated clarification on who, where, and how this approach reflected the reasoning behind choosing techniques or methods to respect individuals appropriately while obtaining outcomes with 'ecological validity'. As seen in Figure 8, a four-level subdivision was utilised to conduct a detailed analysis of the user experience at different layers during the PhD. This approach permitted the application of customised research methods based on specific reflexivity related to participant context experience. The visualisation clarified the user experience situation, enabling the author to make specific research decisions and engage in reflective discussions with other scholars to assess the appropriateness of chosen techniques.

Secondly, it became clear that simply knowing the laws and regulations related to the rights of individuals involved in research or collaborative processes is not enough. Vulnerable participants required heightened reflexivity. On the one hand, the diversity of needs and sensitivities required the formulation of rights and a participant role that ensured empowerment, well-being, and respect regardless of vulnerabilities. On the other hand, working with vulnerable participants required an exploration of existing literature regarding how to integrate relational, emotional, and social rights into research efforts to better meet the diverse needs and sensitivities with respect. More details on this topic can be found elsewhere (Södergren, 2024).

The third main insight details the role Schön labelled 'reflective practitioner'. The study conducted revealed that this role involves being reflexive in both practical activities such as design or research, and in communicating acquired knowledge through writing. The study revealed that reflective practitioners should ideally integrate practical work with writing. Writing

Por un lado, la diversidad de necesidades y sensibilidades exigió la formulación de derechos y un papel de participante que garantizara la capacitación, el bienestar y el respeto, independientemente de las vulnerabilidades. Por otra parte, el trabajo con participantes vulnerables requirió una exploración de la literatura existente sobre cómo integrar los derechos relacionales, emocionales y sociales en los esfuerzos de investigación para satisfacer mejor las diversas necesidades y sensibilidades con respeto. Se pueden encontrar más detalles sobre este tema en otra publicación (Södergren, 2024).

La tercera idea principal detalla el papel que Schön denominó "profesional reflexivo". El estudio realizado reveló que este papel implica ser reflexivo tanto en actividades prácticas como el diseño o la investigación, como en la comunicación de los conocimientos adquiridos a través de la escritura. El estudio reveló que lo ideal sería que los profesionales reflexivos integren el trabajo práctico con la escritura. Poner por escrito las prácticas estimuló la reflexión de la autora, y los formatos escritos concretamente podrían invitar a otros investigadores a realizar aportes. El planteamiento abrió el proceso de reflexión a criterios de validación externos. La figura 7 resume algunos de los resultados de este estudio. El estudio informó sobre cómo abordar las prácticas de reflexividad en el papel de un "profesional reflexivo" en la investigación del diseño centrado en el ser humano para beneficiar las necesidades y sensibilidades de los usuarios, especialmente cuando el diseño del estudio incluye grupos de participantes vulnerables.

Estas tres ideas centrales provocaron una mayor exploración de herramientas, métodos y entornos adecuados para los participantes que muestran reacciones sensibles inmediatas. Como resultado, se desarrolló una herramienta de diálogo visual para apoyar la reflexividad. De este modo se llegó a la conclusión de que el paradigma pragmático puede ponerse en práctica, debatirse y escribirse en cuatro niveles diferentes, como se ilustra en las figuras 8 y 9.

La figura 8 presenta la herramienta *Niveles de reflexividad*, que contiene cuatro niveles de conciencia del paradigma. Estos niveles pueden utilizarse para debatir la reflexividad y las prácticas de investigación reflexiva. Los cuatro niveles de conciencia se basan en: atención subjetiva y sesgo, consideración del contexto específico, adopción de una perspectiva holística y evaluación del impacto transformador. Esta herramienta, impresa, se utilizó con la "técnica persona" (Pruitt & Grudin, 2003; Figura 9) durante el proyecto de investigación. Los distintos niveles de reflexión mejoraron la comprensión de la reflexividad en las prácticas de investigación y diseño, ya que la herramienta facilitó la navegación entre los distintos niveles de conciencia y conexión del contexto. Ofreció una estructura para las opciones analíticas que la autora tuvo que tomar en la aplicación práctica de la reflexividad. El anexo 9 (A9) explica detalladamente la aplicación de la herramienta e incluye una nota crítica.

Tres perspectivas argumentan por qué se desarrolló una herramienta de diálogo como construcción visual y externalización de las prácticas reflexivas durante la investigación de doctorado, que se alinean con Iversen et al. (2019, p. 95). En primer lugar, la herramienta visualizaba prácticas concretas, haciendo más tangibles los aspectos para tener en cuenta en la interacción y las relaciones en torno a los usuarios/participantes. En segundo lugar, externaliza la práctica del investigador de forma que invita a otros investigadores a tener una visión transparente

down practices stimulated reflection for the author, and written formats concretely could invite input from other researchers. The approach opened up the reflection process to external validation criteria. Figure 7 summarises some of the results of this study. The study informed how to tackle reflexivity practices in the role of a 'reflective practitioner' in human-centred design research to benefit user needs and sensitivities, especially when vulnerable participant groups are included in a research design.

These three central insights caused the further exploration of suitable tools, methods, and environments for participants who show immediate sensitive reactions. As a result, a visual dialogue tool was developed to assist reflexivity. This led to the understanding that the pragmatic paradigm can be operationalised, discussed, and written about on four different levels, as illustrated in Figure 8 and Figure 9.

Figure 8 presents the Levels of Reflexivity tool, which presents four levels of paradigm awareness. These levels can be used to discuss reflexivity and reflective research practices. The four levels of awareness are based on: subjective attention and bias, specific context consideration, holistic perspective adoption, and transformational impact evaluation. This tool, in print, was used with the 'persona-technique' (Pruitt & Grudin, 2003; Figure 9) during the research project. The different reflection levels enhanced the understanding of reflexivity in research and design practices since the tool made it easier to navigate between different levels of context awareness and connectedness. It offered a structure for analytical choices the author had to make in the practical application of reflexivity. Annex 9 (A9) explains the tool's application in detail and includes a critical note.

Three perspectives argue why a dialogue tool was developed as visual construction and externalisation of reflective practices during PhD research, which are aligned with Iversen et al. (2019, p. 95). Firstly, the tool visualised concrete practices, making aspects to consider in interaction and relationships surrounding users/participants more tangible. Secondly, it externalised a researcher's practice in a way that invites other researchers to have a transparent view of the research process, enabling heightened criticism and reflection opportunities. Lastly, as a materialised and externalised tool during the PhD research, it provided a framework for constantly reflecting upon selected methods, their impact on involved participants, and their outcomes before, during, and after a research design, offering a generalisable continuum for such reflections. The tool provided a concrete model for exploring abstract thinking, scenarios, or ideas for user involvement and enabled to take a stand on specific aspects while also considering the overall perspective.

