~ MASTER THESIS ~

EMPOWERING ACTION: A CODESIGNED APPROACH TO CLIMATE EDUCATION FOR ADOLESCENTS

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Signature

Abstract

This thesis explores the development of a codesigned transformative educational initiative, with 13-14 year old 8th grade students, and their main teacher Kasper, at the Danish case study school, Ringsted Ny Friskole. The objective of this initiative is to provoke climate action without inducing climate anxiety. While employing theories such as situational analysis, as well as methods like ethnographic interviewing, situational maps, and codesign at the school, and within the classroom, the project investigates how the students think and feel about environmental sustainability, education, and climate anxiety. This thorough analysis led to the development of an educational board game, 'Guardians of the climate', and testing of the student's engagement with it. When trying out the design solution, findings indicated the effectiveness of dynamic, game-based learning in fostering both knowledge and enthusiasm for climate issues, setting the stage for scalable educational models that responsibly heighten awareness and inspire action amongst adolescents.

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Foreword

This project is a result of a 45 ECTS master thesis in Sustainable Design Engineering.
First and foremost, a big thanks goes to my supervisor Maj-Britt Quitzau for her thorough guidance on this project as well as motivational attitude. Furthermore, great appreciation goes to my university institution Aalborg University Copenhagen for facilitating this academic endeavor. Finally, a big thanks goes to Ringsted Ny Friskole, and their 8th grade as well as teacher Kasper, for taking part in this project as the central case study.

1 Introduction

This chapter delves into the foundational aspects of the project, starting by examining the contemporary issue of climate anxiety. The overarching aim of this project is to develop a codesigned transformative educational initiative that not only educates young adults about (environmental) sustainability and climate change (two terms which will be used alternately where appropriate in this report) but also empowers them to take meaningful action while mitigating the risk of climate anxiety. This is carried out together with an 8th grade in a Danish elementary school. More specifically, the school is called Ringsted Ny Friskole, and by being a free school, students pay a small tuition to study there while the institution then has selected autonomy in terms of curricula. The age group in focus is between 14 and 16 as these years lead up to the age group amongst which studies have found increased climate anxiety (Schmidt, 2023). The 8th grade students taking part in the project are around 14 years, placing them within this age group. By integrating pedagogical approaches and participatory methodologies, this initiative seeks to create a cohesive framework for transformative learning that is both impactful and sustainable.

1.1 Climate Anxiety

Climate change is undeniably one of the most pressing issues of our time, with its far-reaching consequences affecting every corner of the globe. Amidst the discourse surrounding climate change, there is a growing concern about its impact on mental health, particularly amongst the younger generation. Research indicates that climate anxiety, also known as ecoanxiety, is a manifestation of the fear, distress, and helplessness induced by the climate crisis, is increasingly prevalent amongst children and adolescents; According to Schmidt (2023) a global survey published in Lancet Planetary Health in 2021 showed that climate anxiety is especially present between the ages 16 to 25, where 60% classified themselves as ‘very worried’.

Addressing climate anxiety amongst children and adults requires a nuanced understanding of its underlying causes and implications. Beyond its evident ecological consequences, climate change can cause a profound sense of existential uncertainty, particularly amongst younger demographics (Hickman et al., 2021). This dimension of climate anxiety reflects not only concerns about the planet's future but also existential distress stemming from perceived threats to one's identity and sense of belonging in an uncertain world (Whitmarsh et al., 2022). By delving deeper into the existential roots of climate anxiety, educational initiatives can effectively address not only the environmental dimensions of the crisis but also the psychological toll on individuals. Through targeted interventions that validate adolescents' emotions and empower them to navigate existential concerns within a collective framework, such initiatives hold the potential to foster resilience and catalyze meaningful action in the face of climate change (Buchanan, 2021).

Chou et al. (2023), on the topic of climate education to children, argues that collective actions are associated with less anxiety. This emphasizes the importance of recognizing children as part of an interconnected world which could induce a sense of agency and participation. Chou et al. (2023) also argues that adultification should be avoided, which is when adults praise children for acting on climate change, but really are offloading their own responsibility onto to the children who in return feel alone with the assignment. To be avoided as well is

invalidating, diminishing or ignoring the children's climate concerns. Instead, they should be empowered by reminding them of the collective effort. Chou et al. (2023) also argues that to communicate climate change strategies to children, it is crucial to understand each child's subjective experience and to help them manage their climate anxiety. This, as their perception of reality affects their emotions and engagement on the topic. For this reason, narratives on climate change should be multiple and address different realities and perception of climate change.

As we embark on the journey to develop an educational initiative aimed at decreasing or preventing climate anxiety amongst adolescents, it becomes imperative to recognize the broader significance of this endeavor. Climate anxiety not only impacts individual well-being but also reverberates throughout society, shaping attitudes, behaviors, and collective responses to the climate crisis (Hickman, 2020). By addressing climate anxiety within the context of educational interventions, we not only allow individuals to be heard on their environmental concerns but might also get the chance to understand what can invoke climate action and thus increase the focus on these parameters. Moreover, by fostering empathy and understanding towards diverse perspectives on climate change, we can create inclusive spaces that encourage dialogue, collaboration, and collective action (Willow, 2022; Whitmarsh et al., 2022). In essence, the development of an educational initiative to combat climate anxiety represents not just a practical necessity but a moral imperative in shaping a more sustainable and resilient future for generations to come (Buchanan, 2021).

1.1.1 Climate Action

So how might climate anxiety affect climate action? Stoknes & Espen (2014) argue that when climate change is portrayed as an inevitable apocalypse, and as a consequence of human actions, it can lead to fear, guilt, despair, anger and helplessness; cf. climate anxiety. They instead argue that climate change should be portrayed as a challenge that can be overcome, as hope and opportunities generate more engagement.

Furthermore, Hornsey & Fielding (2019) suggests that whether people are climate skeptics or not tells very little about their willingness to adopt environmentally friendly behaviors and thus practices. This assertion challenges the prevailing view that climate anxiety is beneficial for the environment, as it is believed to spur climate-friendly actions (Whitmarsh et al., 2022).

Hornsey & Fielding (2019) furthermore argue that the symbolic messages of environmentalism seem more important to non-skeptics than making actual personal sacrifices. This might be due to the seemingly delay of climate change (especially in the Western world) and thus a feeling of less urgency (Moser, 2010). I.e. the feeling of the importance of climate change, and thus environmentally friendly behaviors, are more abstract and intellectual than emotional, thus what some call 'impact skeptics'; being people who believe in climate change but not that it will have great impact on humans (Hornsey & Fielding, 2019). On how to then induce a sense of urgency without provoking climate anxiety, Hornsey & Fielding (2019), suggest that strategies to translate abstract and intellectual concern into action could be to increase realistic and not exaggerated fear messages to communicate urgency, without draining efficacy. This, as positive messages might just make people ease off on actual action.

1.2 Climate Education

1.2.1 Current Climate Educational Initiatives

Educational institutions, particularly schools and teachers, play a pivotal role in shaping young minds and attitudes towards sustainability (Monroe et al. 2017). However, the current approach to educating children about sustainability often falls short, failing to instill a sense of agency or inspire meaningful action (Hornsey & Fielding, 2019). While it is imperative for children to learn about sustainability and its interconnectedness with their lives, traditional methods often lack the depth and engagement necessary to foster genuine understanding and commitment to change (Kwauk, 2019).

One popular initiative that currently serves as a blueprint for addressing global challenges, are the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 (UN, 2024). The SDGs provide a set of 17 goals, with corresponding target indicators, that address a wide range of sustainability related themes, and these are often used in, or referred to, in educational contexts both to children and adults (EMU, 2024; 2030skoler, 2024).

Furthermore, within the educational institutions in Denmark, being the country of analysis in this report, didactics is a common theory used when curriculums for elementary schools are designed. The Danish Learning Portal EMU (2019) highlights the 15 principals of didactic which presents which themes schools should build upon. These include; practice based learning, community, authenticity, holistic teaching, clear learning objectives, learning strategies, clear structures, differentiating, innovation and product design, inclusive learning environments, language attention, evaluation, clarification and guidance, health and nutrition, and finally, formation of individuals.

Combining the SDGs and didactics, one initiative that since 2019 has existed within the field of sustainability communication is 2030 schools (Danish: ‘2030 skoler’). 2030 schools is a network of Danish educational institutions that have committed to work strategically and ambitiously on integrating the SDGs holistically within the school. Besides calling these particular schools ‘2030 skoler’ they are also referred to as SDG certified schools (2030skoler, 2024). The school to be investigated within this report, Ringsted Ny Friskole, is a certified 2030 school, making it both unique and particularly interesting to the thesis.

Yet, while initiatives like 2030 schools seek to integrate the SDGs into their school curriculums, challenges persist. Strict curricular demands and a lack of resources act as lock-ins, constraining the breadth and depth of climate education and mental well-being (10InsightsClimate, 2022). In Denmark, by 2024, a mere 22 schools have obtained '2030 skoler' certification, indicating potential resource shortages or a lack of engagement with such programs (2030skoler, 2024). Furthermore, the SDGs, though comprehensive, fall short in providing explicit guidance for incorporating mental well-being into sustainability teaching, leaving a gap that needs to be addressed within educational strategies (UN, 2024).

1.2.2 Transformative Education

In contrast to these educational initiatives, there is a growing interest in transformative education, which aims to empower students to critically engage with complex issues and

enact meaningful change in their communities. By adopting a transformative perspective, educators can facilitate immersive learning experiences that challenge existing norms and inspire innovative solutions to pressing environmental issues (Jimenez & Moorhead 2021; Walshe & Sund, 2022).

All this leads to the pondering; could climate change education be taken one step further, and become transformative? Exploring this topic, Jimenez & Moorhead (2021) argue that climate change education should be less about indoctrinating children into accepting certain beliefs and behaviors, and more about allowing the students to think independently and therewith formulate their own actions; so-called transformative education. As such, education should be empowering, and not prescriptive or transmissive - the latter relying on education as being merely an instrument for transferring viewpoints from teachers to students.

Jimenez & Moorhead (2021) furthermore argue that educators should not shy away from talking about climate anxiety or downplay the reality of climate change. Instead, educators must be prepared to navigate within the complexity of climate change, as they recognize that current teaching traditions are restrictive. These being, (1) the tradition of conveying facts and scientific evidence, (2) promoting certain values and lifestyles, and (3) prioritizing students' participation and leadership. Jimenez & Moorhead (2021) focus primarily on the third tradition when promoting transformative education, but argues that class, race and gender needs to be acknowledged as an affecting factor.

Exploring the connection between transformative education and climate anxiety further, Walshe & Sund (2022) state that environment and sustainability education plays a huge role in mitigating climate anxiety. This, through navigating away from merely delivering knowledge to students, and instead through providing holistic perspectives that can later lead to changed attitudes and behaviors. Supporting Jimenez & Moorhead (2021) viewpoints, Walshe & Sund (2022) criticize current educational traditions on the topic of environment and sustainability for being merely about knowledge acquisition. To gather an understanding of contrasting educational formats, they present 1st order learning as unreflective learning processes, 2nd order learning as engaging learners in critically reflecting on their own attitudes, and finally, 3rd order learning as deeply challenging beliefs and values. As such, they argue that current education on environment and sustainability is too often about 1st order learning, and advocates for 2nd and 3rd order learning. Finally, Walshe & Sund (2022) state the importance of avoiding western-centric assumptions when educating on these worldwide problematics, and instead advocates inclusivity and awareness on these topics.

Overall transformative education advocates that knowledge should engage learners in reflections and challenge attitudes and assumptions. This, as well as offer customized educational initiatives within social contexts, allowing new learning to take form from individual knowledge and differing cultural perspectives (Jimenez & Moorhead, 2021; Walshe & Sund, 2022).

1.3 Design-oriented Approach

In this thesis, a design-oriented approach is adopted to address the issue of climate anxiety amongst adolescents aged 14-16, through a transformative educational initiative. Drawing from sustainable design frameworks, this project integrates various methodologies such as

codesign, situational mapping, and ethnography to comprehensively understand and tackle the problem.

Central to this approach is the recognition of the unique context of the chosen case study: an 8th grade class within a free school setting. More specifically this school is placed in a smalltown outside of Ringsted and goes by the name Ringsted Ny Friskole. By immersing in this environment, employing ethnographic observational techniques through engagement with the social settings, as well as involving stakeholders through codesign processes, a nuanced understanding of the dynamics at play is achieved. Codesign, a collaborative approach that involves stakeholders directly in the design process, is central to developing an educational initiative tailored to reduce climate anxiety and encourage proactive behavior amongst students (Scott et al., 2017; Aksela & Tolppanan, 2022). By engaging both teachers and 8th grade students in structured and casual interviews and conversations, this project leverages diverse perspectives to ensure the design solution is both relevant and impactful. This inclusive method fosters a sense of ownership and relevance, crucial for motivating young individuals to engage with, and advocate for, climate-related issues (Scott et al., 2017; Aksela & Tolppanan, 2022). In addition, situational mapping, which is a method to understand social settings and interactions, will be used as a tool to examine the socio-cultural elements and environmental factors influencing climate anxiety, education as well as sustainability communication amongst the 8th grade adolescents (Clarke, 2003). This method aids in identifying key leverage points for intervention and designing an educational initiative that resonates with the specific needs and aspirations of the stakeholders involved.

Overall, this design-oriented approach emphasizes participatory methodologies, ensuring that the voices and perspectives of adolescents are central to the process. By fostering ownership and agency amongst the target audience, the initiative aims to prompt meaningful action and foster a sense of empowerment in addressing climate change. In addition, the design-oriented approach adopted in this project underscores the importance of holistic, contextually embedded strategies when tackling complex socio-environmental challenges such as climate anxiety. As such, the project seeks to catalyze transformative change at the intersection of sustainability, education, and design.

1.4 Problem Statement

The central research question guiding this project is: How can a codesigned transformative educational initiative contribute to provoking action for children aged 14 to 16, while avoiding provoking climate anxiety? Through transformative pedagogy, participatory design processes, and practical implementation strategies, this study aims to reveal the potential of transformative education as a catalyst for positive change in the face of a climate crisis and corresponding climate anxiety.

2 Theory

2.1 Codesign

Relevant to engaging in a collective, yet somewhat controlled, design process, is the concept of codesign. This design approach is also called participatory design or cocreation (however, some argue that the terms vary slightly). Codesign is a design approach that invites consumers into the design process of a product or service, to allow for increased innovation and usability of the end product or service (Burkett, 2012). The consumers are involved as active participants in the process by allowing them to offer ideas, thoughts and reflections (Scott et al., 2017). These actors can be all from producers, manufactures or end-users of the product or service to be designed. In this project, the main actors encompass students and a teacher at the case study school. However, since the educational initiative targets the adolescent students, they will take center stage during codesign workshops. This, to allow for an understanding and empathy of their unique perspectives onto the world. Nevertheless, input from the primary teacher will be sought to guarantee that the solution aligns with their insights and addresses relevant concerns.

Codesign also sheds lights on the importance of collaboration, collective decision making, and to recognize that each actor holds unique know-how and perhaps even expertise, as well as experiences (Steen et al., 2011). The latter correlates well with situational analysis where actors are mapped out to create an overview of their unique roles and interplays (as will be dived into in the following chapter, as well as in the methods chapter). As such, the codesign approach aims to be democratic as well as inclusive, and thus stands as a contrast to traditional top-down decision making by authorities or experts (Scott et al., 2017). By codesigning initiatives that reflect student's needs, interests, and preferences, the adolescents become invested in the research process and are more likely to support the implementation of resulting interventions or innovations (Sanders & Stappers, 2008, 2014). The codesign approach offers a dynamic and participatory framework for developing an educational initiative that resonate with the perspectives and experiences of the students at the case study school. By harnessing their creativity and insights, this study aims to design a meaningful and impactful educational outcomes that empower students and enhance their learning experiences.

Another advantage by involving these stakeholders through codesign, is that it allows them to increase their incentives to use the final product as well as offers them a feeling of ownership or emotional attachment to the product (Burkett, 2012). An overview of general advantages of using codesign can be seen on figure 1 below, both from a business perspective as well as from a societal perspective.

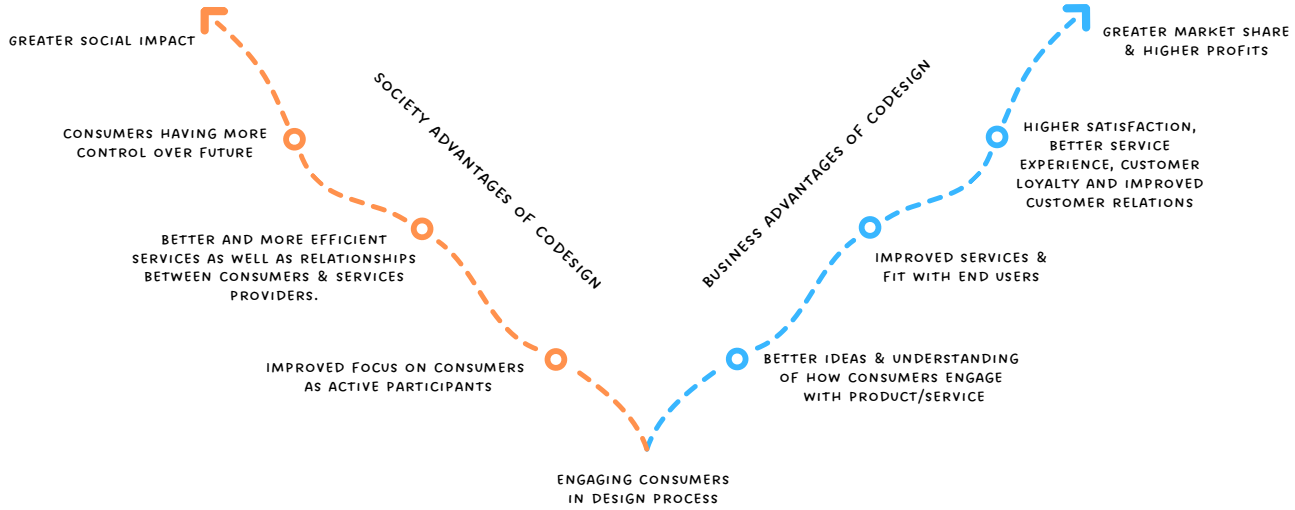


Figure 1: Advantages of codesign, original illustration, inspired by Burkett (2012).

In the context of developing a transformative educational initiative, the principles of codesign offer compelling benefits directly aligned with the project's objective. By actively engaging students in the codesign process, a platform is cultivated where their unique insights, concerns, and aspirations directly influence the educational content and approaches. This, to hopefully prevent or increase the occurrence of climate anxiety while simultaneously inducing climate action.

This participatory approach not only democratizes the development process of the educational initiative, making it more inclusive and reflective of the diverse student perspectives, but also fosters a deeper sense of connection and ownership amongst the participants towards the initiative (Burkett, 2012; Steen et al., 2011). As such, the involvement of students as co-designers might potentially serve as a catalyst for enhancing their motivation to engage with the end design, thereby increasing its efficacy in addressing climate anxiety. The method underscores the significance of harnessing collective intelligence in crafting solutions that are both innovative and deeply resonant with the target audience. Figure 2 below illustrates the link between student engagement in the design process and the potential reduction of climate anxiety and increase in climate action.

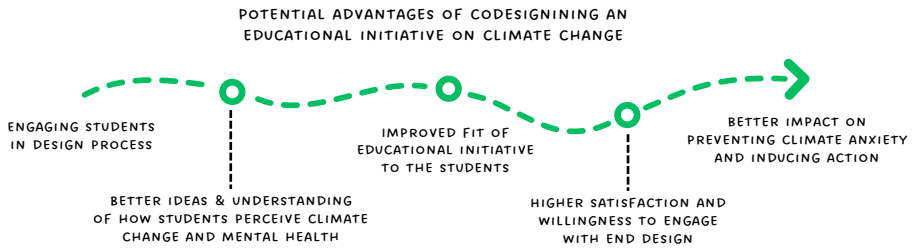


Figure 2: Potential advantages of codesign relating to the problem statement, original illustration, inspired by Burkett (2012)

Codesign, as a method, can be used within various settings, and both for tangible and intangible designs, by drawing upon both physical and virtual components. With this method, boundary objects can be included to enhance the collaboration environment. These

could be visual such as design games that constitute an interactive activity that can facilitate playfulness, creativity, and idea generation (Scott et al., 2017; Steen et al., 2011). In this project, codesign has allowed for a platform to introduce questionnaires on worksheets as well as boardgames in the classroom to perceive, and study, how these yielded unique reflections and discussions amongst the students. How codesign, more specifically, can be used methodologically will be covered in the methods chapter.

Design games - as will constitute the final design of the educational initiative within this report (cf. the analysis chapter, section 4.6) - serve great advantages for codesign processes by providing a practical yet interactive tool to facilitate creative thinking, idea generation as well as collaboration amongst involved actors. This, by being simultaneously structured as well as flexible within an environment with low risks (Vaajakallio & Mattelmäki, 2014). This structure provides an essential baseline that guides the codesign process and ensures that the project objective is being considered continuously. Furthermore, while design games can offer mindsets of playfulness and openness, challenging conventional design methods, the corresponding and essential structure within design games offers a crucial outlining of phases, rules, and goals to be considered (Vaajakallio & Mattelmäki, 2014).

In conclusion, codesign is all about allowing diverse actors to participate and collaborate in a design process through recognizing and empowering their respective competences. This, as well as embracing an iterative process to allow for continuous evaluation. The approach promotes user-centric perspectives by involving end-users, as well as enhances inclusive innovation for effective solutions (Scott et al., 2017; Steen et al., 2011). Ultimately, codesign poses various advantages when designing a product or service, and especially regarding the complex topic of sustainability and climate change, involving the end users into the design process might be especially advantageous when seeking social impact (cf. figure 1 and 2).

2.2 Theoretical Foundations of Situational Analysis

Situational analysis, a qualitative research method within the social sciences, offers a comprehensive approach to exploring and understanding complex social phenomena within their natural context or setting. Situational analysis, as conceptualized by Adele E. Clarke (2003), emphasizes the importance of examining situations holistically and understanding the dynamic interplays between social elements. This is especially relevant when working with a school where so many actors and elements coexist within a large network. These complex worlds often require a holistic angle to ensure all elements are acknowledged, and their unique interactions are uncovered. At its core, situational analysis seeks to uncover the complexity of social phenomena by considering historical, cultural, and contextual factors that shape the situation being studied (Clarke, 2003).

Situational analysis, as a qualitative research method, represents an interesting theoretical basis for providing insight into how education is performed in the case study school. Exploring the school's contexts through situational analysis allows us to grasp the intricacies of its educational landscape, including student dynamics, teacher practices, and institutional policies. This understanding serves as a crucial foundation for the codesign process, when

seeking to design a tailored strategy to effectively address climate anxiety and promote sustainable practices.

Central to Clarke's (2003) approach to situational analysis is the idea of flexibility and iteration in the research process. Clarke (2003) advocates for an adaptive methodology that allows researchers to respond to emerging insights and unexpected findings as they unfold (Clarke, 2003). This iterative approach enables researchers to explore the nuances of the situation in-depth and to capture its dynamic nature over time. When collaborating within a school environment, where trust and social connections naturally flourish over time, embracing this approach proves invaluable for maximizing project outcomes and crafting impactful educational initiatives. This contrasts with rigidly adhering to initial assumptions, allowing for flexibility and adaptation as relationships evolve and insights emerge throughout the project journey.

Another key aspect of Clarke's (2003) theoretical framework is the emphasis on reflexivity and subjectivity in the research process. Situational analysis acknowledges the researcher's role as an active participant in shaping the research outcomes and recognizes the importance of reflexivity in understanding how the researcher's own perspectives and biases influence the interpretation of data (Clarke, 2003). This relates well to the ethnographic method, as will be presented in the methods chapter, which likewise acknowledges the researcher as an active participant in the field as opposed to an objective observer (Naidoo, 2012). An important angle to keep in mind for this particular project, where I will engage with the school environment.