Summarising results, insights constructed Levels of Reflexivity that explicitly detail the 'research machine room', making the author's thinking process and practices transparent to benefit user needs and sensitivities. This transparency may facilitate future validation and broader discussions on reflexivity and validity standards. It is hoped Levels of Reflexivity can inspire future research efforts to document reflexivity practices in methodology sections, especially when catering to highly diverse needs and sensitivities of users, such as the elderly. This framework could help establish retrospective evaluation processes to enhance reflection and critique of ethical practices and standards, prioritising well-being, safety, survival, and brain health factors for the elderly (A2). Standards of reflexivity are currently lacking in design research, and it is increasingly necessary to

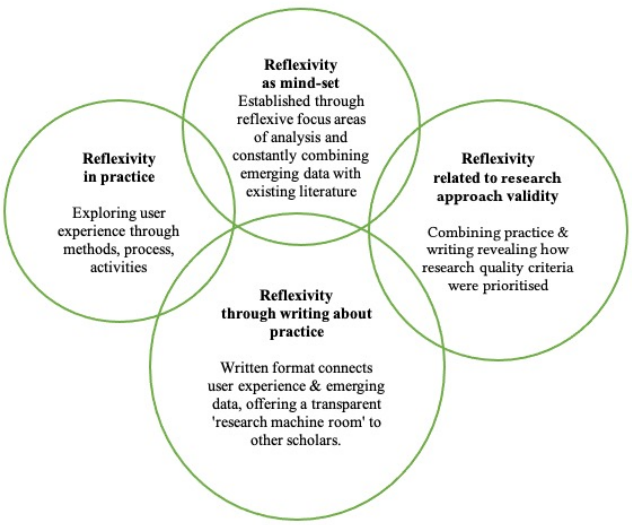

FIGURA 7. Componentes de la reflexividad como profesional reflexivo.
FIGURE 7. Reflexivity–components as reflective practitioner.

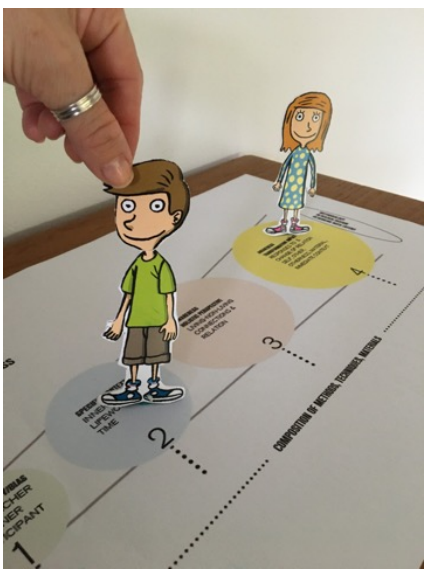

FIGURA 9. Aplicación de los niveles de reflexividad con perfiles persona.
FIGURE 9. Application of Levels of Reflexivity with personas.

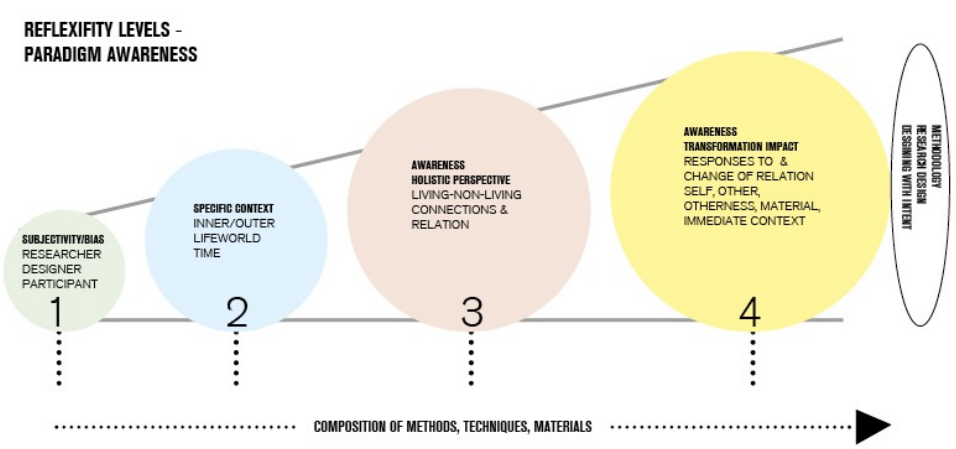

FIGURA 8. Ilustración de los cuatro niveles de conciencia de paradigma de la autora.
FIGURE 8. Illustrating the author's four levels of paradigm awareness.

del proceso de investigación, lo que permite aumentar las oportunidades de crítica y reflexión. Por último, como herramienta materializada y exteriorizada durante la investigación doctoral, proporcionó un marco para reflexionar constantemente sobre los métodos seleccionados, su impacto en los participantes implicados y sus resultados antes, durante y después de un diseño de investigación, ofreciendo un continuo generalizable para dichas reflexiones. La herramienta ofreció un modelo concreto para explorar el pensamiento abstracto, los escenarios o las ideas de participación de los usuarios y permitía adoptar una postura sobre aspectos concretos sin dejar de considerar la perspectiva global.

Resumiendo, las percepciones construyeron *Niveles de Reflexividad* que detallan explícitamente la "sala de máquinas de la investigación", haciendo transparentes el proceso de pensamiento y las prácticas de la autora en beneficio de las necesidades y sensibilidades de los usuarios. Esta transparencia puede facilitar futuras validaciones y debates más amplios sobre la reflexividad y los estándares de validez. Se espera que los niveles de reflexividad puedan inspirar futuros esfuerzos de investigación para documentar las prácticas de reflexividad en las secciones de metodología, especialmente cuando se atienden necesidades y sensibilidades muy diversas de los usuarios, como las personas mayores. Este marco podría ayudar a establecer procesos de evaluación retrospectiva para mejorar la reflexión y la crítica de las prácticas y normas éticas, dando prioridad a los factores de bienestar, seguridad, supervivencia y salud cerebral de las personas mayores (A2). Actualmente faltan normas de reflexividad en la investigación del diseño, y cada vez es más necesario debatirlas para llevar a los individuos y a la sociedad a sus *más altas capacidades (innovadoras)* (A4). Esto se debe a la creciente vulnerabilidad causada por los avances tecnológicos, que están cambiando e influyendo en las relaciones e interacciones relacionadas con la identidad, las comunidades y los contextos socioculturales de nuevas formas interconectadas (A4).

CONCLUSIONES Y PERSPECTIVAS FUTURAS

El documento y su apéndice ofrecen precisiones sobre la terminología y las prácticas de la reflexividad y el papel de un "profesional reflexivo" basadas en un estudio de doctorado de tres años de duración. El estudio exploró cómo la investigación centrada en el niño podría conducir a una perspectiva innovadora de trabajo en curso en beneficio de la investigación sobre la longevidad. Como resultado, se introducen los *Niveles de Reflexividad*, una herramienta de diálogo para la impresión, como nuevo método para explorar los contextos adultos, identificar nuevos enfoques para abordar las sensibilidades y necesidades muy diversas de los adultos mayores, y diseñar la investigación con el máximo nivel de respeto y validez ecológica. Concretamente, el marco permite una mayor precisión metodológica y un diálogo abierto sobre la subjetividad y el sesgo, tiene en cuenta contextos específicos, adopta una perspectiva holística y evalúa el impacto transformador de las prácticas de investigación y diseño. Su principal limitación es que la herramienta solo se ha probado con niños en edad preescolar y no con adultos mayores. Un estudio de seguimiento con participantes de edad avanzada explorará cómo puede utilizarse esta herramienta para examinar la eficacia, los retos y las limitaciones de debatir y presentar normas de reflexividad cuando se trabaja con un grupo demográfico sensible y con grandes necesidades. En concreto, la investigación futura explorará cómo esta herramienta puede ayudar a las personas mayores a sentir que tienen poder, por ejemplo, contribuyendo a enfoques de diseño fron-end. Idealmente, la herramienta descrita en este artículo podría promover la inclusión de las personas mayores y animarlas a participar en la evaluación crítica de los beneficios, retos e inconvenientes de los avances en el diseño (como por ejemplo las tecnologías) para su futuro.

discuss them to lead individuals and society to their highest (innovative) capacities (A4). This is due to the increasing vulnerability caused by technological advancements, which are changing and influencing relationships and interactions related to identity, communities, and socio-cultural contexts in new interconnected ways (A4).

CONCLUSIONS AND FURTHER PERSPECTIVES

The paper and its appendix offer precision in the terminology and practices of reflexivity and the role of a 'reflective practitioner' based on a three-year PhD study. The study explored how child-centred research could lead to an innovative work-in-progress perspective benefitting longevity research. As a result, it introduces Levels of Reflexivity, a dialogue tool for print, as a new method for exploring adult contexts, identifying new approaches to tackle highly diverse elderly sensitivities and needs, and designing research with the highest level of respect and ecological validity. Concretely, the framework allows for greater methodological precision and open dialogue concerning subjectivity and bias, takes specific contexts into account, adopts a holistic perspective, and evaluates the transformative impact of research and design practices. Its major limitation is that the tool has only been tested with pre-schoolers and not with elderly. A follow-up study with elderly participants will explore how this tool can be used to examine the effectiveness, challenges, and limitations of discussing and presenting reflexivity standards when working with a high-needs and sensitive demographic. In particular, future research will explore how this tool can assist elderly individuals to feel a sense of empowerment, for example, by contributing to front-end design approaches. Ideally, the tool described in this paper could promote the inclusion of elderly individuals and encourage them to engage in critically evaluating benefits, challenges, and drawbacks of design developments, such as technologies, for their future.

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ANTONIA ES DOCTORA Y HA INTRODUCIDO UN NUEVO ENFOQUE DE DISEÑO CENTRADO EN EL VALOR, QUE APUNTA A FUTUROS DESARROLLOS DE DISEÑO CENTRADOS EN EL SER HUMANO. TIENE EXPERIENCIA COMO CONSULTORA DE LIDERAZGO EMPRESARIAL. SE HA ESPECIALIZADO EN EL DESARROLLO DE HERRAMIENTAS, PROCESOS Y ACTIVIDADES LÚDICAS PARA MEJORAR LAS EXPERIENCIAS DE LOS USUARIOS Y LOS DISEÑOS TECNOLÓGICOS EN PLANES DE ACCIÓN ESPECÍFICOS QUE AYUDEN A LAS PERSONAS A PROSPERAR O A ALCANZAR OBJETIVOS EMPRESARIALES. ANTONIA TAMBIÉN HA DESARROLLADO HERRAMIENTAS PARA PROMOVER EL CAMBIO A TRAVÉS DE DEBATES SOBRE PRÁCTICAS DE DISEÑO ÉTICO Y, EN SU ROL ACTUAL COMO INVESTIGADORA POSTDOCTORAL, SE ENFOCA EN LA INTEGRACIÓN RESPONSABLE DE IA EN ENTORNOS EDUCATIVOS.

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ANNEX MATERIAL

ANNEX 1 (A1). THEORETICAL UNDERPINNINGS AS MOTIVATION TO EXPLORE PRACTICES OF REFLEXIVITY

This study's amplified attention to embrace and meet sensitivities, diversity and relationships in user-centred research endevours, caused the blurred issues related to the term and practice of reflexivity as a 'reflective practitioner' to surface during grounded explorations and moved the need for specific standards and concrete reflective practices to the centre stage. It has been identified that standards of practice are still lacking in research communities (Zimmerman et al., 2007; Prochner & Godin, 2022). Gillespie (2014) articulates that "unexamined assumptions" are umbrella terms that do not contribute to research communities as he critically notes, "peeking under this umbrella term reveals a heterogeneous assemblage of a scholar seeking shelter, sometimes more unified by trying to avoid the rain, their choice of umbrella." (p. viii). Through the emergence of grounded theoretical insights during the PhD project (Södergren, 2023), it became clear that the term 'reflexivity' might be an umbrella term that required 'a choice of umbrella' if establishing valid standards for user-centered practices. This was particularly important when dealing with highly sensitive pre-schoolers and their diverse needs, while also maintaining ethical and value-related respect. Additionally, it was essential to ensure that appropriate reflexivity was implemented in order to obtain ecological validity evidencing user-experiences. Prochner and Godin (2022) highlight the need for greater focus on practices and external validity standards in research communities. This has led the author to explore the meaning of reflexivity and what it takes to be a reflective practitioner. This phrase is commonly used in existing literature and is sometimes interchangeably referred to as 'reflexivity'. However, it appears to be more dependent on the subjective priorities of each individual researcher, rather than being a clear and consistent standard of practice. Other researchers, such as Gale & Bond (2007), propose that a systematic structural approach can assist a researcher in reflective examination and evaluation, as they remark: "We must be systematic (...) make it reasonable, responsible and replicable (and) think more systematically (...) about what (participants) learn, how they learn, where that learning can be made visible through assessment and articulation" (Gale & Bond, 2007, p. 147–148). Therefore, this paper aims to present a systematic framework for reflective research practices that are 'reasonable, responsible, and replicable'. It seeks to make the process of 'choosing an umbrella' for research visible and discussable by showcasing how the author evaluated and expressed emerging interrelated knowledge about reflexivity.

ANNEX 2 (A2). THEORETICAL UNDERPINNINGS: WELL-BEING AND BRAIN HEALTH FACTORS SUPPORTING LONGEVITY

The field of longevity research is focused on identifying ways to support the processes that promote not only successful ageing (Rowe, & Kahn, 2015) but healthy ageing as well (Engelen et al., 2022). Ageing is not just about enhancing the quality of late-life experiences by improving interactions and relationships but also about taking responsibility for one's own development and success, thereby maintaining self-reliant empowerment as long as possible. Additionally, it encompasses developing and maintaining emotional, physical, and mental health. All these qualities contribute to a balanced state of an individual's well-being, promoting longevity (Danner et al., 2001).

However, in modern societies, technology and machines coexist and can often interfere with human interaction (Latour, 1996), influencing an individual's ability to develop or maintain a balanced state of well-being. It is important to recognise that, unlike machines, humans need time for self-repair and recovery (Mateeff, 1964). For example, proper sleep habits are particularly significant for brain health and can help prevent diseases like Alzheimer's (Walker, 2017). Alzheimer's, dementia, and various forms of cancer are just a few examples of diseases that are costly, time-consuming, and present various challenges to health promotion and future care. Therefore, issues related to the quality of life and longevity are closely related to supporting individuals' health factors, well-being and brain health. Brain health and well-being factors interweave when aiming to 'advance human flourishing' (Friedman & Hendry, 2019, p. 4) at any age since the concepts of well-being and experiencing environmental mastery are interconnected. The insights presented in the above paper emerged from a three-year PhD study (Södergren, 2023) that used a grounded theoretical approach (Charmaz, 2014). Grounded approaches involve collecting rich data by combining in-vivo coding activities with theoretical sampling activities (Charmaz, 2014). The study had specific theoretical underpinnings concerning well-being and brain health that shaped the methodology of the PhD study (Södergren, 2023) and this paper. As the PhD dissertation had a page limit, the main focus was on discussing the concept of well-being, even though it was closely related to being attentive to how co-design practices stimulated expressions of brain health. However, the co-design practices were specifically designed to involve sensitive pre-schoolers with the intention of stimulating both well-being and brain health factors. The ultimate goal of these practices was to facilitate natural, genuine and comfortable engagements in all case study designs. As the following text shows, the importance of well-being and brain health cannot be overstated, as they are interconnected and significant factors for individuals and their flourishing at any age (Fava, 2016). The implementation of reflective practices in the PhD project involving highly sensitive pre-schoolers (Hart, 2018, p. 66) aimed to promote their well-being and brain health. Therefore, the PhD project incorporated the below aspects into its research approach, activities, and design. Details regarding the translation process, application, and project outcomes have been published elsewhere (Södergren, 2023). However, the text below describes the author's efforts to conduct 'theoretical sampling' while designing playthings and co-design environments for pre-schoolers. The author has incorporated these efforts into her reflective practices to ensure the children's well-being and brain health factors were considered. This text presents a brief "noncommittal" literature review (Urquhart and Fernandez, 2016, p. 9) on well-being and brain health, which were used as guiding principles for developing research designs involving sensitive pre-schoolers. The aim of writing this text is to share the author's reflective "thinking experiments" (Frappier et al., 2013) with research communities interested in promoting these factors across all age groups, including those with other sensitivities.