Situational analysis also highlights the importance of intersectionality and contextual sensitivity in examining social phenomena. Clarke (2003) argues that social situations are characterized by intersecting systems of power and privilege, and researchers must consider the multiple dimensions of identity and experience that shape individuals' lived realities (Clarke, 2003). Later, Clarke (2021) has emphasized on the importance of nonhuman actors, which can constitute both material things and intangible things such as discourses as well as cultural elements. She furthermore acknowledges the relevance of collective power relations and boundary objects using social world/ arena maps and perspectives and argues that by addressing potential marginalization, the situational analysis is more democratized (Clarke, 2021). Clarke’s (2003) ideas on how to methodically carry out situational analysis via situational maps, which will be presented in the methods chapter, serve as a great inspiration when the school’s social contexts are investigated and later illustrated. In the empirical work of this project, these ideas support the emphasis on the importance of understanding the contextual side of the case study while involving knowhow, using the school and it’s teaching as situational starting points. As an example, the mapping of the school’s social contexts will be divided into several sub-categories to depict how these complex social worlds are interconnected. This will then serve as an essential cornerstone in the codesign process, to hopefully be able to design an educational initiative, that not only mitigates climate anxiety and induces action, but that also considers, and is customized to, the unique social phenomena within the school environment.

3 Methods

This chapter describes the methods employed to conduct the analysis within this thesis project. As depicted on figure 3 below, the project analysis followed a sequential model while exploring the three themes; (1) education, (2) sustainability, and (2) climate anxiety, beginning with a broad exploration to orient within the field of education and didactics. It then gradually narrows its focus to the school setting, followed by a specific examination of the 8th grade classroom dynamics and learning environment. Ultimately, the aim was to address the challenge of effectively conveying sustainability and climate change concepts to the students.

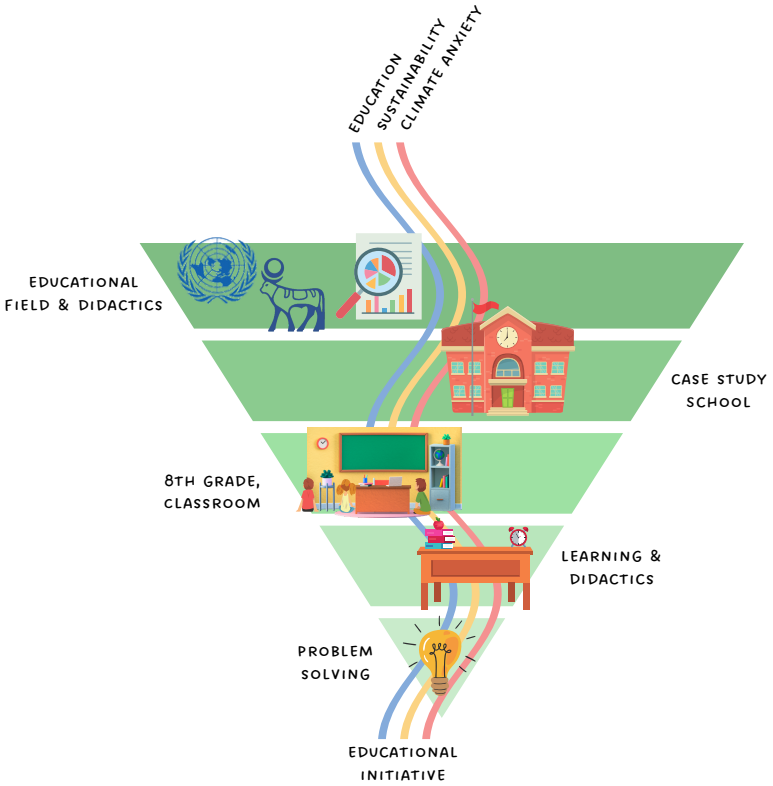


Figure 3: Tract model illustrating the narrowing down of thematics to be examined in the project analysis.

Using the depicted themes and settings as the cornerstone(s), a visual roadmap can be seen on figure 4 below, illustrating the project's analysis process as it progressed, from inception to conclusion. The starting phase of this journey included two significant conferences: one hosted by Novo Nordisk on the theme of design thinking on September 7th, 2023, and another one at the United Nations (UN) on the theme of sustainability communication to children and adolescents on September 28th, 2023, both of which provided invaluable insights and perspectives.

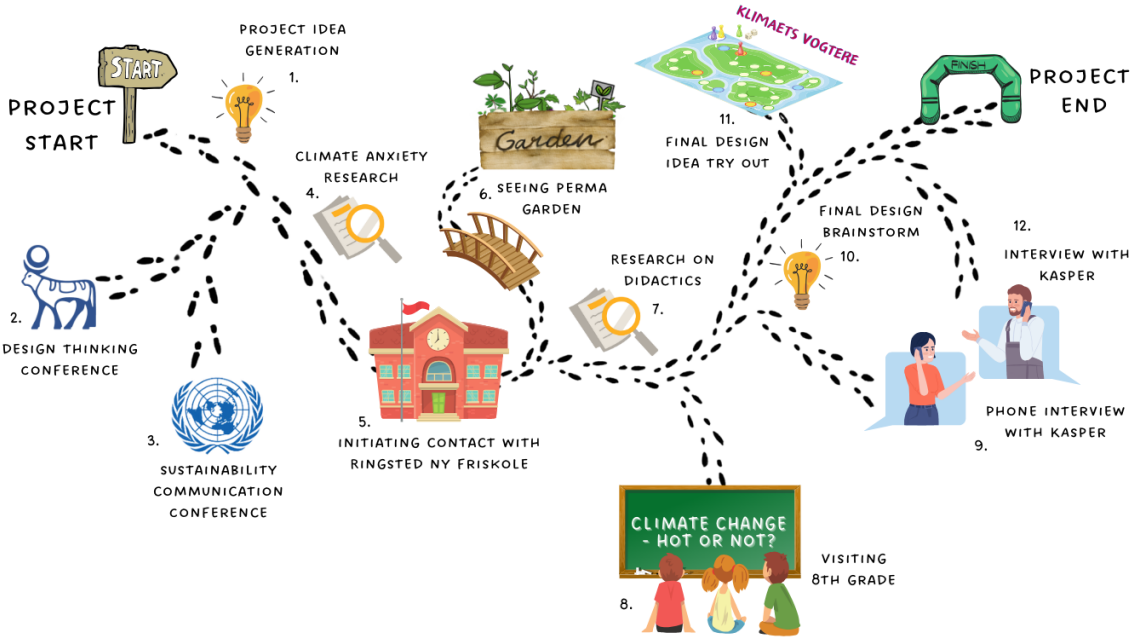


Figure 4: Road map of project from inception to conclusion.

Following this initial phase of orienting within the field of sustainability education and simultaneously formulating a focused research question, attention turned to Ringsted Ny Friskole as the case study (a contact to which was gained at the UN conference). A multifaceted approach was employed (see figure 5), utilizing ethnographic observations, situational analysis, codesign workshops, and interviews with both the teacher, Kasper, and the students (the latter being more casual following Tracy's (2012) ideas).

ANALYSIS PHASES

METHODS	INITIAL PHASE	VISIT 1	WORKSHOP 1	TEACHER INTERVIEW 1	WORKSHOP 2	WORKSHOP 3	TEACHER INTERVIEW 2
CHOOSING A CASE STUDY	X						
ENGAGING IN FIELD (& BUILDING TRUST)	X	X	X	X	X	X	X
INTERVIEW				X			X
ETHNOGRAPHIC OBSERVATIONS	X	X	X		X		
SITUATIONAL ANALYSIS		X	X				
CODESIGN			X		X	X	
DESIGN GAMES						X	

Figure 5: Overview of methods applied in the different analysis phases within the project.

Each method has been carefully chosen to fulfill the needs of each analysis phase, and each offers unique strengths and perspectives to delve deeply into the complex interplay of sustainability communication, education and climate anxiety. This comprehensive exploration allowed for a deep understanding of the contexts and dynamics at play within the school environment as well as for creating a trusting atmosphere. Ultimately, a design solution, tailored to address the identified needs and challenges, was created (cf. figure 4). Importantly, this solution ultimately underwent testing and refinement in collaboration with the students, ensuring its relevance and effectiveness in real-world application.

3.1 Choosing a Case Study

Case studies are a cornerstone of social science research, offering an immersive exploration of specific phenomena within their natural context. In this study, a single case school was selected for analysis, emphasizing the depth of insight that can be gained from a focused investigation. Despite debates advocating for multiple cases, the richness of detail and contextual understanding obtained through an in-depth exploration of a single case can often outweigh the benefits of a broader, multi-case approach (Flyvbjerg, 2006). By immersing deeply within the intricacies of the chosen case, nuanced patterns, relationships, and underlying mechanisms can be uncovered that may not be readily apparent in a comparative analysis (Yin, 2009). Thus, the deliberate choice to focus on one single school for the analysis within this project prioritizes depth over breadth, enabling a thorough exploration of the complexities of the social phenomena under investigation.

Moreover, the selection of this single case study allows for a holistic examination of the unique context and dynamics within the school environment. By immersing oneself in the day-to-day experiences of the school community, including interactions amongst students and teachers, a deeper understanding of the social, cultural, and organizational factors influencing educational practices can be achieved (Flyvbjerg, 2006). This intimate engagement with the case study school facilitates the identification of subtle nuances and contextual factors that shape learning environments and educational outcomes (Flyvbjerg, 2006; Yin, 2009).

Additionally, the single case approach offers practical advantages in terms of resource allocation, time management, and logistical feasibility. Conducting an in-depth analysis of a single case allows for the comprehensive collection of data and the exploration of complex issues without spreading resources too thinly across multiple cases. This focused approach enables researchers to delve deeply into specific research questions, hypotheses, or themes, maximizing the depth and richness of the findings. Thus, while acknowledging the limitations inherent in studying a single case, the decision to adopt this methodological approach is guided by a commitment to consistency, depth, and relevance in exploring the complexities of the educational landscape (Flyvbjerg, 2006).

3.1.1 Ringsted Ny Friskole

Attending the United Nations conference, KATAPULT, on sustainability communication on September 28th, 2023, provided a valuable opportunity for networking, where I reconnected with representatives, Heidi and Helle, from Ringsted Ny Friskole. As an alumnus, my existing relationships with the faculty afforded me a strategic advantage in proposing the school as a case study for my project i.e. information-oriented selection (Flyvbjerg, 2006). Furthermore, given Ringsted Ny Friskole's designation as a 2030 school, with a curriculum deeply embedded in sustainability, it was a natural assumption that the analysis provided by my project would align with and be given due consideration within their educational agenda and therefore be highly relevant for this project. Additionally, and unique to Ringsted Ny Friskole, is that the school is a 'Friskole,' meaning that it is not bound by the standard curriculum, which provides the school with the freedom to innovate.

As such, following the methods presented on choosing a case study, Ringsted Ny Friskole was chosen as the case study school for the analysis of this project. This choice, whilst not random or objective, shows great potential for in-depth investigation. This approach was

informed by Flyvbjerg's (2006) advocacy for information-oriented selection, providing a robust alternative to random selection. Flyvbjerg (2006) contends that choosing a case from which maximum learning is anticipated, and where substantial information is available, is not only valid but can yield particularly insightful results. The choice furthermore aligns with Flyvbjerg's (2006) ideas on the importance of in-depth investigation of a single case to gain a deeper understanding of the subject, rather than superficial investigation of various cases.

3.2 Engaging in a Social Sciences Field

Engagement with the field is a crucial aspect of academic research, particularly within social sciences, as it provides researchers with invaluable insights, context, and understanding that cannot be gleaned solely from academic literature or theoretical frameworks. Instead, it allows researchers to immerse themselves in the real-world context of their research topic, gaining firsthand experience and insights into the complexities and nuances of the subject matter. As emphasized by Silverman & Marvasti (2008), immersion in the field enables researchers to develop a deeper understanding of social phenomena and to ask more meaningful research questions. By directly observing and interacting with the people, settings, and dynamics relevant to their research, researchers can uncover subtle nuances, cultural complexities, and contextual factors that may not be apparent from a distance.

Field engagement also fosters opportunities for knowledge exchange, collaboration, and interdisciplinary learning. By attending conferences, as done in the initial phase of the analysis in this project, networking with peers, and participating in fieldwork, researchers can share ideas, perspectives, and experiences with colleagues from diverse backgrounds and disciplines. The interdisciplinary dialogue achieved when attending these conferences, not only enriches the research process but also contributes to the advancement of knowledge and innovation in the field. As noted by various scholars, including Sawyer (2007), engaging with the academic community and collaborating with colleagues enhances the rigor and impact of research, fostering a culture of collaboration and intellectual exchange. These ideas were the main incentives when attending the conferences at Novo Nordisk and United Nations, leading up to the investigation of the case study school.

In the pursuit of crafting a thesis on codesigning a transformative educational initiative to address climate anxiety and induce action, field engagement translates both into participating in events and engaging in a broader educational field, as well as the more direct partnership with the 8th graders at Ringsted Ny Friskole. Here, the student's perspectives are not merely supplementary; they are central to the authenticity of the research. As these young minds navigate their understanding of climate change, their insights bring a relevance that theoretical analysis alone cannot provide. Their active involvement in shaping the educational content, ensures that the program resonates on a personal level, increasing the likelihood of genuine engagement and action.

3.2.1 Building Relationships & Trust

Field engagement can facilitate the establishment of trust and meaningful relationships with research participants, which are essential for conducting ethical and rigorous research. As highlighted by Seale et al. (2004), building rapport and trust with participants is crucial for extracting honest and insightful responses, ensuring the validity and reliability of research findings. By investing time and effort in building relationships with participants, researchers

demonstrate respect for their perspectives, enhance the quality of data collected, and contribute to the ethical conduct of research.

This was exactly the intent when gathering the 8th grade for the first visit, and initial workshop, as well as to get to know them and their attitudes towards sustainability to prepare for codesign workshops 2 and 3. And when codesigning a transformative educational initiative aimed at reducing climate anxiety and fostering proactive engagement in 8th graders, trust between the students and researcher is critical as trust enables a space for students to comfortably share their authentic thoughts on climate change, a topic that can deeply affect young people emotionally. Facilitating a trusting environment encourages students to voice their feelings and thoughts about climate change candidly, free from judgment (Bengtsson & Höhle, 2023). Such openness is crucial in creating an initiative that educates, resonates with students, and inspires action, while also addressing climate anxiety.

The allocated 45 ECTS to this thesis, exceeding the norm of 30 ECTS, acknowledges the delicate nature of climate anxiety and the essential task of establishing trust with the participants. Addressing this sensitive issue goes beyond typical academic demands, requiring a compassionate codesign approach that deeply engages with the students' emotional and intellectual landscapes. The increased credit allocation reflects the depth of commitment necessary to build this rapport and to iteratively develop, test, and adapt educational strategies based on participant feedback - key actions for driving significant change.

This commitment not only fulfills educational goals but also aims to nurture environmental stewardship amongst the students. While collaborating closely with them, the project equips students to be informed and active in their response to climate change. This progressive strategy highlights the project's wider significance, emphasizing the practical application of engineering principles in crafting educational innovation. The 45 ECTS points recognize the project's intricacy, workload, and the pivotal role of trust in cultivating a generation of environmentally aware citizens poised to meet the challenges of climate change without feeling excessively fearful nor distressed.

3.2.2 First Visit & Observations of Case Study School

The case study school, Ringsted Ny Friskole, was first visited on December 1st, 2023. This visit was just before the first workshop, details of which are discussed in the following codesign subchapter. The primary objective of this initial engagement was to integrate softly into the school environment, fostering relationships and building trust.

During this visit, I had the opportunity to observe a typical geography class with the 8th graders, taught by their main teacher, Kasper. This session provided valuable insights into the students' interaction within their natural learning environment. Kasper guided me through the school's distinctive features, including the permagarden - a project he manages and facilitates. This exploration not only highlighted the unique educational setting of Ringsted Ny Friskole, but also allowed me to gauge the social dynamics within the school.

Understanding these interactions and the school's atmosphere was instrumental in shaping my approach to the subsequent workshops. This alignment ensures that the codesign activities are

relevant and effective, aiming to reduce climate anxiety and inspire proactive engagement amongst the students.

3.3 Situational Mapping

In contrast to the theory chapter on situational analysis, this chapter shifts the focus to the practical application of situational analysis. Situational analysis includes four strategies for mapping; situational maps, relational maps, social worlds/arenas maps, and positional maps (Clarke, 2021). To construct these map, a range of data can be used including interviews or ethnographic observations. The maps might be useful even at early project stages and can be revised and redone throughout the project (Clarke, 2021).

This chapter, and project, has a specific emphasis on the visual tool known as situational maps, which originate from Clarke's (2003) work and serve as visual representations of complex social phenomena, allowing researchers to identify patterns and relationships within social contexts (Clark, 2003). In addition, messy maps, also referred to as abstract situational maps, can be used as a visual representations of all actants prior to investigating the interrelations and relevant actants as used in situational maps. I.e. these messy maps represent a simplification of the more complex situational maps in terms of relations, however, encompasses the entirety of actants, which might later be excluded due to lack of relevance. As such, messy maps might be constructed as a baseline, before developing it further into a situational map. Both of these types of maps begin with the inclusion elements such as human and nonhuman actors, materials, and symbolic elements, and enable researchers to gain insights into the dynamics of the situation through relational analysis (Clarke, 2003). An example of a situational map, inspired by Clarke (2003), can be seen on figure 6.

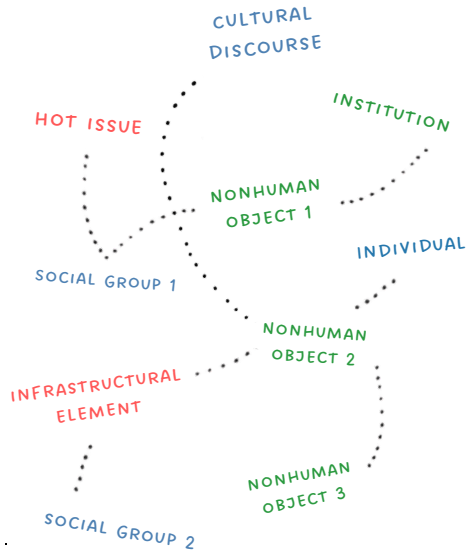


Figure 6: Situational map, original drawing, inspired by Adele E. Clarke (2003)

However, while situational maps aim to provide an overview of a social setting, it is important to acknowledge that they cannot capture every element within the situation. For that particular reason, the related messy maps strive for inclusivity by including elements at an early stage, that might be deemed less important later - ideal for an iterative analysis of the field (Clarke, 2003). As such, both messy maps and situational maps serve as valuable tools

for researchers, offering a visual reference point throughout the research project and allowing for flexibility and adaptation as the research progresses (Clarke, 2003).

Within the scope of this report, messy maps have acted as an intermediate calculus, and later been transformed to situational maps, by analyzing relevance and existing relations. This visual tool will serve as a cornerstone within the analysis of the first visit to the case study school as well as within codesign workshop 1. In this, situational maps will assist in constructing a comprehensive overview of the elements influencing the intersecting realms of sustainability, education, and climate anxiety at Ringsted Ny Friskole. By defining the various sub-elements and exploring their potential interrelations, this method enabled a deeper understanding of the landscape within which the educational initiative would eventually operate. This thorough mapping served as a foundational step when evaluating data from the workshops as well as when developing a strategy that not only educates but also empowers students to engage actively with environmental challenges while safeguarding their mental well-being.

3.4 Interview

In qualitative research, interviews serve as a fundamental method for collecting rich, in-depth data that can illuminate participants' perspectives, experiences, and insights. Tracy (2012) for example argues that interviews should be conducted in a manner that fosters open dialogue and therewith generates meaningful data. Tracy (2012) emphasizes that interviews are not merely structured question-and-answer sessions; rather, they are opportunities for researchers to engage in natural, conversational interactions with participants. This relates to the earlier touched upon importance of building trust with participants, creating an environment conducive to open sharing. This approach encourages participants to express themselves freely and provides researchers with access to nuanced insights that may not emerge in more formal settings.

In the context of this project and given the age and developmental stage of the participants, informal interviews helped cultivate a comfortable and relaxed atmosphere, enabling students to express their thoughts, concerns, and ideas authentically. These conversations and interactions occurred organically during codesign sessions, allowing for flexibility in timing and content, while still yielding valuable data for the project.

Conversely, with the main teacher of the 8th grade involved in implementing the educational initiative, a somewhat structured approach to interviewing was warranted. Structured interviews through prepared interview questions can provide a framework for exploring specific aspects of the teacher's role, perspectives on climate anxiety, and insights into pedagogical strategies, while still pursuing tangents and random topic that might appear during the interview. By employing a balance of casual and structured interviews, the research can capture diverse viewpoints and deepen understanding of the dynamics at play within the educational context (Yin, 2009).

Overall, adopting Tracy's approach to interviewing, while still following some structure where necessary as argued by Yin (2009), aligns with the ethos of qualitative research, emphasizing the importance of authenticity and reflexivity in the research process. By engaging in natural conversations with students and employing a more structured approach with the teacher, the research aims to gather comprehensive insights that can inform the

development of a transformative educational intervention to address climate anxiety and foster action amongst the age group of the 8th grade students.

3.4.1 Interview 1: With Teacher

The first interview with the main teacher of the 8th grade, Kasper, took place on December 13th, 2023. This was in between codesign workshop 1 and 2, so that workshop 1 could support in some of the topics that I investigated via the questions as well as to provide a common ground for casual conversation. The interview was a planned telephone interview, with no specific time limit, though I had told Kasper that it would probably take around 30 minutes to make it less overwhelming. Topics that I intended to explore during the interview were, among other, how Kasper prepares his classes e.g., on heavier topics such as climate change, how he creates enthusiasm within the classroom, the relevance of didactics, as well as how being a 2030 school affects his teaching. A specific interview guide can be found in appendix 1a.

The questions were not asked chronologically, and tangents were explored as subtopics appeared organically during the conversation. This, to allow for a casual interview experience, that was comfortable, which in turn lead to better and more accurate information. Prior to the interview, I had asked Kasper for his permission to record the interview. I furthermore wrote notes down during the interview, to remember key topics. Later, the interview was transcribed, to allow for a systematic in-depth analysis.

3.4.2 Interview 2: Casual Interview with Teacher

This second interview with the main teacher, Kasper, took place on March 8th, 2024. This was just after codesign workshop 3, to allow for direct feedback on the design solution tested within the classroom. The interview was casual exploring his overall impression of the educational initiative. A specific interview guide on these thematics can be found in appendix 1b.

As with interview 1, tangents were explored during the conversation, as subtopics organically appeared. At the stage of this interview, deeper relations had furthermore been built, which caused an increase in comfort and trust and made the interview experience casual and joyful. Again, Kasper had given his permission for me to record the conversation to allow for me to later transcribe it and analyze it systematically.

3.5 Ethnography

Ethnography was used as part of the methodology for analyzing the classroom settings during the initial phase of the analysis when engaging with the academic field, as well as during the first school visit and codesign workshop 1 and 2 on December 1st and 15th, 2023, respectively (see figure 5), is ethnography. Ethnography involves active engagement with, and influence on, the subjects under study, allowing for a deeper understanding of complex phenomena such as classroom dynamics. More specifically, the principles of ethnography, as defined by Naidoo (2012), will be used as a reference. The observations were written down shortly after each visit, to allow for maximum memory.

Naidoo (2012) emphasizes that ethnography should seek to understand social phenomena within their broader contexts (cultural, social and/or historical) as well as how ethnographic research implies immersing oneself into the social setting being investigated. This will be a central angle in this project, as the social settings of the school is being examined by engaging directly with the environment.