The paper adheres to the positive psychology perspective of defining well-being (Fava, 2016). Here, an individual's well-being (subjective well-being) is referred to through own experience of well-being and also having the possibility to evaluate that experience (Stone & Mackie, 2013). Though measurements to objectivise the value and experience of well-being exist through i.e., surveys or questionnaires, well-being is connected to very subjective and individual experiences inter-reliant upon a particular experience in time (fleeting moments or longitude experience). The well-being of an individual is closely related to the level of autonomy they are granted. This autonomy allows them to experience a sense of control over their environment, shaping the conditions that are most beneficial for their personal growth. The degree of freedom individuals experience in engaging in interactions that they find satisfying is a key factor in these processes (Ryff, 1989; Friedman & Nissenbaum 1996, p. 18; Gewirth, 1978; Hill, 1991). In therapeutic well-being techniques, it is essential to promote psychological states of well-being, such as 'relaxation, contentment, physical well-being and friendliness' (Fava, 2016, p. 19). This enables individuals to experience freedom and growth in their body and mind capacities, which in turn supports their autonomy and gives them a sense of control over their lives. Noteworthy, positive emotions influence the inner motivation to engage in a type of "happiness supports the capacity of creative thinking and construction" (Desmet & Hassenzahl, 2012, p. 8; Fava, 2016), which articulates the benefits of implementing playthings and playful activities in processes to support individual growth, increasing collaborative 'togetherness' and social bonding (Södergren, 2022: ; 2023).

This paper adheres to the definition of brain health as the "optimal capacity to function adaptively in the environment" (Garcia-Garcia et al., 2023; Gorelick et al., 2017). Brain health can be evaluated in terms of 'competencies across the domains of thinking, moving, and feeling' (Gorelick et al., 2017, p. 287). An individual's performance reflects their adaptive skills, coping mechanisms, and attachment levels suited for their environment since arousal and stimulation from surrounding environments trigger the expression of emotional, cognitive, behavioural, and sensory-motor brain functions (Gorelick et al., 2017; Hart, 2018). Here, individuals also express conditions of self-hood and appraisal through social interactions and embodied experiences (Märtsin, 2012; Weinreich & Sauderson, 2013). Empirical evidence shows that good brain health can be maintained through a combination of physical exercise, cognitive training, and active participation in social and productive activities (Garcia-Garcia, et al., 2023). Within these brain-health-supporting-activities, experiences of autonomy and well-being should interrelate to activate an individual's competencies in the domains of "feeling-moving-thinking" to keep the brain flexible and maintain its youthful state (Garcia-Garcia, et al., 2023; Raichlen & Alexander, 2017; Rowe and Kahn, 2015). This suggests that living a long and healthy life depends not just on external factors but also on an individual's own proactive effort to maintain their brain health and overall well-being. Ideally, external factors like infrastructures, interfaces, or other solutions should connect with an individual's lifeworld in a way that motivates them to take care of their own well-being and brain health, thus increasing their chances of living a longer and healthier life. In order to maintain brain health, it is important to prioritise overall well-being, especially in later years of life, to preserve high levels of consciousness and decision-making capacity without experiencing exhaustion (Mateeff, 1964). Research on brain health emphasises the significance of a continuous balancing act between stimulation and rest for all the human body's tissues, organs and systems, by providing appropriate stimuli (Mateeff, 1964). When experiencing balanced states, adequate functional loading, and "positive emotional content" (Danner et al., 2001), the brain can be trained to function with 'emotional flexibility' (Garcia-Garcia et al., 2023) by shifting impulses that activate physical, cognitive and sensory body engagements. These experiences stimulate the brain to determine the magnitude and intensity of recovery processes required, which in turn supports more beneficial recovery processes for our tissues, systems, and organs supporting the "hardening processes of the body" (Mateeff, 1964). Therefore, these challenging experiences of having to balance the amount of stimulation or arousal with adequate rest can help strengthen the body, support skill development or maintenance, and promote longevity.

Design research and practices are specialised in enhancing user experience by addressing the above topics, such as well-being (Petermans & Cain, 2020) exploring mental and physical functions, which encompass researching the domains of thinking, moving and (corporeal) feeling. Besides, they also offer methods to explore how to improve design engagement with the surrounding socio-material relations or stimulate productive activity. By combining these methods in user-centred generative explorations, design research and practices can effectively improve the overall user experience at different levels, as seen through the design research literature. Areas of connection between research communities that focus on longevity and child-involving research are described in A3.

ANNEX 3 (A3). CONNECTION BETWEEN LONGEVITY AND CHILD–INVOLVING RESEARCH COMMUNITIES

The study presented in this paper focuses on the importance of discussing reflexive and thoughtful processes in a clear and open manner. The need for these clarifications stimulating discussions concerning standards and tools for value-related reflective research practices is especially seen in the fact that increased attention on longevity has also led to controversial debates that apply not only to the elderly's vulnerability but also to sensitivities faced by younger individuals and their bodies, behaviours, and environments. These debates are closely related to addressing the variations of human body abilities that demand awareness of the 'ethics of body' (Davis, 2013) when designing processes, activities, designs or environments for sensitive individuals across ages, lifestyles or life situations. The recent social and political changes have drawn more attention to ethical concerns in research communities. For instance, there have been debates about classifying individuals without using the traditional ability/disability mindset (Reynolds, 2018). Some pedagogical approaches suggest using the term 'special rights' (Gandini, 2003) instead to respect an individual's dignity by applying practices and oral terms that support inclusiveness. Additionally, communities that involve children in research or design endeavours are increasingly calling for ethical guidelines to ensure that children are treated with respect and that their needs and benefits are considered (Södergren, 2024).

The research communities that focus on longevity and child-involving research share an interest in exploring and promoting best practices for action plans, activities, processes, or environments that respect the needs and demands of sensitive participant groups. More precisely, they connect in two main ways: Firstly, they aim to design solutions that cater to the needs and demands of humans, ensuring that people across ages, sensitivities, and capabilities can rely on themselves, solve problems, enjoy a sense of autonomy and well-being regardless of their circumstances. Secondly, these communities work to assist designers, researchers, and practitioners in exploring, evaluating, and having critical discussions about developing (technology) designs that incorporate determinants and characteristics that influence human perception and experiences, allowing each person to function at their highest capacity.

The MacArthur model is a well-known framework that outlines three core principles for successful ageing (Rowe & Kahn, 2015). These principles can also demonstrate the link between research communities that focus on longevity and child-involving research. The three core principles are as follows: maintaining a 'low risk of disease and disease related disability; maintenance of high mental and physical function; and continued engagement with life, which includes relations with others and productive activity, either paid or volunteered' (Rowe & Kahn, 2015). The activities described under the second and third core principles also benefit younger age groups. Design research practices, especially in generative fields, can address these activities by exploring nuances (Stappers & Giaccardi, 2017; Sanders & Stappers, 2012). These fields involve designing with and for users through prototyping and co-design processes to inform the development of new (technological) solutions to improve user experiences in an area of interest. This kind of research has the potential to contribute to equipping, maintaining, and supporting mental and physical function, as seen throughout the literature. By combining design research with longevity research, it is possible to explore how to enhance engagement in life, creative and productive activities, and better social relations across age groups.

As a concluding note, in the wake of social-political debates related to pollution, consumer cultures, recycling, and environmental impact, it is essential for these communities to pay attention to the longevity of designs in terms of material-selection, physical durability, and potential impact to transform individuals, social interaction, and the environment, for instance, climate change. Therefore, designers and researchers need to be reflective and thoughtful in their approach to design for advancing longevity. In addition, the potential for self- or social transformation within human relations or interactions through design work, such as through technological devices, highlights the importance of researchers being more aware of their designs and research impact and finding ways to discuss a researcher's ethical and valid practices of reflexivity. This is the primary motivation behind the author's decision to write this paper.

ANNEX 4 (A4). THE AUTHOR'S CENTRAL METHODOLOGICAL BIAS: HUMAN–CENTRED DESIGN RESEARCH AND PRACTISES CAN HELP TO EXPLORE INCREASING VULNERABILITY

Action plans related to longevity require ecologically valid and ethical-sensitive approaches because they have to address appropriately the growing interconnectedness and inter-dependencies worldwide, which intensify 'vulnerability' in society (McMichael, 2012; Luna, 2014), especially among the elderly. The elderly have highly diverse needs, demands, and sensitivities, and vulnerability levels vary worldwide due to differences in resource availability, regulations, and ethical considerations. Therefore, action plans aimed at supporting the well-being, safety, and survival of the elderly or other sensitive groups must take this vulnerability into account without underscoring the significance of '(social) responsibility' (Schinzinger & Martin, 2000) when designing solutions and their potential impact on socio-material relationships or future generations. At the same time, ethical and sensitive approaches are necessary to address the controversial debates surrounding longevity and the 'ethics of the body' (Davis, 2013). Not only are these debates related to the vulnerability of the elderly's embodied interactions, but they also involve the sensitivities faced by younger individuals who require solutions to support their highest capacity. It is, therefore, increasingly important to develop action plans that demonstrate precision in reflexivity and consider the (ethical) implications of approaches, infrastructures, or designs aimed at addressing the vulnerability and supporting the highest capacity of individuals of all ages, bodies, lifestyles, and situations. Researchers need to be mindful of accessing experiences, needs, and demands with an appropriate level of reflexivity and ethical respect for variation. This is especially important when designing for the elderly's agency and empowerment, given their diverse needs and sensitivities (Rivero, 2018). Precise communication is essential to ensure the reliability and validity of a chosen approach and to explain how reflexivity can benefit the designing process for supporting emotional, physical, and brain health factors. These factors promote longevity from an early age and throughout life (Danner et al., 2001).

Design research and practices can help overcome 'vulnerabilities' by producing verbal, visual, written or tangible knowledge through participatory or co-design processes (Sanders & Stappers, 2012), which can be used to develop practical applications for the user's future scenario of use. Through thorough front-end research, design solutions can be developed to address individual or segment challenges, such as compensating for reduced abilities by incorporating technological devices to support health development in a neat manner. Generative design research or "research through design" (Stappers & Giaccardi, 2017) processes contribute with activities, user involvement, and resulting data that have the potential to inform how designs can improve well-being and enhance quality of life. These solutions allow individuals to maintain agency and exert mastery over their environment (Engelen, et al., 2022). The benefit of designs developed based on thorough reflections on user experience is that they can serve as tools that more naturally "extend" the body (Latour, 1996), enhance the self-reliant capabilities of the human body and adapt to reduced skills. It is also possible to create designs that facilitate natural human interactions, thus reducing emotional and physical loneliness by nurturing relationships with surrounding environments, communities, and individuals. Despite these advantages, the author has pointed out the challenges that can arise in maintaining self-reliance, human values and sincerely respecting human vulnerability in the context of advancing technological developments (Södergren, 2024). As intelligence and decision-making support

systems become increasingly intertwined with human behaviour, designing for ethical and value-respecting natural and digital user experiences is becoming more essential.

ANNEX 5 (A5). PRELIMINARY PHASE: GROUNDED ANALYTICAL ATTENTION ON SUBJECTIVE EXPERIENCES EXPRESSING SENSITIVITIES

During the pre-schooler-friendly case studies and generative material explorations, pre-schoolers were free to experience the environment, materials and open-ended design activities in manners they preferred. In addition, they had, throughout the process, the possibility to evaluate their own interactions and experiences according to their own measures- not to a specific adult-led measure. In all case studies the experience of autonomy was identified as benefitting the individual and collective expansion of knowledge, intensifying explorations activities and growth of the sense of community (togetherness) (Södergren, 2023; 2022).). Table 1 contains data from case study III and case study IV. Five children participated in both case studies III and IV during step 01. This allowed the author to compare their sensitive reactions caused by external factors such as adult influence, passive observing, and disengagement with materials or assignments. The table shows the number of incidents that occurred during 39 minutes in case study III and 42 minutes in case study IV. The table provides a detailed record of the exact minutes when a child's performance and focus were identified as disturbed or distracted. It shows the number of times each child was distracted or disturbed during co-designing activities with tools, materials, and engagement techniques in a co-design process setting. The children generally showed a fast pace in their on/off engagements that are difficult to document, but these defined variables of incidents pinpointed the minute-count where their displayed performance was sensitive to influences from socio-material relations and demonstrated sensitive reactions to them.

TABLE 3. Display of the minutes a child's performance and focus were affected by distractions.

CASE STUDY	TIMEFRAME	CHILD 01	CHILD 02	CHILD 03	CHILD 04	CHILD 05
III; step 01	39 min	2	3	6	15	12
IV; step 02	42 min	16	7	18	15	10

During the first iteration of 'Step 01' in case study III, there were not many distractions as the materials and environment were appropriately motivating. In contrast, during the repetition of 'Step 01' in Case Study IV, where a different topic was explored through the exact same process and tasks, it was found that participants displayed more sensitivities, but also deeper concentration and longer engagement. However, the impact of negative influences on performance and concentration lasted for a shorter period compared to case study 01. The frequency of sensitive reactions per minute showed that some individuals are more sensitive when involved in collaborative co-design settings while others show higher sensitivities with specific topics, tasks, or materials. These case study data provided insights into factors influencing each child's self-expression and appraisal dynamics during creative processes that require reflective attention (A6; A7). However, the pre-schooler-friendly environment allowed children to control their activities and determine their level of engagement, which may have facilitated moments of pause and fostered "somaesthetic" interaction experiences (Shusterman, 1999). Despite sensitivities, well-being factors like "relaxation, contentment, physical well-being and friendliness" (Fava, 2016, p. 19) could be identified (Södergren, 2023). Additionally, during the creation of tangible or oral expressions, an increase in self-awareness and cognitive processes indicating creative imagination and development supporting brain health factors were detected in pre-schoolers in all case studies (Södergren, 2023; A2).