Furthermore, Naidoo (2012) states that long-term engagement is crucial, as this will yield more deeper understandings of the social setting. The extended duration of this 45 ECTS master thesis not only facilitates comprehensive exploration but also reinforces its distinction from standard projects, as it allows for more extensive data collection, analysis, and reflection over a longer time period.

Naidoo's (2012) ethnographic principles, furthermore, advocates for approaching different cultures with an open mind and without judgement (i.e. avoiding ethnocentrism). According to Naidoo (2012), reflexivity should also be central when carrying out ethnographic analysis; e.g. in terms of the researchers own biases, assumptions and position in the social setting. In this context, it is relevant to acknowledge my own biases as I know the school from attending it myself when I was younger. Finally, Naidoo (2012) argues that inductive reasoning is important, as theories and hypothesis might change or emerge from the field findings organically.

Besides Naidoo's (2012) principles of ethnography, Spradley's (1979) draws upon a framework on asking descriptive questions. This method offers a structured yet flexible approach to exploring social environments like the classroom. It emphasizes the importance of asking questions that are clear and specific, while also leaving room for open-ended responses. To support, Spradley (1979) argues that researcher should be guided to ask detailed questions about behaviors, interactions, and cultural norms.

Spradley's (1979) furthermore encourages researchers to look not just at what people do, but why they do it. This deeper focus on behaviors and meanings can allow for valuable insights into the underlying dynamics of the classroom. Moreover, Spradley (1979) suggests organizing our findings into categories or themes, which helps us make sense of the data we collect.

One of the strengths of Spradley's (1979) approach is its openness to unexpected insights. By asking open-ended questions, we invite participants to share their perspectives in their own words. This may lead to a richer understanding of student-teacher dynamics, learning processes, and classroom culture. As such, Spradley's (1979) ideas agrees with the ideas shared in section 3.4 (Interviews) and will be a cornerstone when carrying out ethnographic analyses within the classroom (Tracy 2012; Yin, 2009)

Overall, by combining Naidoo's (2012) ethnographic principles, Spradley's ideas on descriptive questions, and other analytical tools, the ethnographic analyses painted a comprehensive picture of the classroom environment whilst engaging with it. This not only deepened the understandings of this particular social setting but also allowed for actively engaging with, and influence, the context under study. Here, the utilization of Spradley's (1979) method on asking descriptive questions complements the ethnographic approach by providing a systematic framework for data collection and analysis.

During the first school visit, as well as during Workshop 1 and 2, descriptive questions were asked sporadically and organically, e.g., *'what are your thoughts on this task?'* while the students were engaged with the material given, or while talking with each other. As such, this method emphasizes on open-endedness and provides a structured approach to exploring the complexities of social environments, such as the classroom of the 8th grade students at the case study school. Furthermore, these tools assisted in capturing nuanced aspects of student-teacher dynamics, learning processes, classroom culture, and teacher perspectives. As such, by adopting an ethnographic approach, I intended to gain insights into the lived realities of students and teachers, exploring how their identities, beliefs, and experiences influence classroom dynamics, learning outcomes, and the codesign processes.

3.6 Codesign

Throughout the analysis, a codesign approach will serve as a central methodological framework, drawing inspiration from the works of Sanders and Stappers (2008, 2014). Here, codesign is emphasized to be a collaborative engagement between researchers and end-users, fostering creativity, empathy, and innovation (Sanders & Stappers, 2008, 2014). Codesign methodology aligns with the ethos of participatory research, empowering children to play an active role in shaping their educational experiences (Sanders & Stappers, 2012). Drawing upon this thesis project, this will be to actively involve students at the case study school to generate and refine ideas, to facilitate an inclusive and student-centered approach to the educational initiative development. As such, codesign will be the main method followed within Workshop 1, 2 and 3, while ethnographic observations, situational analysis and interviews will support this aim. All this while building trust with the 8th graders and teacher will be in focus. An overview of how the visits at Ringsted Ny Friskole has been navigated in, can be seen on figure 7 below.

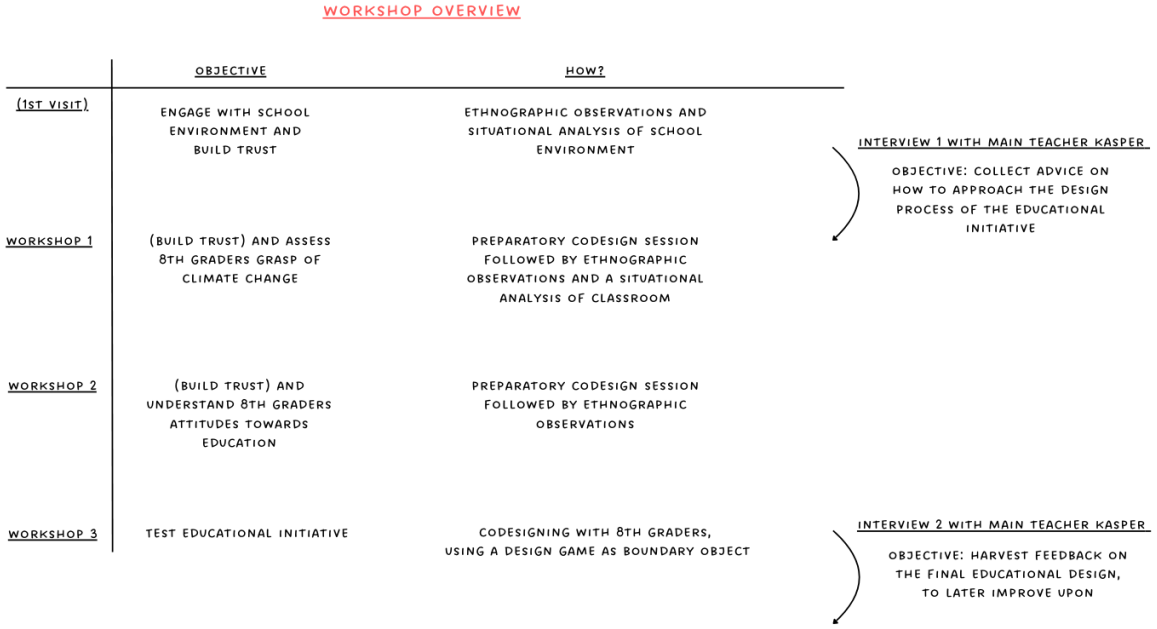


Figure 7: Overview of objectives and methods used at Ringsted Ny Friskole

How codesign, more specifically, is drawn upon during these workshops will be dived into in the following.

3.6.1 Codesign Workshop 1

This following section will focus on the methods for the first workshop with the case study school, which took place during the last part of the first visit, on December 1st, 2023. For this workshop, 12 students were present within the classroom of the 8th grade as well as the main teacher Kasper. The workshop lasted around 1.5 hours in total.

In this initial workshop, the objective was to build trust and relations with the students, as well as to assess the 8th grade students' grasp of climate change and sustainability. To facilitate this, the students were given a worksheet with eight varied tasks to reflect upon and discuss in groups, fostering a collaborative learning environment and encouraging mutual inspiration (see figure 8).

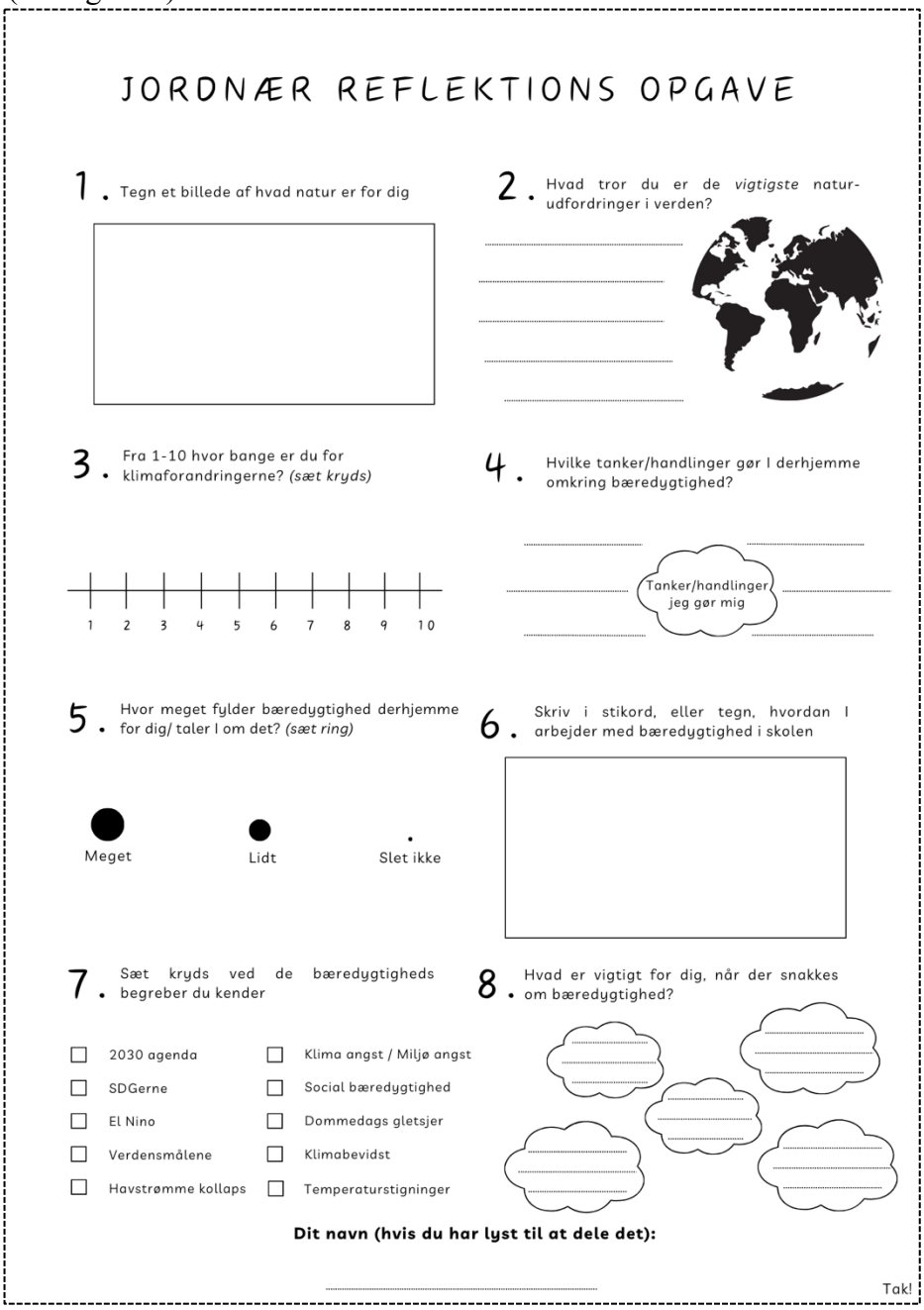


Figure 8: Workshop 1 design, as handed to the students in the 8th grade on December 1st., 2023.

The design of the worksheet was carefully considered to ensure it was straightforward and engaging, offering a range of activities to maintain their interest and avoid repetition. It aimed to empower the students, making them feel valued and listened to by soliciting their opinions and personal connections to environmental issues. Additionally, the worksheet served to identify the students' familiarity with the terminology related to climate change and sustainability, providing a baseline understanding of their knowledge level to inform the future development of an educational initiative. More specifically, the questions explored the following:

(1) Each student was invited to draw a picture representing their perception of nature. This approach initiates the workshop with a gentle introduction, steering away from potential heaviness and boredom, aiming to evoke personal reflections and creativity.

(2) Students were then prompted to share their thoughts on the most pressing nature challenges. By framing the question around "nature" rather than "climate," I aimed to encourage personal opinions and reflections on natural phenomena in their daily lives, hopefully fostering trust and readiness for engaging discussions on climate change.

(3) Utilizing a bar illustration, students were asked to indicate their level of concern regarding climate change. This inquiry seeks to understand their current mindset regarding climate anxiety, essential for tailoring the educational initiative to address their emotional needs.

(4) Students were encouraged to reflect on sustainability within their homes, aiming to gather insights into family and community perspectives on climate change.

(5) Following this, students were asked to evaluate on how present the sustainability dialogue is in their homes. Again, the question layout was made illustrative using a bar of three circles, to hopefully enhance engagement with the worksheet.

(6) Students were encouraged to depict how sustainability is integrated into their school environment, leveraging the school's commitment to sustainability as a 2030 school.

(7) Students were presented with a list of sustainability and climate change-related terms and phrases, asking them to identify ones they were familiar with, further assessing their existing knowledge base.

(8) Finally, students were invited to express what they consider important when discussing sustainability, providing crucial insights into effective communication strategies for the educational initiative.

After the workshop, the worksheets were handed in and analyzed systematically. Here, the thoughtful approach to questioning not only gathers valuable insights into the students' perceptions and knowledge but also lays the groundwork for the codesign of a transformative educational initiative. By engaging students in varied and personalized reflections, the workshop aimed to empower the students, while striving to make them take meaningful action against climate change while mitigating their climate anxiety. As such, the initial workshop represents a crucial step in the codesign process, setting the stage for collaborative

development that prioritizes student perspectives and needs in addressing climate change within the educational context.

3.6.2 Codesign Workshop 2

This subchapter will dive into the methods for the second workshop, with the objective of understanding the students' thoughts and feelings towards education as a whole, to better understand how to later consider their needs and unique attitudes in the final design solution. This workshop took place on December 15th, 2023, and 13 students were present within the 8th grade classroom, excluding the main teacher, Kasper. The workshop lasted around 1.5 hour in total.

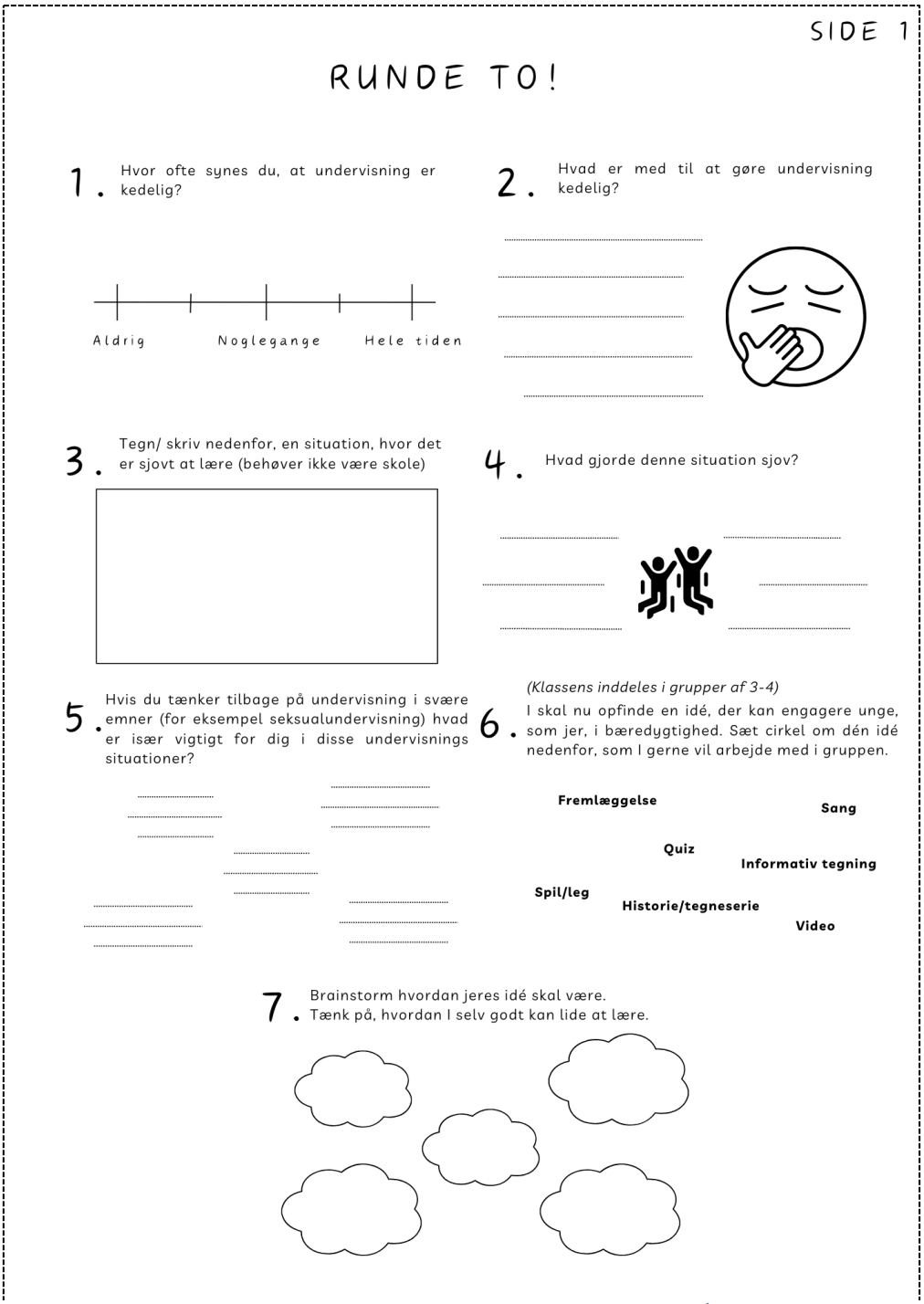
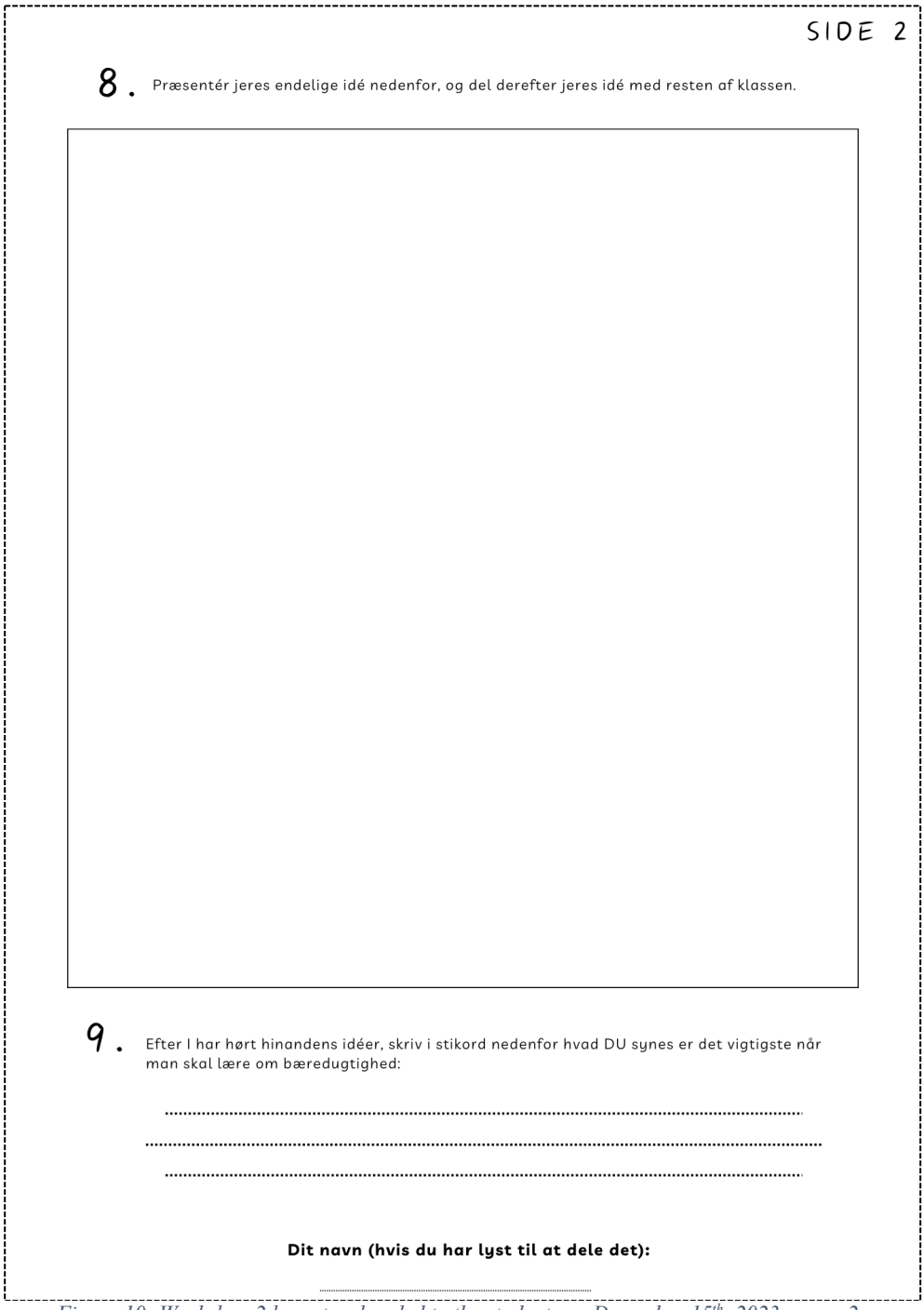


Figure 9: Workshop 2 layout as handed to the students on December 15th, 2023 - page 1.



SIDE 2

8. Præsentér jeres endelige idé nedenfor, og del derefter jeres idé med resten af klassen.

9. Efter I har hørt hinandens idéer, skriv i stikord nedenfor hvad DU synes er det vigtigste når man skal lære om bæredugtighed:

.....

.....

.....

Dit navn (hvis du har lyst til at dele det):

.....

Figure 10: Workshop 2 layout as handed to the students on December 15th, 2023 - page 2.

As can be seen on figure 9 and 10, the worksheet utilizes a delicate combination of solo tasks (like the last workshop) as well as group questions. After this second workshop, the worksheets were handed in and thereafter analyzed systematically. The objectives for the questions given to the students, will be dived into in the following.

(1) and (2) The first question, using a parameter as a guideline, asked the students how often they find their education boring. The intent here was to allow for their individual reflection on this topic, and thereafter question 2 asked for examples on which elements generally contributes to this boredom in class. The intent here was, to be able to avoid boredom in the design process of the transformative educational initiative on climate change thus making the students willing to engage more with the final design.

(3) and (4) The third question then asked the students to draw or write when education, to them, is fun, and in question four, examples were asked to be given. The intent was to let the students reflect on their unique needs and wishes for their education. This will then later support the design of an educational initiative, which the students, hopefully, will feel represents their preferences, thus increasing their incentives to use it.

(5) The fifth question zoomed in on understanding how the students prefer educators handling more sensitive matters, such as sex education, being a topic, the students already know and might have attitudes towards. This, to allow for an understanding of how to later approach the sensitive and heavy topic of climate change and climate anxiety within the design of the transformative educational initiative.

(6) and (7) In question six the students were divided into groups and asked to decide upon the genre of an educational initiative to educate their peers on sustainability. In question seven the students were then asked to brainstorm further on their idea. As such, the utilization of codesign techniques such as brainstorming sessions offered practical strategy for engaging the students as it provides the opportunities for creative idea generation, allowing children to explore their interests, aspirations, and concerns related to the educational initiative. (Sanders & Stappers, 2014). Overall, the objective for these tasks was to see some clear examples of how the students prefer to approach climate education as well as their general attitudes and thinking processes in regard to learning and education as a whole.

(8) and (9) Finally, in question eight, the students were asked to present their final educational idea on sustainability. The students were given a longer amount of time for this particular task, being approximately 20-30 minutes. This design session allowed the students to translate their ideas into tangible solutions, such as sketches, models, or prototypes, fostering hands-on experimentation and iteration with climate education. Lastly, they were then asked to present their ideas in plenum, while noting in question nine, what they, after having reflected upon their own and each other's ideas, found important when considering an educational initiative on this topic.