The aforementioned sensitive reactions prompted the author's attention to explore ways of enhancing reflective practices when dealing with sensitive participants. This was to minimise any potential disturbances or distractions that may arise and allow their full potential and capacities to shine through, despite these sensitivities. Thus, combining initial grounded data with the ISA theory (Weinreich & Saunderson, 2013) played a crucial role in the author's understanding of sensitive reactions. It provided a comprehensive framework for analysis, shedding light on how subjective experiences and bias manifest in all individuals involved in a research design. The ISA theory was practically applied in the PhD project to observe interactions and body sensory engagements during pre-school activities. This approach provided a more precise analysis of the "here and now of self's expression" (Weinreich & Saunderson, 2013, p. 21) and the impact of social relationships in the surrounding environment. As a result, the author's "in-vivo" coding activities were improved in terms of quality (Charmaz, 2014). The ISA theory helped to understand pre-schoolers" agencies, self-aspirations, and emotional dynamics in the research setting. It also revealed how tools, methods, and environments could support or hinder their needs and sensitivities to develop a self-reliant 'self'. This understanding allowed for adjustments in the research design to support user experiences that promote well-being and brain health, particularly for sensitive pre-schoolers, to express their unique child-led engagements and encounters. For more information on the ISA theory and its practical implementation, please refer to document A6.

Data indicated that pre-schoolers who were sensitive to socio-material influences and were sometimes aware of their sensitivities experienced limitations in expressing themselves fully and performing to their highest capacity, particularly in adult-led activities. Therefore, it was necessary to explore clear and concrete practices of reflexivity to create an environment conducive to supporting sensitive participants' abilities for conversations or tangible expressions deliberately. The objective was to offer a

forum for these participants to express themselves freely, using their unique skills, and perform to the best of their abilities by providing environments, activities, and tools that cater to their sensitivities. It was crucial to avoid constructing a "fictional space" (Dindler, 2010) where environments and tools make users behave not naturally but 'staged', thereby failing to offer insights into real-world scenarios. The author aimed to create a space that allowed for the natural and easy expression of perspectives, creative imagination, and conversations in social settings for pre-schoolers. This was achieved by focusing on reflective practices that were not distant from their current play and social practices. By doing so, the author was able to refine data collection efforts concerning the user experiences in that particular space.

ANNEX 6 (A6). THEORETICAL UNDERPINNINGS FOR INTERACTION ANALYSIS ON EXPRESSIONS OF SELF–HOOD

The theoretical sampling efforts that followed initial in-situ data collection efforts employed the Identity Structure Analysis theory (ISA) (Weinreich & Saunderson, 2013), which offered a theoretical perspective that identified pre-schooler's sensitive reactions and their effect upon their expression with more precision. ISA provided a lens to identify what happened in highly dynamic socio-material relations surrounding sensitive pre-schoolers. It enabled the author to pay attention to what degree pre-schoolers expressed self-attributions, particular moods and behaviour patterns concerning a pre-school confrontation with others, otherness and experienced context (see below).

ISA connects psychology, sociology and social anthropology (Weinreich & Saunderson, 2013, p. 1). More precisely, it is a theory that interrelates the construction of identity, appraisal and cognitive-affect theories with notions from the psychodynamic, developmental field, symbolic interactionism and social constructionism (Weinreich & Saunderson, 2013, p. 20). Knowledge of ISA allowed the author to be attentive to the representation of an individual's selfhood and identity (here, pre-schooler) in social situations with respect to their lived experience. The theory recognises that individuals are influenced by their surroundings. The author identified other, otherness, and experienced context during coding activities as beneficial key points of orientation. Through the 'in-vivo' coding activities (Charmaz, 2014), the author was able to analyse in greater detail how pre-schoolers reacted sensitively to anything outside of themselves. This could include other people, objects that felt different than expected, or surprising environments.

ISA is a theory that pays attention to the role of self-appraisal or the effect of another's appraisal upon the formation of identity constructions (Weinreich & Saunderson, 2013, p. 4) and acknowledges that the manners of how an individual reveals perceptible appraisal concerning context and its meaning reveals something from the identity they carry (Weinreich & Saunderson, 2013, An appraisal is understood as an ongoing effort of an individual in his interpretation and reflective judgement of surrounding social relations; expressed in the following: "The person's appraisal of situations from moment to moment will depend on both one's characteristic self-attributions say, unsure), when cued by a specific context (say, new challenge) or a particular mood state (say, anxious) and the others' actions in that context (say, aggressive)" (Weinreich & Saunderson, 2013, p. 52). Though this paper and the PhD's scope did not allow the full exploration of the 'formation of identity constructions', it benefitted the author's reflective practices to employ the theoretical knowledge concerning pre-schoolers appraisal dynamics in the research design. This theoretical knowledge enabled the author to pay attention to pre-schoolers' assessment of a situation and their expressions of reflective judgement concerning their role in it. Though pre-schoolers were very young, it was still possible to collect knowledge of these aspects, for example, concerning their revealed personality attributes, aspirations and experiences during their (play) discourses. Weinreich and Saunderson (2013), describe that a possible construction of individual self-hood (identity) can be analysed in interaction through paying attention to three conceptualisations of self that each individual expresses as perceivable embodied experience (2013, p. 36-37). Put differently, breaking down the concept of 'self' into three parts can help analyse individual behaviour. The first perspective pays attention to expressions of the 'agentic self' (S1), where relational properties of experiences construct an individual's paradigm and determine his/ her behaviour. The second perspective pays attention to expressions of unique characteristics and attributes of the 'self' (S2), which makes it possible to detect authentic aspects and personality traits in an individual's expressed behaviour. This behaviour reflects the uniqueness of self-concept, history, sensing and reasoning within one's body. The third perspective on individuals' appraisal dynamics allows one to pay attention to how an individual expresses the self (S3) during engagements with other individuals or explorations of 'otherness'. By interacting with materials, objects and other people, individuals can reveal their ambitions and how they believe they are perceived by others in a particular setting. These engagements can indicate how an individual presents themselves to others and how they think they are being interpreted.

Pre-schoolers expressed their sense of self through both language and body-sensorial engagement in all case studies (Södergren, 2023). For example, a child's physical expressions, such as displaying comfort or unease, indicate Table depicts a small section of Case Study IV, Step 02, at minute 47. This small excerpt demonstrates how the ISA theory informed the author' s analytical work and reflective practices.

TABLE 4. Conversation during case study IV, Step 02, at minute 47 and author's notes

TRANSCRIPT	INTERPRETATION – ALIGNED TO ISA METHOD
Child 03: 'Now I make a gift for Child 02's little sister'	Reveals Child 03's memory, expresses empathy.
Child 02: 'For my little sister?' (smiles happy)	Reveals appraisal of that situation through, e.g., facial expression, emotion.
Child 03: ' Yes, she would like to get a gift.'	Reveals S2: own consideration and own attribute of 'care' when engaging with relations. Child 03 also expressed this care and attention to others throughout this entire study as his unique personality attribute in relations.
Child 02: '... But if she destroys it?'	Child 02's question shows that it is based on its previous experience with the sister's performing S3.
Child 03: ' If she destroys it, then I do not want to make it'	Reveals Child 03's S1 chosen paradigm: Child's 03 has boundaries of his agentic self (if she destroys, he will not continue making a gift)
Child 03 to Child 01: 'Are you finished with my gift yet?	Child 03 looks at performing S3 of Child 01, who is expressing his S2 through making the gift. Child 03 reveals his S2 through expressing the personal attributes 'curiosity' and 'desire' to have a Child 01's gift.
Child 01: (smiles back at him) 'I want to do that, but it's not done yet...'	Child 01 expresses in response empathy, while he expresses his S3 by revealing his agentic S1 that has not yet fulfilled what his S" aspires to do.

The insights gained through this process allowed the author to implement specific design considerations into her research, ultimately resulting in positive emotional dynamics and self-reliant self-expressions being supported for the sensitive participants involved. Table 5 illustrates how the author's self-awareness regarding subjective experiences expressing sensitivities (refer to A5) helped to design a case study setting. This enabled the collection and analysis of video and photographic data, which showed that factors related to pre-school development, well-being, and brain health could be identified (A2; Södergren, 2023 see critical note A9).

TABLE 5. Subjective pre-school experiences that were documented and analysed

•	Experiences indicating well-being (physical, relaxation, contentment, friendliness)
•	Experiences of intuitive and play-led enjoyment
•	Free engagements in negotiation and evaluation practices whilst expressing emotions of well-being
•	Autonomy in decision-making regarding materials, activities and levels of engagement
•	Showing mastery in problem-solving and context, both related to the assignment and within social processes, spontaneously using materials or tools and working with others.
•	Interactions that satisfied preschoolers – performed in behaviour or expressed orally during conversation or by body parts, such as facial expressions
•	Free expression of both positive and negative emotions. Having a healthy state of well-being requires both the expression of positive and negative emotions (Nett,2005)

ANNEX 7 (A7). RELATIONS WITH RELEVANCE TO SENSITIVE PARTICIPANTS' ENGAGEMENT IN CREATIVE PROCESSES

The PhD study presented in this paper utilised theoretical sampling techniques to explore five potential relationships surrounding creative processes. This approach led to reflective practices that improved the precision and accuracy of the researcher's analytical work and coding activities. As a result, the research was able to better define quantitative variables to analyse pre-school behavior across all case study designs (see details in Södergren, 2023).

The 5 A's framework 'actor, action, artifact, audience and affordances' (Glăveanu, 2013) supplemented the reflective practices related to the relational elements at work during creative processes. Akin to other established theoretical frameworks that highlight the influential role of relationships on individuals (Latour, 1996 ; Märtsin, 2012 Gibson, 1986; Seligman, 2018), this perspective considers individuals as interconnected through social interactions and dynamics within a given context. It recognises that "mental processes are [...] situated and distributed between brain and body, person and environment" (Glăveanu, 2013, p.70). In other words, our thoughts and actions are not isolated events, but are shaped by the context in which they occur. This framework allowed to study pre-schoolers with respect to their sensitivities but also actors in their own right so their personal attributes were free to determine agency, behaviour and relationships with the surrounding context. Pre-schoolers were understood as "socialised selves" (Glăveanu, 2013, p. 72), shaping and enacting from within their individual embodied experiences of context.

Using the five A's framework, the author identified unique behavioural attributes of each pre-schooler that actively contributed to direct psychological or behavioural manifestations in action. In creative processes and human behaviour, both the inner and outer psychological dimensions come into play and are expressed (Glăveanu, 2013, p. 73). As a result, the author observed that creativity processes produce not only specific oral or cognitive constructions but also tangible artifacts that initiated pre-school 'dynamics of interpretation' (Denzin,1998, p. 322). By constructing a tangible 'making-be', these dynamics revealed indications of pre-school self, creative imagination, and made pre-school ideas tangible (Södergren, 2023). Therefore, the author's reflective

practices revealed that pre-schooler-produced artifacts can encompass a wide range of objects, concepts, and manifestations of performative action. Through observation, it was noted that creativity processes among pre-schoolers were highly interconnected with materials and social relations. The way in which a pre-schooler perceived affordances and experienced an observing audience had an impact on their ability to engage in sensorial expression and create. Also, it was observed that the arrangement of a room and the materials available within it had an effect on how pre-schoolers perceived affordances and interacted with their surroundings. This affected their behaviour, engagement, and activities. By combining the five A's theory with the theory of affordances (Gibson, 1986), the author was able to analyse how materials, features, attributes, and the physical environment influenced pre-schoolers' creative processes. Through these reflective practices, the author was able to obtain precision in coding activities, leading to the results published (Södergren, 2023).

ANNEX 8 (A8). OVERVIEW OF THEORETICAL SAMPLING EFFORTS

TABLE 6. Overview of theoretical sampling

THE AUTHOR'S CONCRETE REFLECTION–IN–ACTION PRACTICES	PRESENTATION OF THEORETICAL SAMPLING EFFORTS INFORMING AUTHOR'S PRACTICES	POTENTIAL FOR RESEARCH PRACTICES (INDICATED BY PHD RESULTS)
1. Attention to potential 'signposts' in interaction	This study clings to the understanding that reflexive practice can offer somehow to research what Heidegger labelled as 'signposts'. In his work Sein und Zeit (1977), Heidegger asks "Wo sind die Wegweiser für die Entwurfsrichtung, damit sie überhaupt das Sein treffe?" ("Where can I find the signposts that indicate the design direction, so that it aligns with what actually can be identified as existing?"; 1977, p. 312). Reflexivity, for the author, then, is understood as a practice to identify points of orientation and direction a particular identified 'void of knowledge'and further investigate a phenomenon of study. Heidegger highlights two guiding principles that helped the author in her reflective practices during interaction analysis. Firstly, the principle of discovering things 'through missing something' ('im Vermissen'; Heidegger, 1977, p. 355). This refers to the experience of missing something that was expected to be present, or suddenly lacking something that is usually apparent in its presence. Secondly, there is the possibility of surprise ("Überraschtwerdens"; Heidegger, 1977, p. 355) where something unexpected appears that does not align with prior expectations or reference frameworks. Attention to these signposts directed the author's attention during grounded analytical work.	These principles are important for reflective practitioners as they provide two practical guidelines to help put reflexivity into practice. These two principles offer clear direction during the process of reflecting on complex socio-material dynamics, making it easier to navigate through reflective discovery. When addressing user needs and navigating complex diversity issues, it is important to pay attention to specific value-related concerns. Signposts help in delving deeper into the context and can draw attention to specific information about sensitivities in socio-material relationships, including materials, designs, groups, and settings, and how they can positively or negatively impact users. These signposts can be used to analyse interactions by identifying specific points of attention that can be coded and analysed in relation to the topic of interest.
2. Various forms of generative design processes	"Reflexive awareness" (Pink, 2013, p. 41) indicates a state of mind, a "reflexive approach" (Pink, 2013, p. 181) suggests it can constitute a procedure and type of activities, and a reflective practitioner (Schön, 1983) indicates a premise of being. These levels accord with the well-known process, activities and mindset practised by designers engaged in practices of reflective judgement. In this paper, the design process is understood as a "problem-solving process" (Cross, 2011, p. 148) that involves reflective discovery through "reflection-in-action" (Schön, 1987, p. 44).	Design processes, particularly the participatory front-end co-design processes, allow both users, researchers and other stakeholders to engage in reflective judgement regarding a specific topic of interest. Generative design processes involve creating a sequence of interactions that are specific to the context, problem, or "scenario of use." This approach encourages a holistic perspective by promoting reflection on materials, activities, tools, settings, and other relevant factors related to the topic and its users or participants. Ultimately, it leads to greater awareness, reflective judgement, and understanding. Reflective judgement is significant to enable a transition between 'what if's of cognitive processes into perceivable approaches with outcomes that are justifiable as indicated by Genova: "Reflective judgement that furnishes an independent principle of transition by pointing to an inherent analogy between theory and practice- an indeterminate 'as if' connection that yet can and must be justifiably thought." (1992, p. 55). This explains the potential of generative (design) research to investigate solutions for considering impact and the future scenarios of use. Generative design practices allow to pay attention to appraisal dynamics in social relations indicating degree of well-being and comfort with individuals, tools, assignments or scaling degrees of positive or negative context-situated experiences. An appraisal is understood as an ongoing effort of an individual in his interpretation and reflective judgement of surrounding social relations (Weinreich & Saunderson, 2003, p. xix). Therefore, attention to appraisal dynamics enables data-based refinements to improve user interaction and experiences. Reflective judgement enables critical self-reflection throughout research related on a researcher's possible paradigm-constructing biases and theoretical inclinations (Schwandt 1997). Here, when conducting generative research, in-vivo coding can improve ecological validity and reflective judgement of needs and sensitivities by a researcher having to write down their clear procedural descriptions of data collection efforts