The methodologies articulated above represent a strategic approach to codesign that is closely aligned with the objectives of this thesis. By actively involving the 8th grade students in the design process, even at early stages, the initiative not only gathers direct insights into their perceptions of educational engagement but also integrates their preferences and needs into the

development of the climate education model. This approach is anticipated to result in an educational initiative that not only resonates with the students, encouraging active participation and mitigating boredom but also delicately navigates the complexities of climate change to minimize anxiety. The emphasis on collaborative ideation, personal reflection, and sensitive handling of tough topics is crafted to empower the students to take meaningful action against climate challenges, embodying the transformative potential of educational codesign.

3.6.3 Codesign Workshop 3

This subchapter will dive into the methods for the third and final codesign workshop. The objective here was to test the transformative educational initiative that intends to mitigate climate anxiety while inducing climate action. The workshop took place on March 8th, 2024, and 13 students were present within the 8th grade classroom. Furthermore, the main teacher, Kasper, was present. The workshop lasted around 1.5 hour in total. As such, this workshop had two main elements; first a great focus on the specific design and testing of educational initiative. Thereafter an evaluation of the student's game experience.

Testing Design Solution

In the initial part of the third codesign workshop, a design game was employed as a central pedagogical tool to engage the 8th grade students in the active codesign of a transformative educational initiative to mitigate climate anxiety and sparking action. The game, chosen for its balance of structure and flexibility as highlighted by Vaajakallio & Mattelmäki (2014), provided an interactive platform for the students to brainstorm and share ideas in a low-risk environment. The specifics of the game will be presented in the analysis chapter.

Upon introducing and distributing the game, I closely interacted with the students, facilitating the gameplay and encouraging open dialogue. However, I did not collect ethnographic observations for this workshop to center my focus and capacity towards the design game testing. My role extended beyond mere observation; I prompted critical thinking through targeted questions and provided guidance, ensuring that the game's phases, rules, and goals were clearly understood and effectively contributed to the workshop's aim.

This interactive method not only bridged the gap between theory and practice but also allowed the students to immerse themselves in a playful yet purpose-driven process, thereby reflecting the dual aims of this project: to harness the collective creativity of the youth in addressing climate change and to embed these critical engagements within their educational environments.

Evaluating Design Solution

The evaluation worksheet, as handed out to the students, can be seen on figure 11. The intent and objectives for the specific questions and tasks, as given to the students, will be explained in the following.

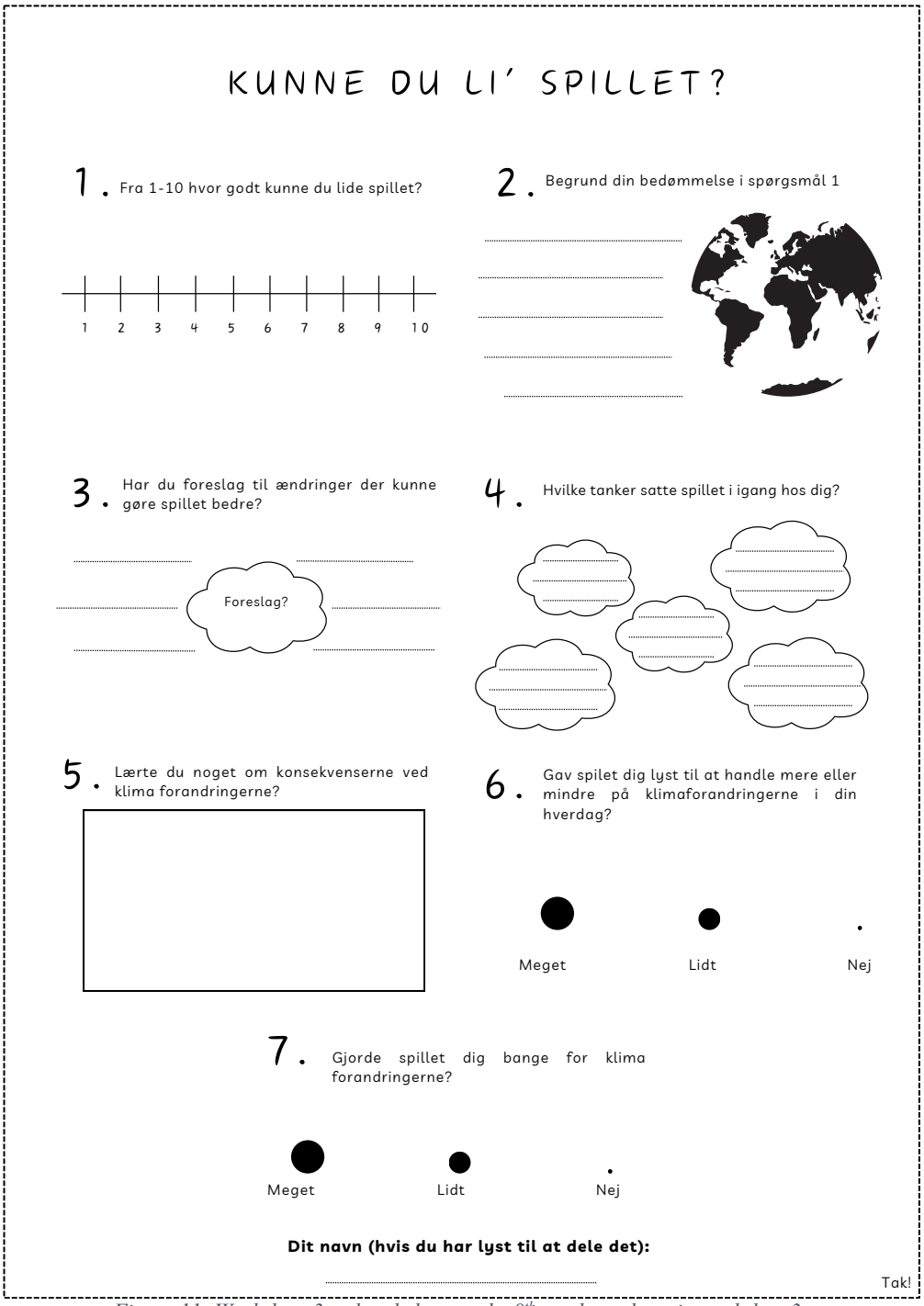


Figure 11: Worksheet 3 as handed out to the 8th grade students in workshop 3.

(1) and (2) The first two questions sought to understand whether or not the students like the educational initiative, as well as why they did or did not care for it. The hope was, that as this workshop was the third, and as relations and trust had been established, that the students would be more inclined to share their honest opinions and thoughts towards the material given.

(3) The thirds question asked the students directly whether they had thoughts about specific improvements on the final design. Again, the hope was, that the students, during this third and final codesign workshop, would be more inclines to share their raw perspectives.

(4) The fourth questions zoomed in on the students unique and individual though processes, by asking them how the design solutions had initiated perspectives within them. This question remained open with no requirements for the answers to be given, to allow for diverse thoughts and perspectives.

(5) The fifth question, following a unique discussion which had appeared during workshop 1 in plenum, asked the students if they had achieved a greater learning of the climate change consequences, which they had earlier requested. As such, this particular aspect, too became a crucial goal of the final design solution, as it was of high importance that the final design would take the students unique needs and wished into considerations.

(6) The sixth question then dived into the problem statement of the report, by asking the students if the design solution had made them want to ask more or less on climate change after engaging with the educational initiative. The reason for this direct question, is to allow for a clear picture of the design solutions' effect on climate action and thus the overall goal of the report.

(7) Finally, following the same ideas as for question 6, the students were again asked directly if the design solution had caused them to be climate anxious. To grasp this, perhaps, abstract topic for the adolescents, the two final questions were depicted as three circles in different sizes, where the students could then choose one. The goal, again, was to get a clear picture of how the final educational initiative, on climate change, affected their mental wellbeing in regard to climate anxiety.

The formulation of these questions was carefully crafted to align with the overarching objectives of the transformative educational initiative. By engaging students in this manner, the intent was to foster a reflective and participatory environment that not only addressed their concerns and curiosity about climate change but also empowered them to articulate their thoughts on the potential solution and how it might be further improved. This approach ensures that the data collected, and later systematically analyzed, was both meaningful and directly correlated to the students' evolving perceptions and emotional responses to climate change, thus providing a robust foundation for assessing the impact of the educational initiative on reducing climate anxiety while encouraging proactive engagement.

3.7 Chat GBT Sparring

In this study, the generative AI model ChatGPT has been utilized strictly within the parameters outlined by the permissible aids. ChatGPT has been employed for sparring and textual verification purposes, ensuring the clarity, coherence, and technical accuracy of the written content. Specifically, ChatGPT has not been used for the direct generation of text, but rather as a tool for refining and enhancing the text already produced by the researcher of this report.

4 Analysis

In this analysis chapter, we delve into the intricate dynamics and multifaceted dimensions of codesigning a transformative educational initiative to induce action while preventing climate anxiety. As the project progresses, the analysis evolves to examine several thematic areas. This, while the three key topics are being explored; education (as well as didactics), sustainability (and therewith climate change) and finally climate anxiety. The project analysis follows the sequential models as depicted on figure 3 and 4 in the methods chapter.

4.1 Preparations, Research & Engaging in the Field

In the following we will focus on the educational field, as well as didactics, as can be seen on figure 12 below.

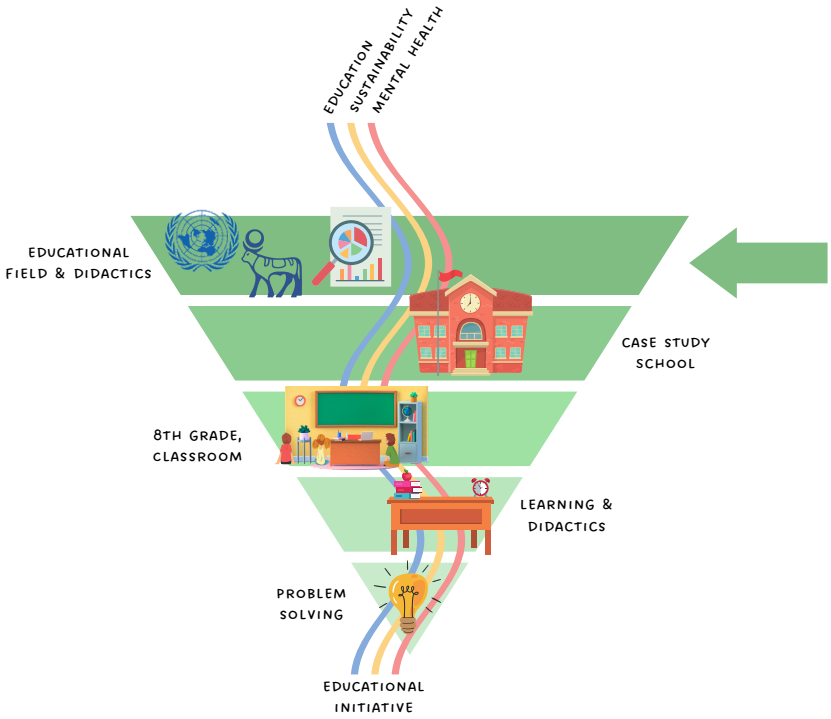


Figure 12: Focus area, being the educational field and didactics, in the following section.

This phase of the project constitutes the initial phase in which some relations were established, and research was done to prepare for the ongoing analysis (step 1-4 on roadmap on figure 3).

The project started with the brainstorming and idea generation on the theme of climate anxiety as well as transformative education. During the preparation and research phase, extensive research was done on the topics of climate anxiety, and relevant literature was found on relevant sub problematic as well as potential solutions to how to approach climate education and anxiety both at home and at school. The latter, for example, encompassed avoiding portraying climate change as an inevitable apocalypse as well as leaving all of the responsibility to act sustainably to the younger generation (Stoknes & Espen, 2014; Chou et al., 2023).

One way that the field was engaged with, following ideas by Silverman & Marvasti (2008) and Sawyers (2007), was by attending events within the field of science communication to get a sense of relevant themes, approaches and problematics (see figure 13).

Figure 13: Left: Photos from the Novo Nordisk design thinking conference. Right Photos from the KATAPULT by YOUNG conference at United Nations in Nordhavn.

On the 7th of September 2023, a conference at Novo Nordisk on design thinking, was attended, among other, to network for potential connections for the thesis, and to offer new perspectives on how to adopt a design thinking approach with empathy (figure 13, left). Networking was done with various actors, among other a woman working within their Circular for Zero departments who works with adopting design thinking approaches into Novo Nordisk's sustainability approaches and operations. She was very interested in hearing my findings later on in my thesis process. The conference had another Novo Nordisk department from India attending virtually. However, while the conference provided valuable networking opportunities, it was predominantly oriented towards optimizing Novo Nordisk's internal processes. As a result of this, specific details about the conference's tasks and themes cannot be disclosed.

Furthermore, the annual KATAPULT conference on the 28th of September 2023 by the United Nations in Nordhavn (Copenhagen), and their affiliated YOUNG organization, was attended to gather general information on sustainability communication to school children, as well as to potentially establish some relations to schools that would later come in handy for the codesign phase with school children (figure 13, right). The following observations from this fruitful conference will be noted as ethnographic observations.

4.1.1 Ethnographic Observations

Following Naidoo's (2012) ideas, for this study I have not acted as an objective engineer but instead inspired ethnographic approaches using myself as a subject as I am part of what is being analyzed. As such I have staged myself as an ethnographer. In the following analysis

chapters, ethnographic observations will therefore be added as italic texts resembling that of a diary entry.

September 28th, 2023

At the KATAPULT conference, I garnered a wealth of insights relevant to the realm of climate communication. A lecture that particularly resonated with me was delivered by Lasse Schøber; a seasoned satirist known for his work with Denmark's Radio. He skillfully discussed the use of humor in elucidating complex issues like climate change and warfare, a perspective I found intriguing for its educational potential. Equally engaging was the display of sustainability themed board games, one crafted by schoolchildren from an international school. This game, with its focus on memorizing the Sustainable Development Goals (SDGs), exemplified the innovative approaches which younger generations have to environmental education.

Another standout experience was the interactive session hosted by Copenhagen Zoo. They presented a range of vegetables, not as mere edibles but as boundary objects - tools to communicate the dietary habits of zoo animals, thereby enhancing the interactive learning experience. It was an exemplary method of using tangible items to facilitate engagement and understanding.

Amongst the diverse participants, predominantly educators invested in didactic methodologies on the topic of sustainability and climate change, I reconnected with two familiar figures from my past: Heidi and Helle, my former teachers at Ringsted Ny Friskole, which I attended from grades 6 to 8. The encounter was pleasantly unexpected, and they were keen to catch up on my academic progression, expressing particular interest in my thesis endeavor. When I mentioned the need for a case study school, they immediately proposed their school and gave me relevant contact information to their school, and later Kasper, a new 8th grade teacher there, potentially opening avenues for collaborative exploration.

The conference, especially through its lectures and workshops, reinforced the significance of didactics - the interplay of teaching theory, methods, and practice that unifies these diverse educational experiences. Ringsted Ny Friskole's commitment as a 2030 school, with its strategic integration of the SDGs into its operations, stood out as a living example of this educational synthesis. To illustrate the knowledge and observations gained from the KATAPULT conference, I have compiled a map on figure 14, with the green circled objects being the elements which especially stood out to me. Overall, this conference not only offered a rich variety of educational insights but also unexpectedly steered my thesis journey towards a case study school and thus a potential setting for the development of a climate educational initiative.

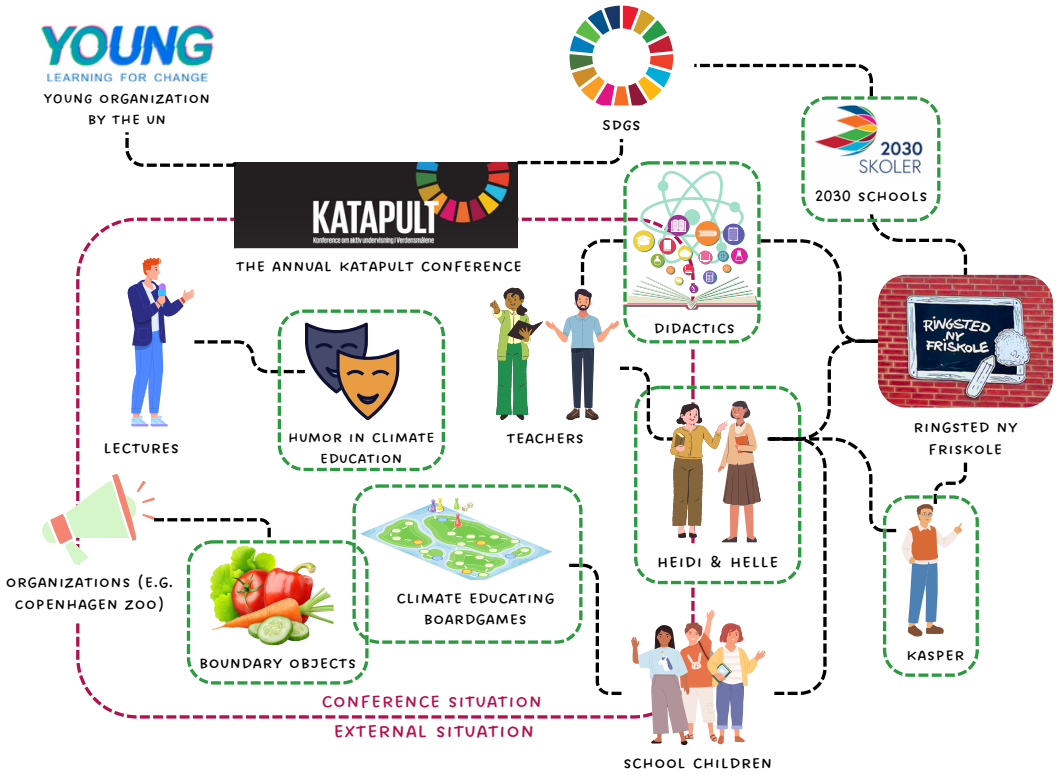


Figure 14: Depiction of actors and non-human actors present at the KATAPULT conference. Circled in green is what inspired the further analysis within this project.

4.1.2 Sub-conclusion

In summary, this chapter marks the inception of the project, focusing on establishing relationships and conducting initial research to lay the groundwork for ongoing analysis. Following figure 14, this ethnographic observations at the KATAPULT conference found interesting and unique ways - such as humor and games - to approach sustainability communication and education. Climate change, while not a direct topic at the conference, was indirectly part of the conversation, when Lasse Schøber promoted humor, among other as a way to approach heavy topics such as war. These are therefore great take aways for the later design of the educational initiative. Notably, reconnecting with former teachers Heidi and Helle from Ringsted Ny Friskole opened doors for potential collaboration and enriched the project's scope. As such, this chapter lays a crucial foundation for a journey towards contributing to creative a transformative climate educational initiative.

4.2 Case Study School

In the following we will zoom in on the case study school to be used in the analysis of this project, as can be seen on figure 15.

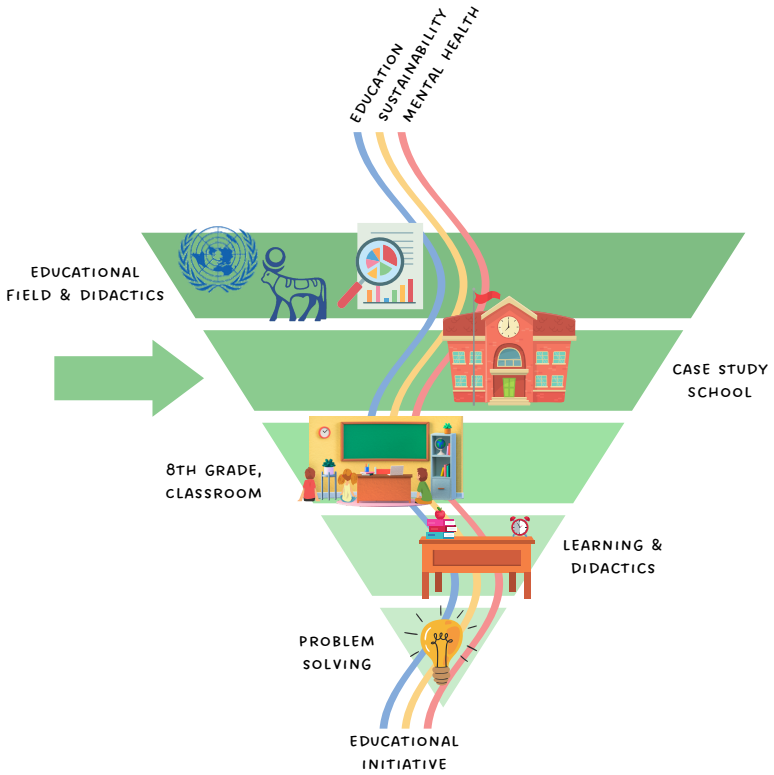


Figure 15: Focus area for the following chapter, being the case study school.

4.2.1 Initial Contact with Case Study School

Following the methods presented on choosing a case study, and as a result of randomly meeting Heidi and Helle at the KATAPULT conference, Ringsted Ny Friskole was chosen as the case study school for the analysis of this project. As covered in the methods chapter, the school is a 'free school' meaning that they have selected autonomy in terms of their curriculum. Interesting to investigate however, is whether this freedom might lead to limitations, as the school may develop its own ways of doing things that are hard to change. These potential lock-ins will therefore be investigated in the analysis chapter. Following Flyvbjerg's (2006) insights, this focused study might reveal detailed information about how the school's autonomy shapes its teaching, especially in areas like sustainability and climate education. Additionally, the school's status as a 2030 certified institution which adds another layer of interest, as it reflects a commitment to integrating the SDGs into its operations. However, following a particular strategy, with predetermined requirements, towards sustainability education and communication, might block out other potential (and transformative ways) of educating sustainability.

This section will explore initial contact with the case study school to gradually get closer to designing a transformative educational initiative on sustainability and climate change. This constitutes the initial communication with Ringsted Ny Friskole, as well as the first part of the first visit, where the school was navigated in, and the key actors presented themselves.

From the contacts given at the KATAPULT conference, email contact was taken with Kasper, the 8th grade teacher at the school. Kasper, and educated teacher in biology, physics/chemistry and geography, plays a large role in the project. The age group of the 8th grade was for most of the children 14 years; however, one girl was still 13 years old.

The first email sent to the school and Kasper was a thorough introduction of the intentions with the project, made visually organized, which mentioned some of my relevant experiences with science communication as well. I was invited to visit the school on December 1st. While the first workshop was held later on the same day, the first half of the visit consisted of observing the 8th grade for 1.5 hour while they were taught geography. The intention of this, was to both make them used to my presence and therewith more open to later share their thought on climate education, as well as to observe their relations and the communications within the classroom. Afterwards I got a tour around the school which included seeing their permagarden. The school is located in the small town Bringstrup outside of Ringsted, with large premises including a forest and a permagarden which is being owned and managed by Kasper as he - besides being a teacher - is a neighbor to the school.

4.2.2 Ethnographic Observations of School

December 1st, 2023

It is Friday morning, the sun is forcefully shining through a thin cloud cover onto the snow covered landscapes, and I am taking the regional train from Copenhagen to Ringsted, and then the bus to Bringstrup - the little town where Ringsted Ny Friskole is located. I felt like a proper city girl, as I at 10:00 showed up at the school with soaked sneakers since the snow had not been even close to as present back in Copenhagen. I looked at the school that I had not been to for so many years and entered the glass doors into the hallway. I was instantly met by Kasper, the teacher I had been emailing, but not yet had the pleasure of meeting physically. Next to him stood the cleaning lady, whom I remembered clearly from back when I attended the school - and who remembered me. She was surprised to see me, and I smiled and explained why I was there. Kasper then showed me to the teachers' lounge, where I had never been except perhaps once or twice, standing in the door to ask for assistance for something childlike. Now for the first time I realized how cozy this lounge was. With its location in a proper house, it was like being in someone's home. 'How cozy it must be, being a teacher at this school?' I thought to myself. At the lounge I met some other well-known faces, which was strange, and I got to tell a summarized story of what I had been up to sine leaving the school in 2012. Kasper then showed me around his teaching locations, and with his energetic being he interacted with many of the children on the way to the 8th grade classroom. 'At this school everyone knows everyone' he said.

Entering the classroom, I was briefly introduced to the 12 students present that day (7 girls and 5 boys), and thereafter sat down in the back and quietly followed the class. I noticed that the students had given their phones to Kasper prior to the class, where they would remain until their next break. They were being taught in geography, on the topic of pollution. The whiteboard was used for showcasing relevant online texts while Kasper would use a whiteboard marker to highlight particular sentences or words.

The 12 students were divided into groups of 2-2-4-4, and while they were discussing their readings with each other, Kasper came to me and said that, due to my presence and our dialogue leading up to my visit, he had actually chosen to include some heavier topics such as deaths due to pollution, as it had made him reflect on these topics and their importance and relevance.

The groups discussed (1) deaths and air pollution, (2) air pollution and particles, (3) particle pollution from traffic, and (4) particle pollution from agriculture. The class thereafter discussed these topics in plenum. E.g., the advantages or disadvantages on the reduction of the NOx fee in Danish agriculture, the advantages or disadvantages of letting the agricultural industry use 20% more nitrogen, and finally how the students think these two political decisions would affect societal fees. After the plenum discussion, the students got, what Kasper called, a fun task where they were allowed to research the future of energy sources. For example, some students talked about AI while others talked about how we could travel into the solar system while curiously including Kasper in the conversation as someone who might know more, showcasing a trust in his authority and knowledge base.

It was then time for the lunch break, and I once again followed an enthusiastic Kasper to the teachers' lounge. He told me that he had the lunch break duty, and therefore asked me if I wanted to follow him around, as he would have to check up on the students outside. I thought to myself, that my shoes were already soaked, so we might as well go outside into the snow again. When walking around, many of the children were excited to see Kasper. We went to the football field, where the children had been allowed one area for snowball fights. I ran quickly across it without being hit, however Kasper were not as lucky. One girl decided to follow Kasper and I to the permagarden, which he was thrilled to show me. Kasper was particularly secretive about the fact that it was his property used for this initiative, until he finally said that he was in fact the owner. He showed me the snowy garden, and explained with enthusiasm how it looks in the summer, when all the plants are blooming, and the bees are buzzing.

Figure 16: The snowy permagarden as showed by Kasper, teacher at the school and owner of the property.

On the way back to the 8th grade classroom he showed me some of the other classrooms, and pointed out how the SDGs were particularly present around the school. He furthermore showed me a classroom where the tables and chairs had been arranged in a circle, as the main teacher in this particular classroom were fond of showing the students Ultra News (news made for children from Denmark's Radio) and thereafter discuss these news in the

classroom. I was surprises to see how each classroom had a unique personality, demonstrating a customizable angle on the teaching at the school.

Figure 17: Photos from the tour around the school.

4.2.3 Situational Mapping of School

In this section, I undertake a situational analysis approach to Ringsted Ny Friskole while utilizing Clarke's situational analysis framework to outline the complex interrelations that shape the educational ecosystem. From my ethnographic observations, and knowledge of the profile of the school, I created a situational map below following the method on illustrating relevant actants as well as interconnected relations amongst them (see figure 18).

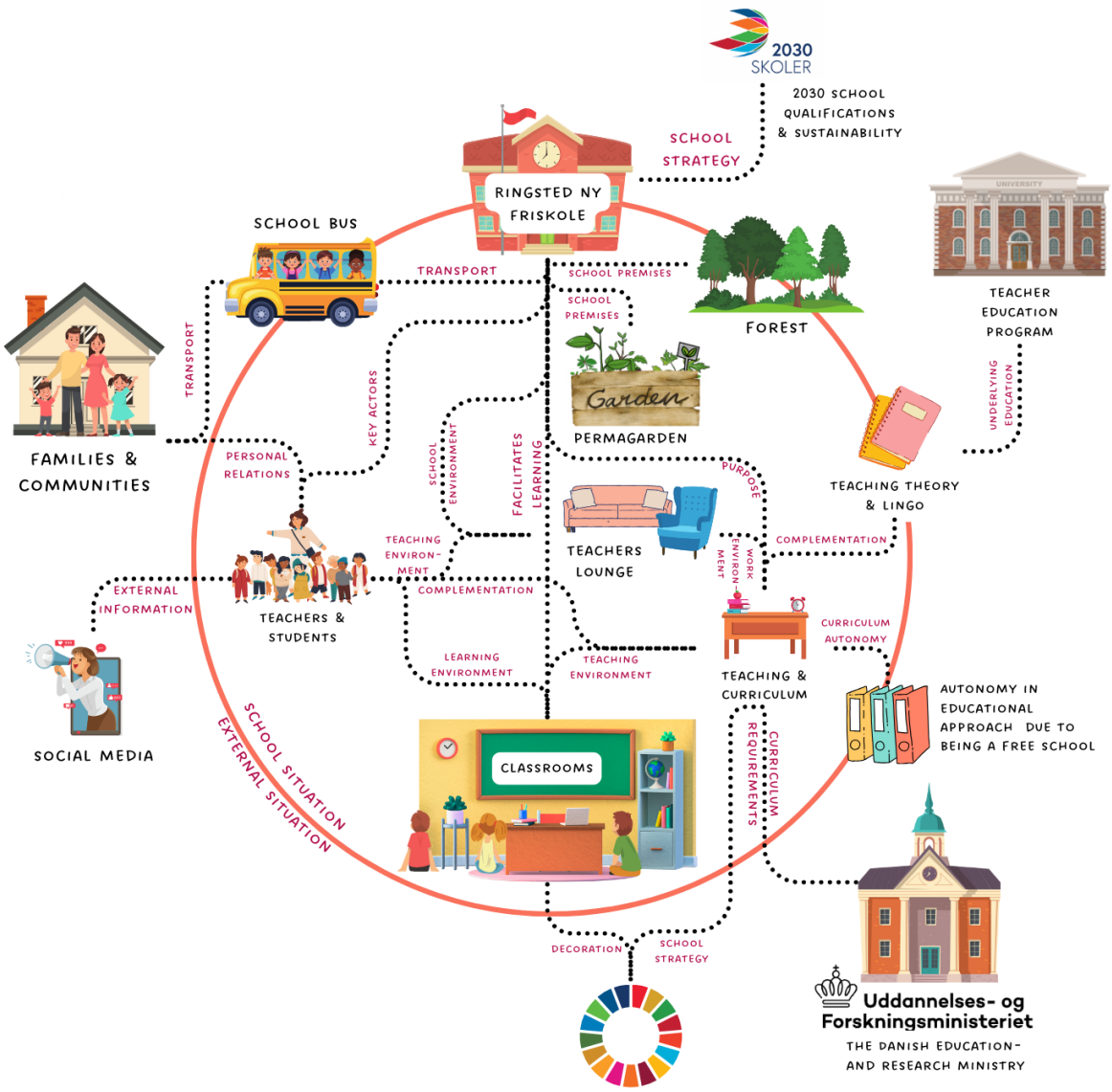


Figure 18: Situational map of the school settings within and around Ringsted Ny Friskole, original illustration, inspired by Clarke's (2003) ideas.

As presented on figure 18, Ringsted Ny Friskole stands out as a forward-thinking educational establishment deeply entangled in the '2030 skoler' initiative, a strategic approach that underpins its entire educational philosophy. The school's commitment to sustainability is evident in its very fabric, with SDGs prominently displayed on classroom walls, serving as a daily reminder and inspiration to students and teachers alike of the global goals they are collectively striving towards. This strategy, however, may also act as a barrier to other important educational elements that might be marginalized as a result. Ensuring a balanced curriculum that covers all educational requirements while emphasizing sustainability might be challenging. The school is locked into a path of continuous innovation to keep its 2030 certification relevant and up to date, which requires the ongoing inclusion of the strategy into the school's operations.

Additionally, the school's unique location, including a forest and a permagarden, not only provides a serene environment but actively engages students with nature, reinforcing lessons in sustainability through hands-on learning experiences. However, the isolation of the school

could potentially be a lock-in regarding resources, as access to external educational partnerships, cultural events, and extracurricular opportunities may be limited.

The small-town school's distinctiveness is further enhanced by its free school status, granting it a degree of autonomy that allows the curriculum to be finely tailored to mirror community values and the explicit educational aim of fostering an understanding of sustainability. This autonomy facilitates the creation of a curriculum that is not just compliant with educational standards but also resonant with the local community's ethos, empowering students to have a tangible connection with the global sustainability movement. However, important to consider is how this autonomy might also mean that the school may be locked into its unique educational philosophy, creating a barrier for integrating broader educational standards or innovations that contradict its established approach. The tuition fee, although small, may also limit the diversity of the student body, as it could be a barrier for families from different socioeconomic backgrounds.

The school's intimate scale contributes to its uniqueness, fostering a familial atmosphere that extends beyond the classroom. However, this physical environment may make it challenging to introduce a more modern or less traditional aesthetic that could be conducive to different teaching styles or learning experiences. Teachers, many of whom have longstanding tenures, often have their own children enrolled at the school, which blurs the lines between their professional and personal lives and enriches the school community with a sense of shared investment and belonging. This creates a strong sense of continuity and tradition but can also be a barrier to new educational practices and perspectives. The teacher’s pedagogical approaches are a fine mix of theoretical knowledge interlinked with practical application, embodying the very essence of experiential learning that the school provides.

In addition, the school is conscious of the influence of social media and digital devices in contemporary life. In a strategic move to ensure that these influences serve rather than hinder educational engagement, the school collects phones before class to minimize distractions, thereby enhancing the focus and engagement of students in their learning endeavors.

Transportation services, like the school bus, play a critical yet understated role in connecting students to the school and the broader range of community activities, ensuring that education at Ringsted Ny Friskole is both accessible and intertwined with local life.

In summary, Ringsted Ny Friskole offers a unique learning environment where sustainability is not just taught but lived. Despite potential barriers and lock-ins, its free school status, small-town charm, and distinctive learning environments like the permagarden exemplify a holistic approach to education, where the school, its staff, students, and the wider community engage collaboratively in nurturing a sustainable future. These reflections will be essentials to bring along into the design of educational initiative to ensure that it is customized to its end-users within this school setting. Especially relevant to the final design, is the schools 2030 strategy and how the SDGs decorates the indoor environments. Furthermore, its free school status provides a great potential for the educational initiative to be incorporated within the school curricula.

4.2.4 Sub-conclusion

In the initial phase of the project at Ringsted Ny Friskole, I established foundational understandings critical for developing a transformative educational initiative. Following the three key themes on figure 15, this school, with its unique free school status and commitment to the '2030 skole' strategy, offers a vital case study for integrating the SDGs into educational practices despite potential challenges such as its rural setting and autonomous nature. As such, drawing upon the school's knowledge on the SDGs as well as willingness and autonomy to include sustainability communication into its operations, will be brought along into the later design of the educational initiative.

Additionally, the situational map revealed key relational dynamics and how sustainability is in focus, which will guide the codesign of the educational intervention aimed at mitigating climate anxiety and promoting proactive environmental engagement. Moving forward, the analysis of the 8th grade's classroom environment will further inform the codesign approach, ensuring it effectively addresses the diverse educational needs and preferences of the adolescents.

4.3 Workshop 1: Building Trust

This following chapter will revolve around the first codesign workshop within the 8th grade classroom (cf. figure 19), aimed at getting to know the students, building trust, and grasp their thoughts and knowledge on climate change and sustainability.

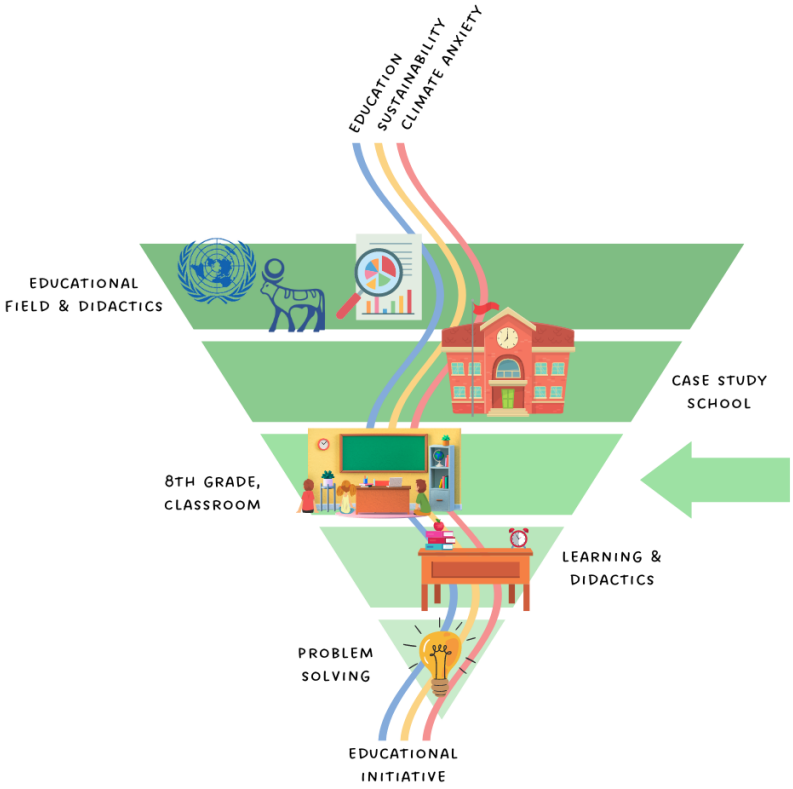


Figure 19: Zooming in on the 8th grade classroom, while investigating education, sustainability and mental health.

4.3.1 Ethnographic Observations

During this initial workshop, that followed the methods for codesign workshop 1, ethnographic observations were made. These can be read in the following.

December 1st, 2023

Upon returning to the teachers' lounge, I prepared my printed documents and brought them to the classroom. I introduced myself thoroughly and shared with the students that I had once been a student at the school myself to make myself relatable. At the start of the workshop, the students were very quiet and did not engage much while I presented the task.

After I explained the questions, they began discussing the tasks in their groups of 2-2-4-4 and gradually started to open up, even asking me a few questions. I noticed that many of the girls were particularly absorbed in task 1, spending a considerable amount of time drawing nature scenes. To encourage engagement, I walked around the groups frequently, asking if they had any questions. The students were especially curious about question 2, regarding what they deemed the greatest nature challenges, wanting to understand it better. I clarified that there were no right or wrong answers; I was interested in their opinions on which aspects of global warming they found most concerning.

In a conversation with Kasper, I learned that the class was particularly small at the moment due to recent bullying issues, and as a result, some students had changed schools. He expressed that they needed some calm following that period, and he expected that new students might start in the future, so that the class could regain its normal size.

Around 30 minutes into the workshop, I gathered in the worksheets without looking much on them, and we gathered for a full-class discussion. I asked them in which subjects they encountered sustainability, and one student responded that it was in their natural science classes. They felt that sustainability was quite present in most of their topics, which aligned with their '2030 skole' strategy. When questioned if they found sustainability boring, they said no, but one student mentioned that one teacher, Katja, made it somewhat dull. Another student added, 'she talks like we know nothing, like we are really stupid, like she is being condescending and we are stupid.' I asked if they meant the level of complexity was too low, and they agreed.

I then inquired if they were not afraid of climate change, given their knowledge about sustainability. 'Are you positive and optimistic?' I asked. One student said, 'We haven't heard much about what climate change can do in the future.' Another student expressed, 'We are doing what we are asked in terms of sustainability, and if people can't do more, they can't do more, like if they can't afford an electric car.' I then asked if their parents were worried. One student said, 'No, but they ask me to sort my trash.' Another chimed in, saying, 'They sometimes mention it but not often.' So, I asked, 'So you discuss more about the small behavioral changes rather than worries?' and they agreed.

I asked if they felt like the adults put all the responsibility on the children or if they helped out. This, to relate the concept of adultification cf. the Introduction chapter, on how adults should not praise children for acting on climate change by offloading their own

responsibility. When I asked, the topic of the condescending tone again came up. Another student mentioned that sometimes it might be the other way around, with the young blaming the old.

I then asked if they saw much about climate change on their social media feeds, but they said no, with only two students recalling rare posts related to climate change, like those involving Greta Thunberg. I then asked to confirm their ages, and they said everyone was 14, except one who was 13.

To conclude, I asked if they had any final thoughts. One student asked, 'What are the actual problems with climate change in the world?'. Feeling unqualified and unprepared to answer thoroughly, I glanced at Kasper. I briefly touched on the challenges, mentioning glaciers and ocean currents and the interconnectedness of these issues. A student asked, 'So, for example, because we are driving cars too much?' and I replied, 'Yes, but there are also big polluting companies.' Kasper added, 'Maybe we need to talk more about the consequences of climate change.' I mentioned that the next times I visit we would look more at this topic and perhaps what can be done about the problems. After thanking them for their time, the students applauded, and I left as they headed to their physics class.

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4.3.2 Worksheet Findings

On figure 20 below can be seen an overview of the 8th graders responses to the questions in workshop 1.

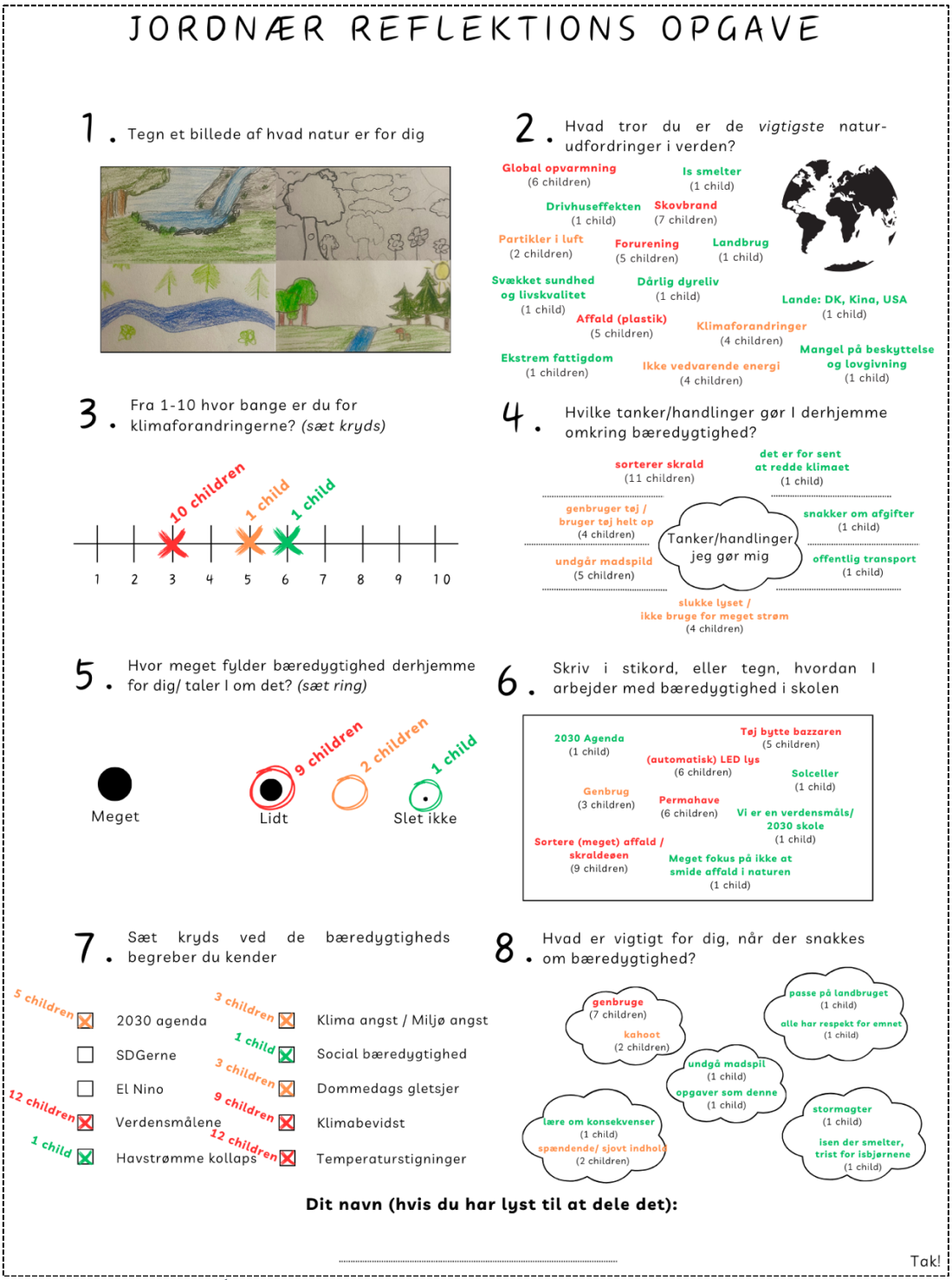

Figure 20: Overview of the 8th graders responses to the questions in workshop 1. The colors indicate frequency of each answer; green being less frequent, orange somewhat frequent, and red very frequent.

Figure 20 captures the children's individual responses to the eight questions about climate change and sustainability. The color coding on the figure highlights the frequency of similar responses: red indicates the most common answers, orange for somewhat common, and green for the least common responses.

Analyzing the responses reveals several interconnected themes. The first question revealed a common theme amongst the students, associating nature primarily with trees, greenery, and water bodies like streams and lakes. This creative exercise not only showcases their artistic

expression but also hints at an appreciation for the natural world. The time spent on this task by the students too indicates their enthusiasm towards drawing as a means of expression. This indicates a potential of incorporating hands-on, creative activities, e.g. drawing, in the educational initiative aimed at addressing climate change.

When asked to identify the most critical environmental issues, pollution and trash were top of mind, which aligns with the school's active curriculum focus on these areas as well as their '2030 skole' strategy. This was substantiated during the group discussion, where students noted regular trash sorting at their school and the recent geography class that had focused on air pollution.

Regarding their feelings about climate change, the students generally did not express significant concern, which was consistent with the sentiments expressed during the larger class discussion. Furthermore, the majority of students indicated they practice environmental behaviors at home, such as waste sorting, mirroring the actions encouraged at school. Interestingly, one student voiced a concern that it might be too late to save the environment. This observation is relevant to keep in mind, for the evaluation of the final educational initiative, to see if climate anxiety has decreased or increased amongst the students.

When asked to draw or write how they work with sustainability in their school, the answers reflected the '2030 skole' strategy, as the children mentioned trash recycling, working in their permagarden, having automatic light in the classrooms and finally that they have a clothing exchanging bazar at the school. However, when asked about the frequency with which environmental topics are discussed at home, responses varied, most indicating occasional discussions, with one student specifying that these topics are not discussed at all. As such, addressing this gap is crucial to ensure continuity in environmental education efforts and to promote environmental awareness beyond the classroom.

In response to question seven, the students showed knowledge of some key sustainability terms. However, terms related to more complex or catastrophic environmental phenomena - specifically 'doomsday glaciers' and the 'collapse of ocean currents' - were largely unfamiliar to them. This underscores the need to enhance educational efforts to deepen students' comprehension of climate change and its broader implications, aligning with the objective of reducing climate anxiety through action.

The final question sought to understand what the students value in discussions about sustainability. The majority referred to practical actions, similar to those they perform in their school and at home. A few students highlighted the importance of understanding the consequences of environmental issues and engaging in respectful dialogue when discussing such topics. This aligned with the discussion had, and as described in the prior ethnographic observations, and might be key to bring along into the final design, as this aspect is not in focus within the school at this stage. Conversely, practical actions already take up a lot of the sustainability discussion at the school.

Overall, the analysis of students' responses offers valuable insights into their perceptions and behaviors regarding climate change and sustainability, and thus brings forward idea to bring along into the design of the educational initiative. Through fostering a deeper understanding of environmental issues as well as engagement both within and beyond the school environment, the transformative educational initiative to be designed will seek to empower

students to become proactive agents of change in mitigating climate change and promoting sustainability.