3. Production of various forms of externalisations, such as visualisations or tangible evidence	Visualisations, prototypes, and other tangible evidence can provide a "reflexive text about the context" (Pink, 2013, p. 177), allowing for reflective practices such as prototyping or drawing. These stimulate "dynamics of interpretation" (Denzin,1998, p. 322) among researchers or users.	Tools for stirring reflexive awareness. Literature shows that production of these is easily and convivially achieved by a broad range of age groups (Sanders & Stappers, 2012) and is beneficial when aimed to include a wide diversity of participants with age-related needs, sensitivities, and diversity. Visualisations and tangible evidence are generative tools that stimulate individual and collaborative reflective awareness Tools can be used as vehicles to gain a deeper understanding of user experience, especially when conducting grounded research related to needs and sensitivities Enable the evaluation and interpretation of the impact that transformations in materials, designs, participants, or settings have.
4. Co-design practices	"Reflexive competencies" support "problem-solving and world-creating" (Strydom, 2011, p. 159), which argues why the activation of reflexive competencies through co-design practices can benefit traditional research as well as design research. Reflexive competencies are context-connected yet enable problem-solving beyond present context by shaping different cognitive routes and transforming perceptible objects to change current reality. Creswell (2014) points out that reflexivity can be identified in problem-solving activities by a verbal conversation that allows for critical reflection and evaluation concerning subjective biases that impact interpretation and interaction practices (Creswell (2014, p. 247).	Stimulate the expression of both the participant's and researcher's reflexive competencies through social and material engagements enabling in-depth analysis of needs and sensitivities Enable reflexivity in terms of full-body sensing, which helps in understanding a user's cognitive abilities and how subjective experiences can transform their current reality. This includes examining the material, objects, situations, activities, and other socio-material relations that shape their experiences.

ANNEX 9 (A9). APPLICATION OF LEVELS OF REFLEXIVITY

As seen in Figure 8, the first level is connected to a researcher's subjectivity and reflections regarding other participants present in the research design that bring subjective perspectives, experiences and values into a research setting. It allowed reflexivity concerning bias found in the researcher's influence of her own biography and possible elements of previous experiences that shaped the author's "frame of reference" (Thisted, 2018, p. 69). At this level, reflexivity was practised through questioning, lending the term from Vygotsky (1978, p. 64), of own 'fossilized' sources of knowledge or preconceptions. This questioning was done to identify the needs and sensitivities of children, determine appropriate social rules to guide methods for supporting interaction processes and assess the appropriateness of techniques for involving children in research approaches. The author became aware of their own 'fossilised' biases regarding child capacities and ways of providing instructive elements or facilitation during research. This first level of awareness helped the author become more precise in their reflection on techniques and settings that either supported or hindered user autonomy, well-being, and self-reliance. Concretely, throughout the project, this level assisted in maintaining reflexivity on three specific value-related issues in a kindergarten setting similar to Figure 10

FIGURE 10. Pre-schoolers exploring materials

Firstly, it enabled the author to focus on sustaining sensitivities, diversity, and individual expression while ensuring that self-determined participation, activities, and material explorations were part of the research design. Secondly, it made the author recognise the unpredictability that can occur due to these sensitive reactions, expressions, or behaviours while refraining from exercising control that could have limited the individual expression of each participant. Thirdly, this level aided the author's 'open-mindedness' in reflective practices to potential dynamical complexities and conflicts that arose during the project because participants were free to experience and express their sensitivities and stewardship during research.

In Figure 8, the second level of reflexivity stimulated a focus on the specific boundaries of time and the inner/outer 'lifeworld' that affect participant behaviour (Södergren, 2023). This allowed for a deeper exploration of context-specific elements that are perceived as context by the author, participants, or bystanders. The theoretical foundations that informed the analytical work at this level of reflexivity are presented in detail in sections A6 and A7.

The third level represents the reflexivity that arises from a "holistic-oriented" perspective (Thisted, 2018, p. 26). This level enabled the author to differentiate between the interconnectivity of the levels illustrated in Figure 8 during analytical coding activities. This helped the author to decide on appropriate research practices that would respect the sensitivities of pre-school participants in a kindergarten setting while collecting valid data for the focus of inquiry. Based on reflective practices at this level, the author decided on the methods and techniques that seemed most appropriate to explore the topic of study. These methods and techniques enabled the author to extract knowledge in respectful manners while obtaining results that show ecological validity.

The fourth level of reflexivity was utilised to determine the extent to which various methods and tools impacted the "dynamics of interpretation" (Denzin,1998, p. 322), and whether this impact was beneficial. This level of awareness helped the researcher identify which materials or methods had the appropriate level of impact. It is worth mentioning that this fourth level was developed through design research practices. It facilitated reflexivity regarding the socio-material relationships and interconnected influences involved in a research design that can lead to changes in interactions, relationships, or motivation to create tangible transformations in a given context, thereby rearranging all present actors (objects, materials, individuals, and space; Glăveanu, 2013; A7).

During data collection, one of the author's observational notes mentioned, "Reflexivity matters, but even more important is its articulation and critical interpretative development in practical applications" (a post-it note that was written in 2021 during the author's PhD observations. [Södergren, 2023]). This understanding was essential for developing Levels of Reflexivity. This tool assisted in simplifying complex and highly diverse user-context experiences by breaking down a specific context (such as a research design) into four levels to cultivate context-situated reflexivity.

As a critical note, employing the above focus areas and practices also required reflexivity in relation to validity. One the one hand, each researcher paradigm has unique characteristics (Kuhn, 2012, p. 168) that influenced the research methodology and design. On the other hand, each researcher's individual "cognitive map" (De Wit and Meyer, 2005, p. 28) creates biases that influence reflexivity practices, making it challenging to establish standards of practice.

Because this study indicates that the author's personal "cognitive map" influenced the research design, further comparative research is necessary, despite adhering to research quality standards, utilising data triangulation, and explicitly detailing all techniques.

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