4.3.3 Situational Analysis of Classroom

From my ethnographic observations and codesign workshop within the 8th grade classroom a situational map was made following the situational analysis method (see figure 21 below).

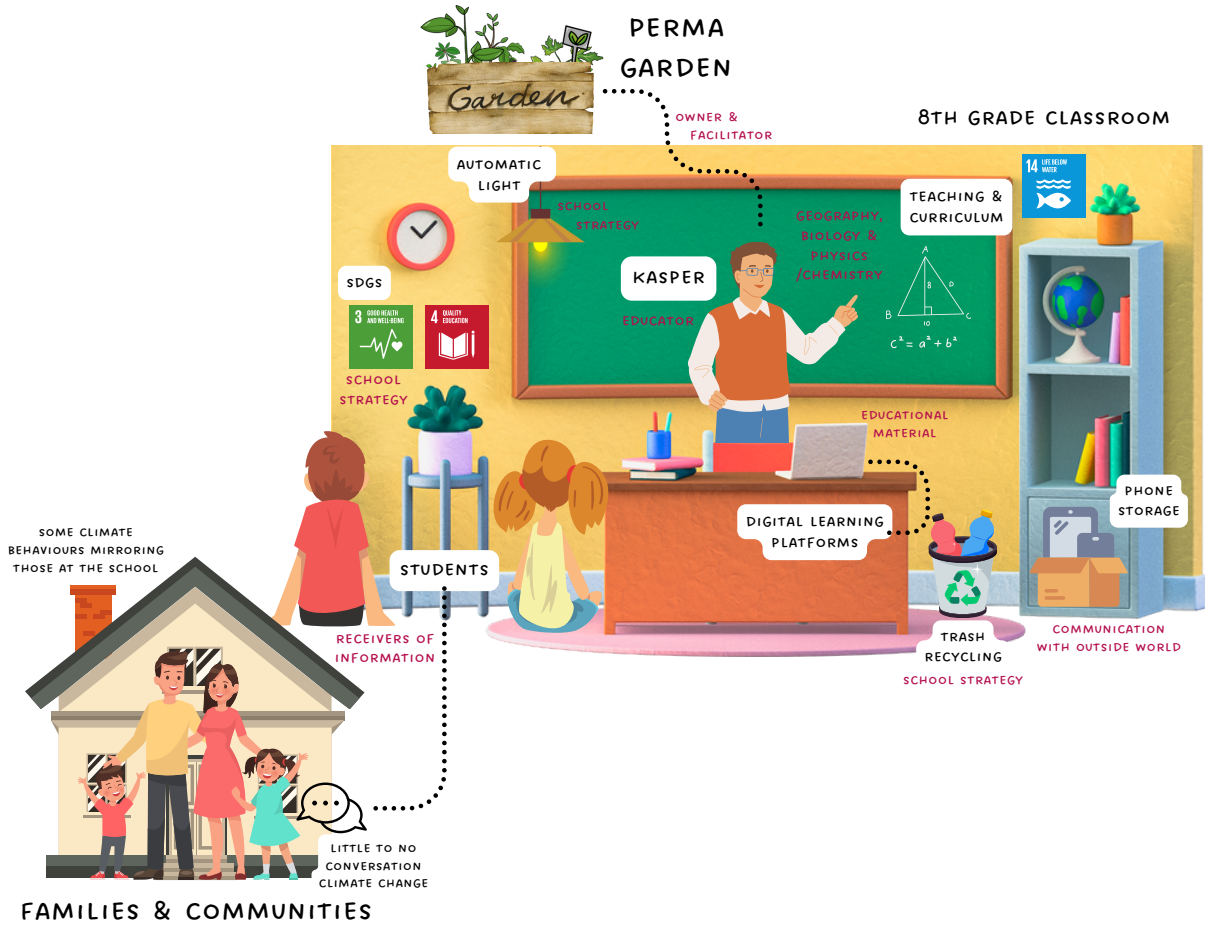

Figure 21: situational analysis of classroom dynamics and social settings.

As depicted in figure 21, the classroom serves as a focal point for the communication of sustainability as well as for the implementation of environmental education initiatives. As illustrated, the 8th grade classroom of Ringsted Ny Friskole has vibrant displays of the SDGs which constitute a daily reminder of the school's allegiance to the '2030 skoler' strategy, anchoring the concept of sustainability into the educational experience. Furthermore, this classroom is a unique ecosystem where the tangible elements of environmental action, such as well-ordered recycling processes and energy-saving lighting, blend into the students' learning journey, making sustainability not just a lesson but a lifestyle.

At the heart of this dynamic classroom is the interplay between the educational strategies of Kasper, the teacher, and the minds of his students. Kasper, with his dual role as an educator and steward of the permagarden, serves as a living link between the curriculum and real-world environmental engagement, holding the ability to promote green consciousness among the students.

The classroom also represents the crossing at which the lives of the students intersect with educational goals. The decision to collect mobile phones at the start of each class is furthermore a testament to their collective commitment to focus and engagement. The commitment to sustainability and education furthermore overlaps with their familial homes. While practices like recycling find their way from classroom to household, there is an opportunity to further weave the narrative of environmental awareness into their homes, bridging the gap between academic environmental advocacy and day-to-day practice.

In summary, Ringsted Ny Friskole's 8th grade classroom constitutes a microcosm of the school's broader mission (the 2030 strategy). It's a space where the decorations of SDGs are not mere adornments but are as integral to learning as textbooks, where the teacher's influence extends beyond academic instruction to impart life values, and where the students' active engagement shapes their learning environment.

4.3.4 Sub-conclusion

The initial workshop at Ringsted Ny Friskole revealed the 8th grade students' understanding and attitudes towards environmental sustainability. While students demonstrated active participation in sustainability practices, varying levels of concern about climate change were evident. Their feedback emphasized a desire for more nuanced discussions and deeper understanding of environmental issues beyond basic behaviors. Furthermore, their shared knowledge on climate change terminology serves as a crucial baseline to integrate into the design of the educational initiative. By employing situational analysis to deconstruct and understand the diverse actants within the classroom situation, one might apply a more integrated and holistic approach to environmental education - one that not only informs but transforms. Ultimately, essential take away from this workshop, for the later educational design, will be the students wish for a deeper understanding of climate change as well as potential integrations of their phsyical and sustainability themed environment. Moving forward, the focus will shift to the educator, Kasper, exploring his perspectives on climate education, while investigating how such initiatives might best awaken students' interests.

4.4 First Interview with School Teacher

4.4.1 Analysis of Kasper's Perspectives

The interview with Kasper, the main teacher of the 8th grade at the school, conducted on December 13th, 2023, provided valuable insights into his perspectives on the development of the transformative educational initiative aimed at addressing climate anxiety and promoting action amongst adolescents. Kasper's reflections shed light on key considerations regarding teaching strategies, student engagement, and the broader context of environmental education within the school.

One notable aspect of Kasper's approach was his emphasis on fostering student interest and engagement in the subject matter. He highlighted the importance of connecting classroom content to real-life experiences and anecdotes, stating, *"The more interest they have, the easier it is for me to teach them".* Kasper's use of informal, anecdotal teaching methods resonates with what I had learned at the KATAPULT conference, where humoristic anecdotes, among other, were promoted as a great way to foster interest. Kasper mentioned

"Many for example thinks that physics and chemistry is difficult, so telling them some anecdotes [is advantageous, ed.].

Furthermore, Kasper mentioned that my presence during the initial visit and class observation, had affected his focus area during the class. He mentioned *" because of your visit, I changed the class procedure a bit".* He went on to explain how he had reflected on the heavy topics within the climate change theme and had decided to teach the children about pollution-caused deaths.

He went on to add that he was happy about workshop 1 that initiated a conversation about climate change and anxiety. Both because we discovered that the children did not have so much climate anxiety, and because he had had a conversation with them after I had left about the consequences of climate change. He emphasized that the students did not know much on this topic, and there this could be a focus area for the future. A key take away for the later design of the educational initiative, which matches the conclusions on workshop 1 as well.

Moreover, Kasper's willingness to integrate contemporary cultural references, such as the film "Don't Look Up," into classroom discussions on climate change demonstrates his adaptability and creativity in engaging students with complex topics. By leveraging popular media, he seeks to make abstract concepts more relatable and accessible to students, thereby enhancing their understanding and emotional connection to the subject matter. Thus, referring to popular media topics within the final design might too be advantageous.

Additionally, Kasper underscored the significance of building trust and rapport with students to create a supportive learning environment conducive to open communication, he emphasized *"I think that is very important".* This supports how establishing trust and fostering a sense of psychological safety are essential for students to feel comfortable expressing their thoughts and concerns, particularly when addressing sensitive topics such as climate change - a key objective for the design of the educational initiative (Bengtsson & Höhle, 2023).

Following the theme of sensitive topics, Kasper shared some insights into the dynamics of sex education at the school. He had observed that students in later grades often initiate discussions about sexual education themselves to inquire learning on the topic, which reflects a broader trend of student-led engagement. This underscores the importance of creating a supportive learning environment where students feel empowered to explore and request to discuss challenging topics openly - matching the findings from workshop 1, where the students openly shared their wish for a deeper understanding of climate change consequences.

During the interview, Kasper talked about how the school being a "2030 school", prioritizing sustainability, shaped its approach to environmental education. He noted how having supportive parents who were resource-rich played a big role in getting students engaged with environmental issues. While this speaks to the discussed barriers within section 4.2.3 of potentially not having diversity amongst the students at the school (i.e. from less fortunate backgrounds) it highlighted how partnerships within the community is essential for promoting sustainable behaviors amongst students.

Kasper furthermore went on to mention his colleague Katja, and how he thought she was a great role model as she shows great enthusiasm into, for example, sorting out trash and other

sustainability behaviors. However, the students had during workshop 1 shared that they were not fond of Katja's teaching method, demonstrating a gap between how the students prefer being taught and how the teachers think the students wants to be taught. This underscores a need to consider the students explicit wishes for the educational initiative.

On how Kasper ended up managing the permagarden, he explained; *"My land is so big that I cannot manage to maintain it […]But then Katja suggested that we could use the garden for the school, and I said yes, as long as there is food for the bees. I really like wild nature. But the permagarden itself is very random"*. This adds on to the importance of community for the school, and the central part and commitment teachers take within the school's operations. And while this close knit community might also lead to barriers and lock-ins, these rich facilities at the school's premises might be an advantage within the educational design.

I finally asked Kasper about how I could increase my knowledge on didactics for the project; which topics within the theory he could recommend me reading up on. He admitted that while didactics is a central theory during the teacher education program and the beginning of his work as a teacher, it did not play a central role anymore. This indicates a potential gap in ongoing professional development within the teaching profession, where emphasis may shift away from foundational theories like didactics over time. As such, didactical expertise and theories might be relevant topics to research in connection to this project, if resources allow for it.

4.4.2 Sub-conclusion

In summary, Kasper's insights from the interview provide a comprehensive understanding of the dynamics within the educational context and highlight essential considerations for the development of a transformative educational initiative. His emphasis on fostering student interest and engagement, integrating contemporary cultural references, and building trust and rapport with students underscores the importance of creating a supportive learning environment conducive to open communication and critical thinking. As such, these are essential considerations to bring forward into the design process of the educational initiative. Moreover, his reflections on the school's commitment to sustainability and community partnerships further emphasize the role of educators in shaping students' attitudes and behaviors towards environmental issues. However, Kasper's acknowledgment of a potential gap in ongoing professional development within the teaching profession regarding foundational theories like didactics suggests opportunities for further exploration and development in this area. Ultimately, Kasper's insights offer valuable guidance for designing an effective educational initiative that addresses climate anxiety and empowers adolescents to become agents of change in their communities.

4.5 Workshop 2: Codesigning Solutions

In the following, we will dive into the learning environment within the 8th grade classroom (cf. figure 22) and the students' answers to the second workshop, as described in the methods section, aimed at investigating their preferences when it comes to learning initiatives. Due to the nature of this workshop, shifting its focus from individual tasks to group work, the ethnographic observations will be added under their suitable subsection accordingly.

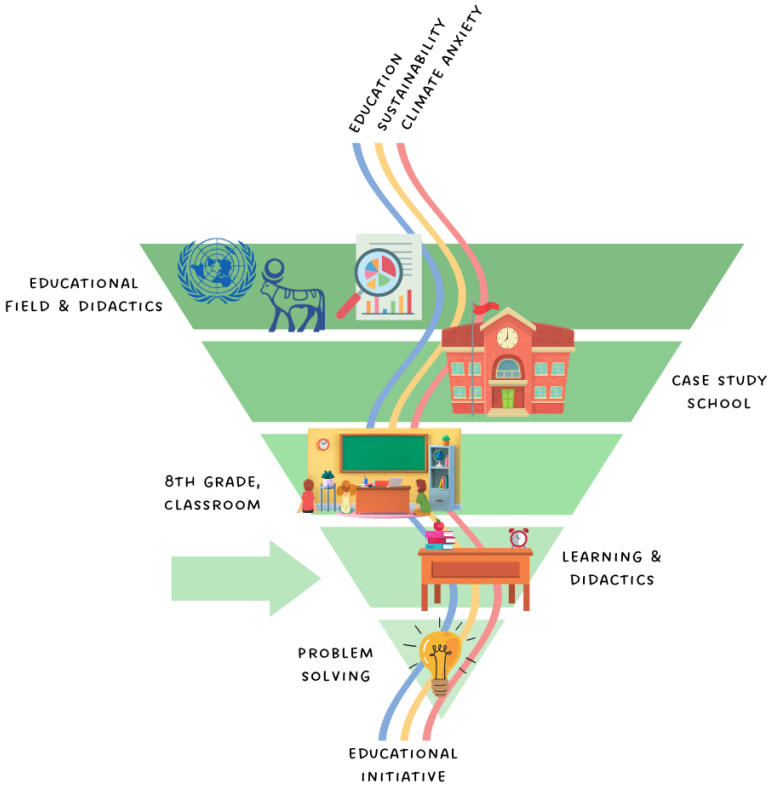

Figure 22: Focus area for the following chapter, being the case study school.

4.5.1 Ethnographic Observations: Individual Tasks

December 15th, 2023

Engaging with the class this time, felt more natural as they had already met me merely two weeks ago. For that reason, the worksheets were handed out not long after I entered the classroom, and after I had introduced the worksheet, the students started answering the question.

While they worked individually, I walked around the class to make sure I was reachable did they have any questions. Some of the students were brainstorming quiz questions, and per request I tried to add in with some topics such as 'fast fashion' (being unsustainable fashion). Compared to the formal interactions I had had with the students during my last visit, they today expressed joyfulness towards me, as well as appreciation for my presence. 'We love it when you are here because we get to make something fun. We really love your classes. You should be a teacher here and teach us about sustainability'. I then asked, 'but don't you think if I stood up in front of the class that you would find what I say boring?' They said no, we think what you teach us is cool for example fast fashion. I asked them, following the discussion from my last visit; What is it about sustainability you find boring? And they once

again expressed how they find their teacher Katja boring and annoying. They did however say these things while smiling and laughing. They expressed that she is very energetic. As such, the criticism did not seem harsh but instead friendly.

4.5.2 Workshop Analysis; Individual Tasks

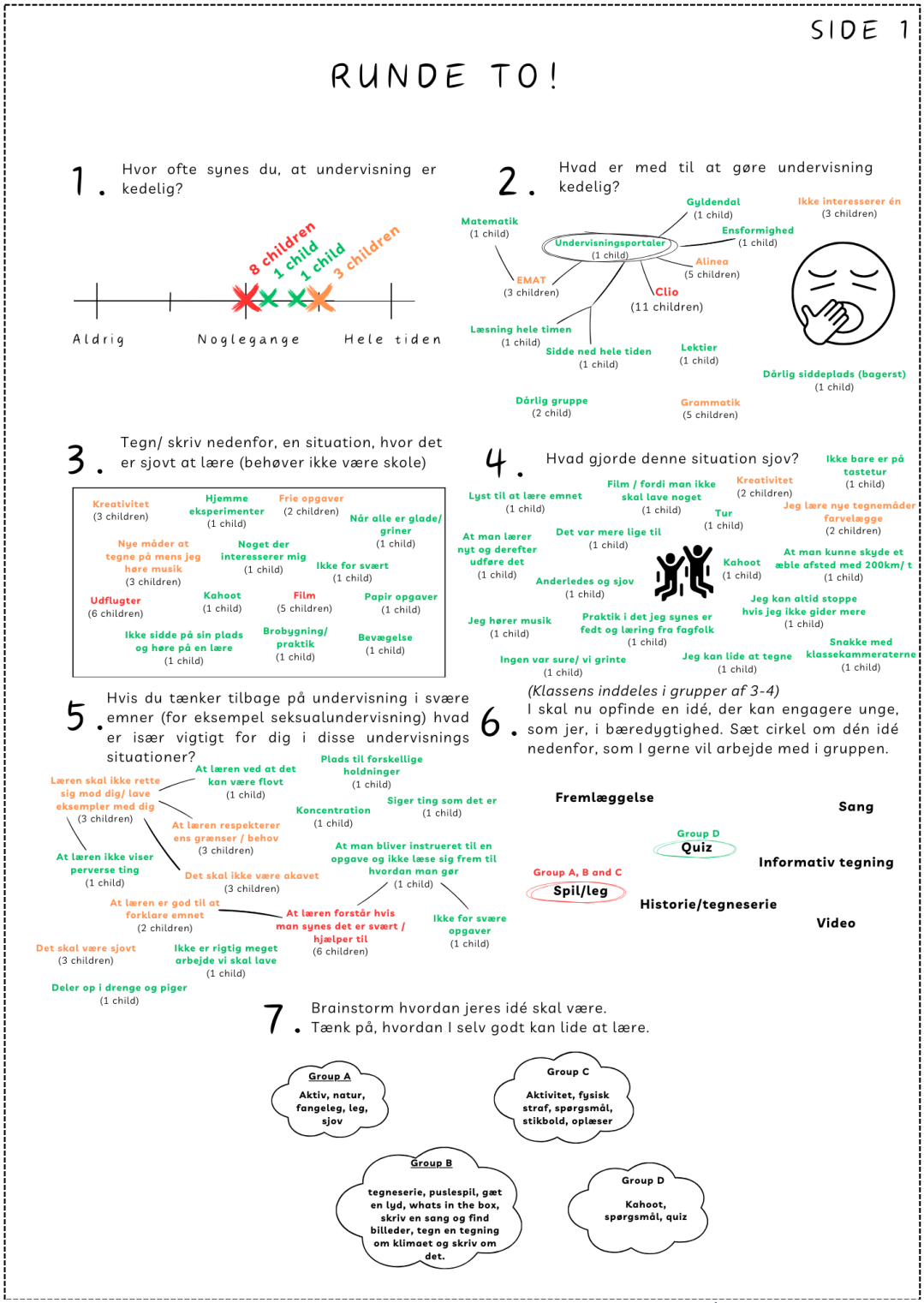

Figure 23: Worksheet from workshop 3 (page 1) with answers by the 8th graders.

Displayed above on figure 23 is workshop 2, where student's responses are graphically represented and categorized by color-coded hotspots. Red indicates the most frequent responses, followed by less common ones in yellow, and even rarer ones in green. For the first question, it emerged that the majority of students perceived their education as somewhat monotonous, with a handful deeming it predominantly dull. These findings thus might support the inclusion of fun and humor within the final design.

Delving into the second question, students critiqued online educational platforms, notably 'Clio', where 11 students expressed that it contributes to making education boring. The third question prompted students to ponder over more stimulating educational initiatives. It became apparent that excursions, films, and more inventive, autonomous activities like sketching were highly favored; all being essential take aways to consider for the design of the final educational initiative. No doubt being, that any digital educational initiatives should be excluded within this report.

In addressing the fourth question on why these activities piqued their interest, students offered various responses. However, common themes surfaced, emphasizing enjoyment, creativity and positivity, which have been deemed important.

Question 5 steered the conversation towards how to approach heavy subjects, such as sex education. As illustrated in figure 23, there is a connection amongst various responses. Students articulated a desire for recognition of task difficulty, seeking support and guidance. They also emphasized the importance of mutual respect for personal boundaries by educators and peers, particularly by avoiding using students as examples or creating discomfort. These become important considerations for when fun, competition and humor might be considered to be included in the final design - it is highly important that the students feel respected and comfortable within the setting simultaneously.

4.5.3 Ethnographic Observations: Discussion in Plenum

December 15th, 2023

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Following their initial work on the worksheets, both individually and a few questions with their respective groups, I observed that while the groups had been working on their games for some time, the discussions had shifted away from seriousness. Recognizing this, I decided to convene a session in plenum with the students to gather their thoughts on their individual tasks in the worksheets. This, without collecting their worksheet, but merely facilitate a casual group discussion. I initiated the discussion by addressing the issue of boredom in class, drawing attention to the number of students who had expressed dissatisfaction with Clio, describing it as dull.

One student elaborated that they had been using Clio for an extended period, and to clarify to me, they explained, that Clio consisted of a menu offering texts across various curriculums. Another student shared that the more they used the website, the more tired they became of it after just a class or two. Confirming whether the repetitiousness was the primary issue, they nodded in agreement. When prompted for suggestions to make it more engaging, they struggled to articulate specific ideas.

Another student chimed in, expressing that traditional teaching methods, whether involving educational portals or classroom instruction, were inherently dull if they confined students to their seats. Agreeing to this, another student highlighted the enjoyment derived from field trips. Additionally, a student emphasized their appreciation for drawing and the creative aspect of learning, an aspects which I had already strongly considered to include in the final design of the educational initiative.

4.5.4 Workshop Analysis; Group Tasks

For Question 6, students were grouped and asked to conceptualize an activity that would impart the principles of sustainability to others. As depicted in figure 24, the majority of groups chose to create a game, with one selecting a quiz format. This showed, that while the students expressed a need for seriousness when it came to sex education (cf. figure 23), the heavy topic of climate change might need less seriousness to allow for comfortability, according to the students. Question 7 challenged the groups to ideate and gather keywords that would encapsulate the essence of their envisioned project. As shown, the groups pursued different thematics for their initiative, however the previous found interests, such as drawing, creativity, excursions and activities, are highly present within the essence of their ideas.

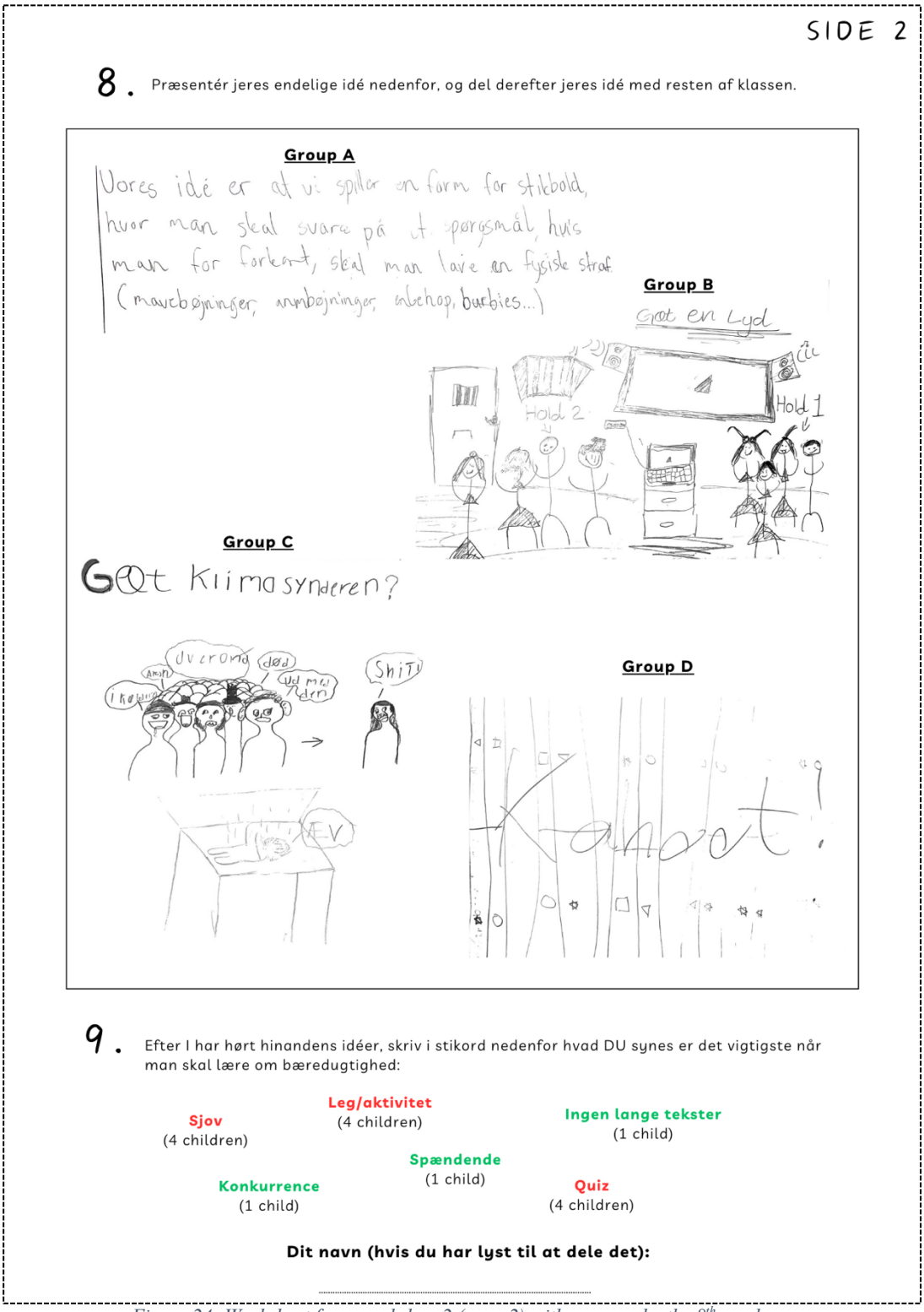


Figure 24: Worksheet from workshop 2 (page 2) with answers by the 8th graders.

As can be seen in the response to question eight, the four groups worked together to design their final ideas to communicate sustainability to other young people like themselves. These ideas will be explained in detail in the following ethnographic observations, as they were presented in plenum by the students' groups. After having heard each other present, the

students expressed that fun, games and activities as well as quizzes, to them, is highly essential when having to learn about sustainability (cf. question nine).

4.5.5 Ethnographic Observations: Group Ideas

December 15th, 2023

While the students finished working on designing their educational initiatives, I talked to Kasper, and he expressed how the educational portals are both a great learning source but that he now also reflected on the fact that the teachers might not be good enough at incorporating them.

The various groups were tasked with presenting their educational concepts. The first ensemble, Group B, introduced their game titled 'Guess a Sound.' One participant proposed a competitive format involving two teams. A sound linked to climate change would be played, and the teams, each equipped with a unique buzzer sound, would race to identify it first. The examples provided, such as the sound of people screaming, were intended to underscore the dire aspects of climate change. The group found this game engaging due to its novel approach, a departure from traditional platforms like Clio, and its element of competition.

Group A followed with their 'Cue Ball' concept (in Danish: 'stikbold'), a dynamic game intertwining sustainability queries with the physicality of playing the widely known cue ball game. An incorrect answer might result in a playful physical consequence. When asked about the preference for preliminary instruction, the group expressed a desire to dive directly into the game, suggesting that physical activity could enhance their learning experience. They shared that their fondness for cue ball inspired this idea.

Another group, Group C, described their 'Catch the Climate Sinner' activity, drawing parallels to the popular game 'Among Us.' In this scenario, a designated 'climate sinner' would stealthily blend in with other participants, all while fielding climate-related questions. If accused, the sinner could deflect suspicion onto another, mirroring the gameplay of 'The Wolf is Coming.' This alternative to traditional learning was praised for its engaging, mystery-solving aspect.

Lastly, an individual from Group D expressed a preference for 'Kahoot,' a quiz-based platform. He suggested integrating this game post-reading sessions on Clio, believing that the anticipation of a competitive Kahoot challenge could bolster information retention. He highlighted the appeal of the game's competitive nature, requiring both speed and intellect for success.

4.5.6 Workshop Analysis: Design Ideas

So, what are the students trying to say with these ideas, as presented in the ethnographic observations above? The students are conveying a clear preference for interactive and competitive learning experiences over traditional educational methods. Their innovative concepts suggest that they find learning about sustainability more engaging when it involves active participation, a sense of play, and the thrill of competition - potentially via sport and

physical movements. All of these take aways are essential to consider for the later design of the educational initiative. They are furthermore advocating for a shift from conventional platforms like Clio, seeking alternative methods that incorporate movement, teamwork, and game mechanics that require quick thinking and problem-solving. These preferences also indicate that the students value a learning environment where they can be physically active while mentally challenged, which they believe can make the serious topic of sustainability more accessible and memorable. The incorporation of elements from familiar games and sports suggests a desire to connect new knowledge with existing interests, connecting the motivational power of fun to enhance their educational experience.

4.5.7 Sub-Conclusion

Overall, and cf. the three key thematics on figure 22, the students' game designs and preferences indicate a desire for educational approaches that are dynamic, interactive, and divergent from traditional learning methods. They favor incorporating elements of competition, physical activity, and familiar gaming concepts into their learning process, particularly in the context of sustainability education; key considerations to bring forward when designing the final educational initiative. Overall, this suggests a broader trend towards interactive and engaging learning styles that could potentially be more effective in capturing student interest and improving retention of the complex subject of climate change.

4.6 Workshop 3: Solution Experimentation

The third codesigning workshop utilized a different format compared to those of Workshop 1 and 2, by engaging the students in a designed game initiative in addition to the codesign approach. As can be seen on figure 25, for this workshop, the key objective and focus will be problem solving by designing - and testing - the educational initiative.

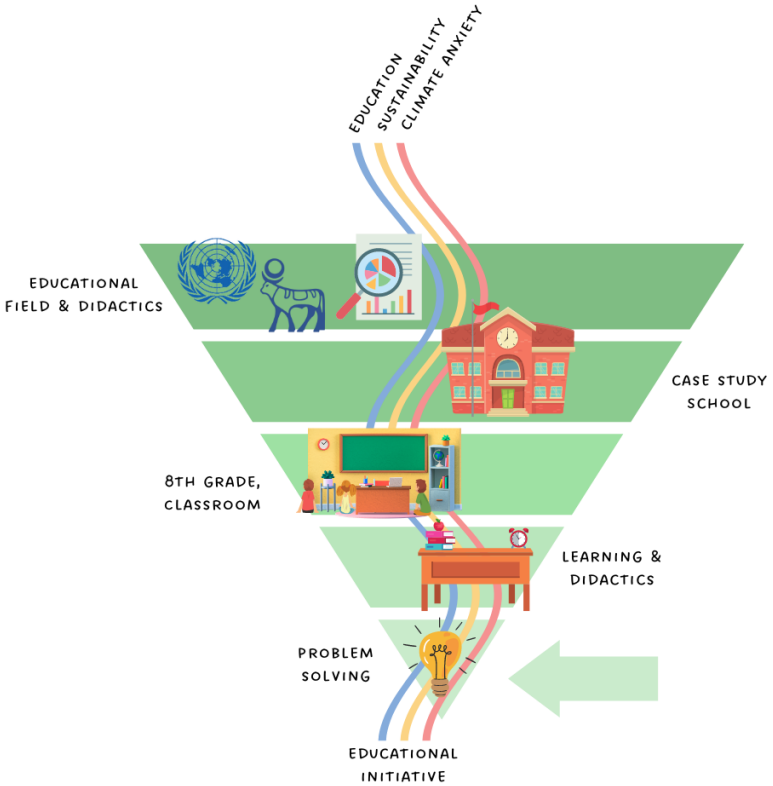


Figure 25: Zooming in on the problem solving of the project; designing and testing the educational initiative prototype.

4.6.1 Design Idea Brainstorming

Following the general methods on design games as well as codesigning, a game was designed utilizing the key take aways from Workshop 1 and 2 - these both from ethnographic observations, situational maps as well as the worksheet findings. The inspirations and brainstorming leading to the design can be seen on figure 26 below.

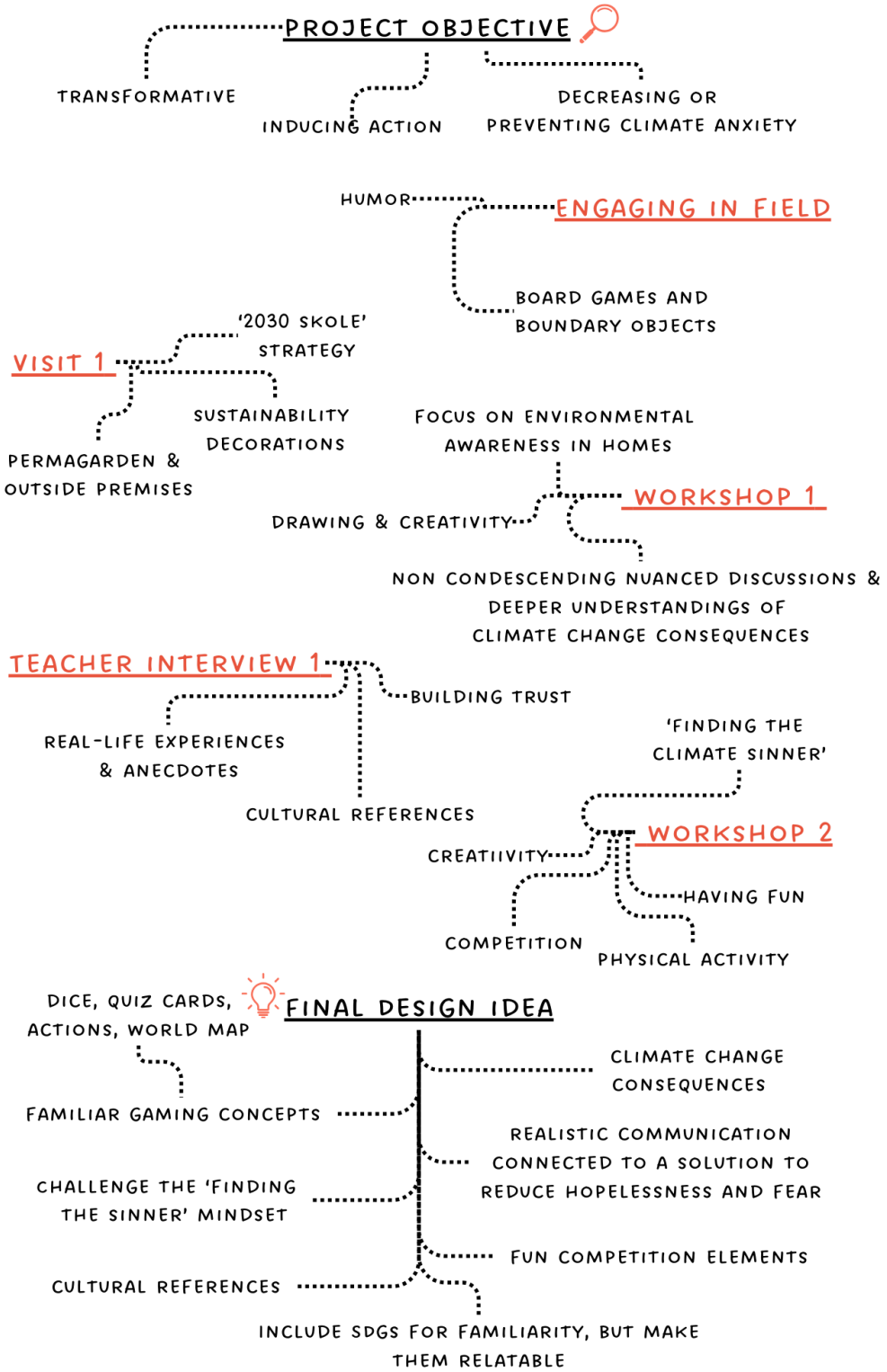


Figure 26: Overview of inspiration soruces for the final design of the transformative educational initiative.

Following the project objective; to design a transformative educational initiative that would reduce climate anxiety and induce action, essential elements was added onto the design idea from the initial visit, workshop 1 and 2, as well as the interview with the teacher, Kasper.

Having the permagarden and large natural areas accessible within the school premises, one initial though was to utilize these areas for the design idea. This was, however, later decided against due to lack of resources and capacity within this one-person group.

From workshop 1, environmental awareness, on a deeper level, lack within the students' homes. It furthermore was clear that they were particularly fond of drawing in the class. With this design idea not only intending to be customized the students age group, but these particular students, including drawing in the final design was highly considered. Finally, during workshop 1 it was found that the students lacked a nuanced understanding of climate change consequences. Being important with clear incentives to induce action on climate change, educating on broader consequences on climate change became a high priority.

When interviewing Kasper, he advocated for using real life examples and anecdotes. While this too was a great suggestion, it was decided, that real life examples were already quite present within the school environment; sorting out trash, using energy saving light, reusing clothes etc. For that reason, keeping the focus on educating on the deeper consequences of climate change remained the main approach to the design idea. Kasper also advocated for building trust, which aligned with the main objective for workshop 1. When mentioning cultural references, this was highly considered, for example through the inclusion of (perhaps known) climate initiatives or problems such as the Paris agreement, lab grown meat, trash island and celebrity jets.

Following workshop 2, the student's preference towards creativity and having fun during class, were confirmed. They furthermore shared, through their design educational ideas, that they like competition, physical activity, and also, that they found it a fun task to find the so-called 'climate sinner'. This particular design idea indicated that having someone to take the blame for human caused climate change might be of interest. However, knowing that many educational initiative revolved around introducing environmental behavior within citizens regular life (such as the schools sustainability initiatives and strategy), I considered to also include perspectives on large polluting companies or celebrities. This, to further the students thinking on human caused climate change, to allow for their own individual thinking and considerations on the matter.

Finally, the ideas to be included in the final design idea was decided to be perspectives on climate change consequences while connecting these to a potential solution to reduce hopelessness and fear. In addition, competition elements would be included, and to allow for less complexity of the design idea, and from inspiration from attending the KATAPULT conference, it was decided to do that through familiar game elements such as quiz cards, dice, a world map and action cards. Finally, in respect to the schools 2030 strategy, and to allow for familiarity, the SDGs would furthermore be included, and referenced to in the quiz cards. This, to allow for a further understanding of the SDGs, and practical examples of their meaning.

4.6.2 Design Idea Generation

After the initial brainstorming, having decided upon the essential building blocks of the initiative, the design of the cosmetics and formulation of the detailed rules, began. For the particular design of the game, Canva was used. The game elements designed will be listed in the following.

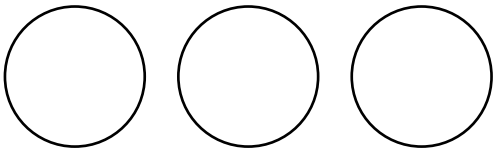
Game Concept & Gameboard

Below can be seen the design of the gameboard for the game 'Klimaets Vogtere' (English: 'Guardians of the climate'). As can be seen, the gameboard depict a world map with various fields, exclamation marks, and question fields. Around, the SDGs are added for referencing within the quiz cards, which will be described in the following.

Figure 27: Gameboard for 'Klimaets vogtere' (Guardians of the climate).

Illustrated around several locations as exclamation marks, are specific climate problems as well as solutions, such as ocean garbage, melting permefrost, solar energy and wind energy.

Bricks



For the bricks, which the students will use to represent them in the game, will be used white paper, cut out in small circles which the students can draw their own figure on. This, to make the students feel included into the design process as they had expressed a liking towards

drawing and creativity during workshop 1. There are no requirements for the figure the students can draw.

Quiz Cards

The quiz cards, which will be answered when bricks land on the question marks, will revolve around many relevant climate change subjects, with a few examples below.

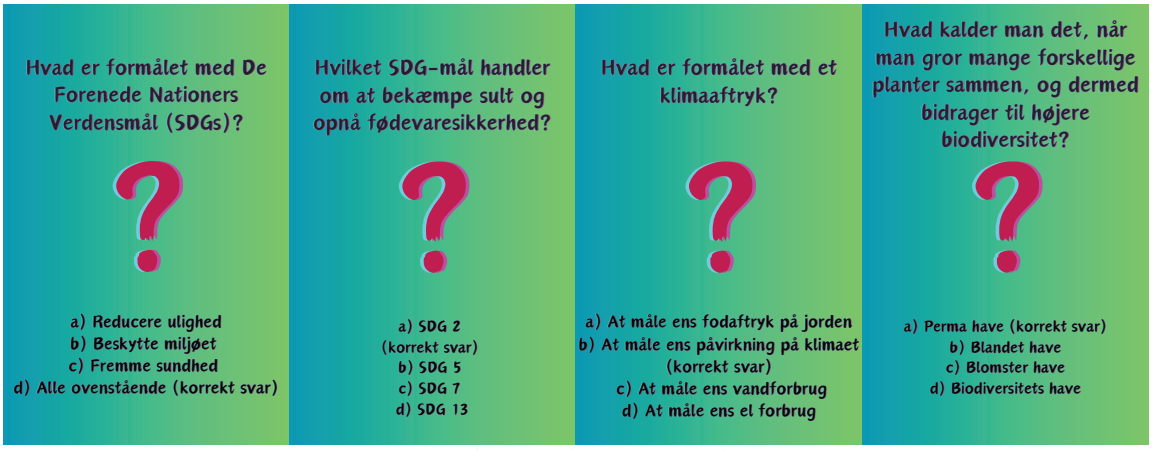


Figure 28: Examples of quiz cards in the original Danish language.

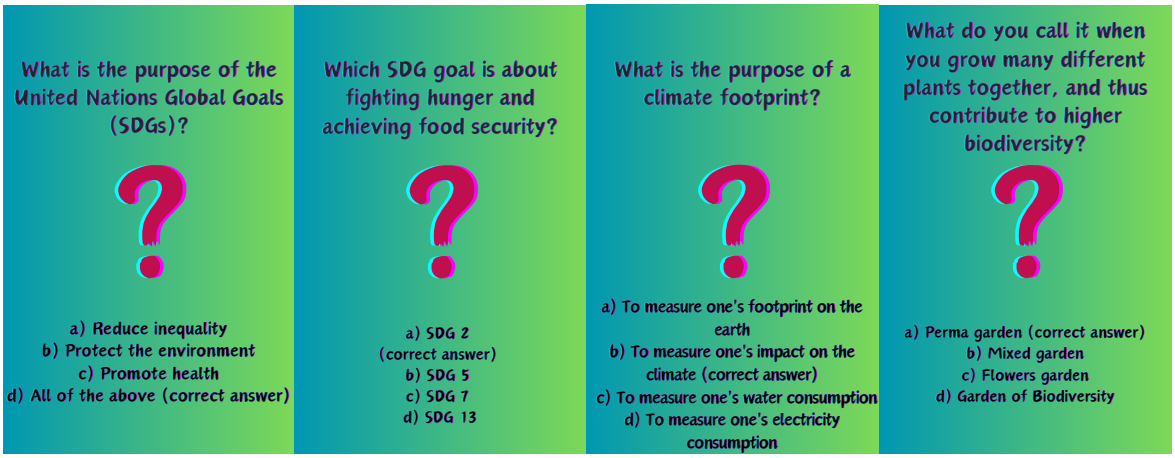


Figure 29: Translated quiz cards; from Danish to English.

To validate the presence of the SDGs on the game board, various of the quiz cards represent a question revolving around the SDGs. This is to allow for a better, and practical, understanding of them, while appealing to the schools '2030 skole' strategy. When a question is answered correctly, one climate point, as seen below, is given to the player.

Figure 30: Climate point.

Problem/ Mission Cards

For the actions to take during the game, problem/mission cards are drawn by each player prior to initiating the game. A few examples of these can be seen below.

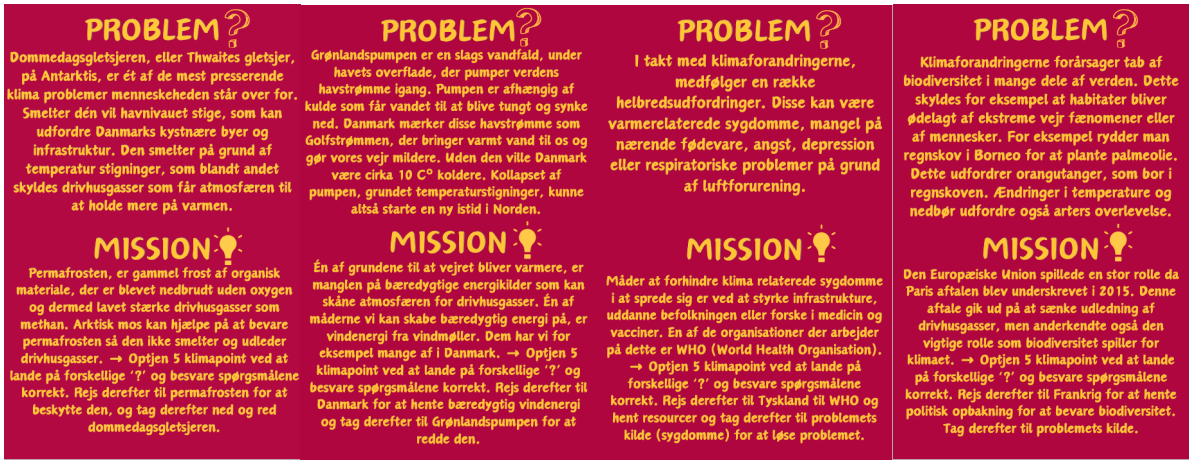


Figure 31: Examples of problem/mission cards in the original Danish language.

Figure 32: Examples of problem/ mission cards translated from Danish to English.

As can be seen on the example cards, the problem is a direct but thorough explanation of a current climate problem, such as the doomsday glacier, ocean current collaps, climate related health challenges, or loss of biodiversity. While these terms might be linked to hopelessness, they have been used to avoid shielding the students from the common used terms, which they

might sooner or later run into. And to then intend to reduce the feelings of hopelessness regarding climate change, each problem has been linked to a mission constituting a potential solution. For example, for the ocean current collaps, the players are asked to collect sustainable energy, in the form of wind energy, in Denmark. Here, Denmark has been added as a location to allow for an association with their home environment, as well as positivity towards our production of wind energy.

Solution Cards

When players reach the location of their mission, location cards are handed out. For simplicity, the cards take form as the country or location in which the mission leads them to, and not the potential solution. For example, players are asked to spread awareness on trash recycling in Argentina, collect sustainable wind energy in Denmark, go to World Health Organization in Germany and find political solutions on climate change related diseases, and save the permafrost in Greenland.

Figure 33: Examples of location cards where the potential solutions are located.

Game Rules

Finally, the rules on the boardgames can be seen below. As can be seen, the players are asked to land on the questions marks to collect climate points by answering the sustainability questions correctly. Finally, they are asked to reach the location of their respective climate problem to win the game.

KLIMAETS VOGTERE: Regler

1. Fordel jer i hold på 2-4 personer.
2. Tag en rund brik og tegn din figur i spillet. Brug max 2 minutter. Du vælger helt selv hvad det skal være.
3. Placér jeres brik på et tilfældig startfelt på spillepladen.
4. Alle spillere tager et 'problem/ mission' kort, og bruger et par minutter på at gennemlæse kortet grundigt. Kortene holdes hemmelige for de andre spillere.
5. Alle personer slår én gang med terningen. Personen med det højeste tal starter. Derefter fortsættes spillet uret rundt.
6. Ved hver tur slås med terningen én gang, og ens brik rykkes terningens antal prikker på spillepladen. Spilleren vælger selv hvilke retning man går.
7. Når man lander på et ? trækker personen til ens venstre side et ? kort fra bunken, og læser spørgsmålet højt. Hvis spilleren gætter korrekt, får spilleren et klimapoint (**grønt kort**). Hvis ikke, går turen videre.
8. Lander man på det samme felt som en medspiller, kan personen der rykkede sin brik sidst på feltet, vælge imellem to straffe til medspilleren; **1.** at fratrække et klimapoint fra medspilleren, eller **2.** at slå medspilleren hjem til hvor de startede.
9. Når man lander på lokationen som ens ´problem/mission´ kort påkræver, svares der igen på et ? kort. Kun hvis der svares korrekt, har spilleren løst opgaven og kan trække kortet med lokationen (for eksempel ´Sahara´)
10. Spilleren vinder spillet ved at bringe lokationskortet til problemets kilde (!).

GUARDIANS OF THE CLIMATE: Game Rules

1. Divide yourselves into teams of 2-4 people.
2. Take a round piece and draw your character in the game. Spend 2 minutes (max). You choose what the drawing should be.
3. Place your piece on a random starting square on the game board.
4. All players take a 'problem/mission' card and spend a few minutes reading the card thoroughly. The cards are kept secret from the other players.
5. All persons roll the dice once. The person with the highest number starts. The game then continues clockwise.
6. At each turn, the dice are rolled once, and if the checker is equal, the dice's number of dots is moved on the game board. The player chooses which direction to go
7. When you land on a ? the person to your left draws a card from the ? deck and reads the question out loud. If the player guesses correctly, the player gets a climate point (**green card**). If not, the tour continues.
8. If you land on the same field as a fellow player, the person who moved their piece last on the field can choose between two penalties for the fellow player; **1.** to deduct a climate point from the fellow player, or **2.** to knock the fellow player back to where they started.
9. When you land on the location that your 'problem/mission' card requires, you answer a ? card again. Only if the answer is correct, the player has solved the task and can draw the card with the location (for example 'Sahara')
10. The player wins the game by bringing the location card to the source of the problem (!).

Figure 34: Game rules for 'Klimaets vogtere' (Guardians of the climate), Danish as handed out to the students on the left, translated to English on th right.

4.6.3 Solution Experimentation

When the day for workshop 3 arrived, the students were divided into groups of 3-4-4-3, each group with a paper showing the game rules.

Figure 35: Game, cars and bricks, as handed out to the 8th grade during workshop 3.

To allow for better engagement, and to accommodate for the student's lack of interest in lectures, I merely presented the game rules superficially, and then asked them to use the paper with the game rules as their guideline. I furthermore mentioned to them, that the game

was a prototype and for that reason might lack some elements and had room for improvement.

As expected, the class was keen on the drawing task in making their personalized bricks. The drawn bricks showed a variety of faces and objects, as can be seen below.

Figure 36: The 8th graders drawing the bricks before playing the boardgame.

The students then initiated their game, some groups faster than others. One group, in particular, initiated the game before knowing the rules of the game, indicating that the game depicts familiar board elements, that allow for a straightforward understanding of the game's foundational elements. One student asked if it was the boardgame 'Afrikas stjerne' and I admitted that that particular game had been a subconscious inspiration for my game without me realizing it.

Figure 37: The 8th graders playing 'Klimaets vogtere' (Guardians of the climate)

While playing, many of the students called my name, and our communication, particularly during today's workshop, had turned quite informal and humoristic, indicating an increased sense of trust and, in general, closer relations. Some students were also curious on me and my

education, and asked various questions such as when I would graduate, what my degree was about and my own knowledge on climate change.

When the students had played for a while and had understood their respective missions and answered various climate question, many of them realized the rule about how one could steal another players climate point. For that reason, laughter became very noticeable in the classroom, while the students competed to reach their destination first.

After playing the game, the students were each given a worksheet with questions to evaluate their game experience. As can be seen on figure 38, the students' answers have been mapped following the same color coding as the prior worksheets; red being the most common answers, yellow being less common, and green being unique answers by the students.

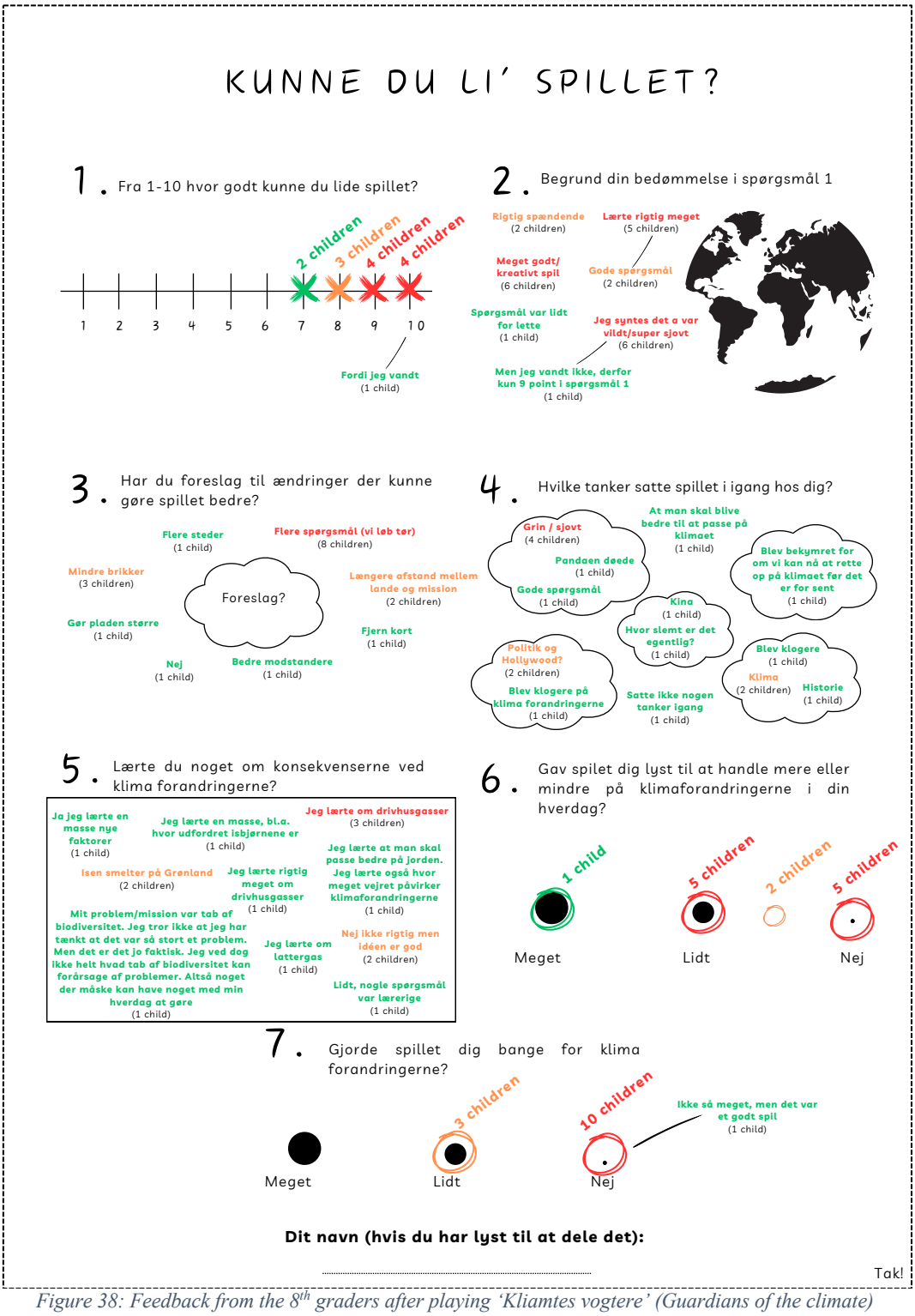


Figure 38: Feedback from the 8th graders after playing 'Kliamtes vogtere' (Guardians of the climate)

The feedback from the 8th grade students, regarding the educational boardgame design, revealed promising insights. The game, aimed at decreasing climate anxiety while encouraging proactive behavior, was generally well-received, with students rating their enjoyment between 7 to 10 on the scale. This positive response underscores the game's potential as a learning tool. Some students humorously admitted their lower initial ratings were influenced by not winning the game, an aspect that speaks to the game's engagement level.

Suggestions for improvement included the addition of more question cards and an expanded game board; a feedback that is not surprising as the boardgame distributed in the class were prototypes with room for improvement and expansion.

Reflecting on the game's impact, students found it to be enjoyable and humorous. It also sparked discussions on serious topics such as climate and politics, with students acknowledging an increased awareness of the urgency of climate action. However, a note of concern was raised by a student who expressed worry about the timeliness of such actions, which directly relates to the project's objective of addressing climate anxiety, as well as raise thoughts on whether their concerns were met appropriately or should have been handled differently.

When exploring the educational value of the game, students shared that they had gained knowledge about greenhouse gasses and the melting ice in Greenland, indicating the game's success in conveying factual information about climate change. Yet, when discussing the game's influence on their willingness to act, responses varied, with the majority indicating either medium or no willingness to act more on climate, as well as one student feeling significantly motivated to act more.

Concerning the game's emotional impact, most students reported not feeling scared about climate change, with a few acknowledging a slight increase in concern. These findings are relevant to consider for future improvements to the game, where a more delicate balance between climate change education and well-being might be taken on. Here, it would be relevant to zoom in on the few students who did feel a bit anxious, to investigate what could be done to incorporate their needs in the design of the educational initiative, e.g. via more comforting use of language.

Moving forward, these observations, complemented by the following conversations with their teacher (as will be described in section 4.7), will be instrumental in refining the game. The objective remains steadfast: to foster an educational environment where awareness and action are cultivated in a manner that mitigates climate anxiety, rather than worsening it. This codesign approach, involving students in the developmental process, is key in creating a learning experience that is both informative and transformative.

4.6.4 Sub-conclusion

In summary, the educational board game trialed with the 8th grade students, while targeting the three key thematics from figure 25, has shown positive potential as a means to both inform and engage young learners in the critical subject of climate change. The enjoyment level expressed by the students affirms the game’s appeal, while their suggestions for improvement highlight an active engagement with the material. Crucially, the game has successfully sparked meaningful dialogue on climate issues and has variably influenced students’ intentions to act, all without inducing significant climate anxiety. However, some relevant concerns on the game’s potential to fully mitigate climate anxiety were raised, making room for future potential refinements of the initiative. Overall, the game aligns well with the thesis's aim of creating an educational experience that responsibly heightens awareness and induces action. The codesign methodology employed ensures that the game evolves through direct participant feedback, promising a learning tool that is both impactful and aims to be sensitive to the students' needs.

4.7 Second Interview with School Teacher

This second, and casual, interview with Kasper, conducted following the third workshop, unfolded naturally, encompassing a range of topics related to the educational board game. A notable point of discussion was didactics and language, where Kasper's observation on the quiz card question - 'What is the greatest source of greenhouse gas emissions?' - illuminated the complexities of language interpretation in educational content. As a science teacher, Kasper interpreted the question literally, expecting a single source rather than a list of several elements. He stated, *'if you asked a language teacher, they might have a different opinion and put a different weight on the word 'greatest'*. His experience underscores the necessity for clear communication in educational materials, critical for the project's mission to present climate information that is accurate yet accessible, aiming to reduce misunderstandings that, potentially, could lead to climate anxiety.

He went on to mention that he was fond of the game, and that he thought there were *'many fantastic elements'* such as the familiar boardgame elements. He noted, same as I had noticed, that one group had even initiated the game without reading the rules due to this familiarity. These familiar game elements, alongside the game's inherent fun, was seen as a valuable asset for enhancing students' learning curves, which is essential to the thesis's objective of engaging students in climate education through interactive and enjoyable means.

Addressing the SDGs, Kasper provided a fresh perspective; despite students' frequent exposure to the SDGs, he perceived the game's integration of these goals as beneficial, noting, '*they are bombarded with the SDGs all the time […] but now they are seeing them in a different context, with examples, while having fun, so I think it is a really good idea to include them.*' This aligns with the thesis's objective of presenting climate education in a transformative manner that captivates and educates - hopefully in a non-boring manner.

When further discussing the game's complexity, Kasper appreciated the questions' difficulty level on the quiz cards, stating, *'if it becomes too difficult, the fun disappears and thus some of the learning[…] so rather too easy than difficult […] but the level of difficulty of the game and questions was very suitable to the age group of the students.'* His comments echo the project's aim to balance educational content with engagement, maintaining a level of challenge that is appropriate for the age group.

When talking over the design of the game, he mentioned *'the layout is super great, and if the game board could be just one level bigger, it would look like the boardgames they have at home'*. When then talking about how I had focused on the world map rather than zoom in on everyday situations, I noted that this had been a consideration to meet the students' desires for deeper understandings and nuanced conversations about climate change consequences. This, as well as due to the amount of current focus on sustainability in every-day situations at the school, which Kasper agreed on, and noted how he liked the different locations on the game board.

He then went on to mention how the boardgame could be analyzed mathematically in terms of how many questions each player stumbles upon, and thus the different distances from the start fields to the missions. We then talked on how the numbers on the dices too were random and how that would probability complicate such calculations.

Concluding with the sentiment that the game was *'cool'* and could be suitable even for students as young as within the 6th grade, Kasper's feedback reinforces the project's overarching goal: to codesign an educational initiative that not only educates about climate change but does so in a way that is engaging, age-appropriate, and has the potential to extend its impact across different educational levels, all while aiming to reduce climate anxiety and provoke meaningful action.

4.7.1 Sub-conclusion

The insights from Kasper's interview post-workshop illuminate the success and areas for refinement in the educational board game, underscoring its efficacy in blending climate education with enjoyment. His perspectives highlight the critical need for clear question phrasing to avoid misconceptions. Kasper's approval of the game's engaging elements and its ability to present the SDGs in a novel, enjoyable context reaffirms the game's alignment with the thesis's objective. Moreover, his confirmation of the game's complexity as well-suited for the students' age, and his suggestion to increase the game board size, speak to its potential as a scalable learning model that can serve to a broader educational spectrum.

5 Final Design Solution

In this concise chapter, we will briefly explore the updated design of the board game, highlighting the subtle yet impactful changes made, or considered, following workshop 3 and the enlightening dialogue with Kasper. Given the game's general positive reception amongst the students and the teacher, only a handful of adjustments were promoted by them.

Figure 39: Updated gameboard with subtle cosmetic improvements.

As can be seen above, a few cosmetic adjustments have been made, including making the fields more distinctive through coloring (start fields), as well as adjusting the size to a bigger game board, which will be done when printing the game for next use. In addition, adjustments have been done to the grammatic on the quiz cards, as an example the following cards have undergone the following adjustments:

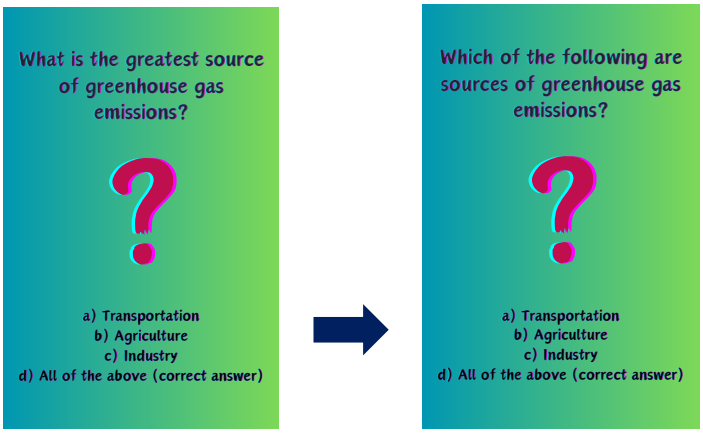


Figure 40: example of fine grammatic adjustmemts of quiz cards

While other, more comprehensive changes might be relevant to explore, at this stage, and with the allocated resoruces, only these subtle changes were incorporated. However, to list the potential improvements considered after engaging with the students and teacher post-play, these would be:

- Engaging with the students' expressing of slight climate concern to understand the cause of it.
- Potentially avoid terms that have a negative meaning, such as 'doomsday glacier', despite it being a common used term.
- Thoroughly go over all quiz cards to ensure their direct and clear meaning.
- Potentially involve a source of didactical expertise, to ensure grammatics and instrutions within all game elements are optimal.
- Reflect on the amount of critical reflections that were promoted during the game, amongst the students, and thus the transformative abilitities of the initiative.

6 Discussion

This following discussion chapter will critically examine the analysis findings and implications of this project, exploring the educational initiative's significance within the broader context of sustainable design engineering and climate education.

6.1 Strengths & Weaknesses

Firstly, this subchapter will discuss the strengths and weaknesses of the designed educational initiative, as well as the project's approaches and outcomes.

To begin with the fundamental questions: did the 'Guardians of the Climate' initiative effectively alleviate climate anxiety and inspire action amongst the students? The results are mixed. Based on the evaluation worksheets from the 8th graders post-gameplay (workshop 3), the majority indicated they did not experience climate anxiety after having played the game, however three students reported feeling it to a degree, suggesting areas where the game could be refined, e.g. through the improvement suggestions in chapter 5. When it comes to inciting climate action, the responses were split: five students felt no wish to change in their environmental behaviors, two noted a very slight shift, five reported a slight inclination towards action, and one student felt strongly motivated to engage in climate-positive behaviors. These varied responses reveal that while the game showed more promise in preventing climate anxiety, it had a less pronounced effect on stimulating climate action. This feedback is invaluable, providing a directive for future iterations of the game to enhance its impact on student empowerment and environmental stewardship.

Additionally, in response to the students' feedback, 'Guardians of the Climate' appeared to effectively raise awareness about the repercussions of climate change. A majority of students were able to recount specific climate-related concepts learned through the game, such as the impact of greenhouse gases or the ice melt in Greenland. This indicates that the educational aspects of the game resonated with most participants. Nonetheless, two students acknowledged that despite finding the game engaging, they did not gain new knowledge from the experience. This suggests that while the game succeeds in educating on climate issues, there is room to enhance its informational delivery.

So, what might the shortcomings of 'Guardians of the Climate' be, that could perhaps be improved upon? Student feedback predominantly pertained to the aesthetic aspects of the game, a reminder that they engaged with a prototype. In post-game discussions, one relevant point emerged, particularly during the final interview with Kasper: the choice of language warrants careful consideration, cf. improvements suggested in chapter 5. For instance, the term 'doomsday glacier' as a stand-in for 'Thwaites Glacier' could inadvertently reinforce perceptions of climate change as an inevitable apocalypse (Stoknes & Espen, 2014). This kind of language might amplify climate anxiety, contradicting one of the game's objectives. In light of these insights, enlisting didactical expertise during the development phase could potentially refine the educational impact of the game, as will be discussed further in the following.

This project's ambitious goals - to alleviate climate anxiety and motivate climate action - are undeniably challenging to achieve simultaneously. Especially, while attempting to meet the student's requests being to enhance their understanding of climate change, which added on to the predetermined objective, and thus seeking to carefully navigating the balance between

education and the risk of inducing climate anxiety. Hence, the identification of specific improvements is not unexpected but part of the iterative process of game development. This continual refinement is vital to ensure that the game not only educates but also empowers its players to engage with climate issues constructively, cf. codesign methodology and importance of collaborative refinement (Sanders & Stappers, 2012).

Evaluating the project's effectiveness can be enriched by applying Walshe & Sund's (2022) framework of 1st, 2nd, and 3rd order of learning. This framework critiques the predominant and traditional educational focus on knowledge acquisition, prompting a reflection on how 'Guardians of the Climate' aligns with these concepts. Although the board game was designed to generate critical thoughts amongst the 8th grade students, one must question whether the game's design truly realized this aim. Insights from workshop 3 suggest that while the game successfully enhanced the students' knowledge about climate change, it fell short of ambitiously fostering critical thinking. The game's strategy was to present information without mandating specific environmental actions in the students' daily routines. Knowledge was imparted indirectly through gameplay, yet the opportunity for students to engage directly in critical thinking - such as matching climate solutions to problems independently - was not fully capitalized upon. Consequently, despite aspirations to move towards 3rd order learning, which involves deeply challenging one's beliefs and values, the initiative, in its current form, appears to rather navigate the transition from 1st order learning, centered on knowledge acquisition, to 2nd order learning, which encourages reflection and understanding. This evaluation indicates that future iterations of the game should integrate more dynamic problem-solving elements to move firmly into the realm of 3rd order learning as envisioned by Walshe and Sund (2022).

6.1.1 Didactical Expertise

The incorporation of didactical expertise into the project 'Guardians of the Climate' could substantially augment its educational efficacy. Didactics, the art and science of teaching and learning, is a cornerstone of educational initiatives, ensuring that content is not only engaging but also pedagogically sound. An expert source in didactics thus could offer insights into the cognitive development stages of the 13-14-year-old target demographic, tailoring the game's complexity and learning outcomes accordingly. While this might potentially threaten the entirety of the current game prototype, one must be open to better alternatives to the educational initiative.

Bengtsson & Höhle (2023) offer a method to enhance climate education by acknowledging how the current focus is too skewed towards cognitive learning, and not the emotional impact which climate change can have on students. Their idea is to integrate principles from constructive journalism into educational content design through a toolkit of three design solutions that aims to balance emotional and cognitive learning: solutions orientation, future orientation, and community orientation. The intent of these toolkits is to encourage a democratic and participatory approach to learning, while empowering the students, fostering agency, and finally mitigate climate concerns, apathy, and fatalism. Such a didactical approach could provide a structured methodology to better align the game elements with educational objectives, such as enhancing critical thinking or group collaboration skills. This expertise is particularly beneficial in ensuring that the game not only educates on climate change but also effectively equips students with the competencies to engage in climate action, a key aim of the initiative.

The involvement of a didactic specialist could furthermore ensure the scalability and adaptability of the game for different educational settings, a crucial factor for widespread implementation. By leveraging their knowledge, the game could be designed to meet various educational standards and incorporate assessment tools, which would be invaluable for teachers and educators seeking to integrate 'Guardians of the Climate' into their curricula.

Furthermore, didactical expertise could inform the iterative design process of the board game, guiding the refinement of prototypes based on educational impact assessments. This collaborative effort between design engineers and didactic professionals could lead to a more nuanced and impactful educational tool, potentially increasing its acceptance and success within the educational market.

Furthermore, instead of an in-person didactics specialist, further references for didactical theory and its application in educational design could be found in educational psychology literature, curriculum development journals, and texts specializing in instructional methodologies.

6.2 Market Creation Value

While there certainly is room for further improvement, the current educational initiative prototype 'Guardians of the Climate' is not only a promising pedagogical tool but also represents significant business potential and market value within the educational sector. Designed as a board game with familiar gameplay elements, it benefits from the widespread popularity of board games, which facilitates its entry into the production stream and potential adoption by schools, institutions and perhaps families. The predominant positive response - both on the project's objective, but also in terms of fun and laughter, competition and learning - from testing with an 8th grade class confirms its appeal to the target age group (14-16 years), indicating a market ready for innovative educational tools that tackle climate issues in an engaging manner.

Moreover, 'Guardians of the Climate' is not just a game; it's a conversation starter, an educational device, and a gateway to understanding complex environmental issues in a format that resonates with young minds. With a market increasingly seeking sustainable and educational products (Petro, 2022), this initiative holds the potential to create, or contribute to, a new niche: educational entertainment that prepares the next generation for environmental challenges while promoting a focus on mental health, fun and excitement. By integrating the principles of sustainable design engineering, the initiative ensures that the product is not only educational but also adaptable, durable, and aligned with the growing emphasis on sustainable practices.

Drawing on the insights from Çalışkan and Callon (2009) and their discussion on modes of valuation and the economy of qualities, the market potential of a sustainability board game becomes a compelling narrative of value creation. They underscore the intricate process of valuation beyond mere price mechanisms, focusing on how diverse qualities are appraised within market dynamics. In line with their theories, launching a sustainability board game into the market leverages these principles by inviting players, especially young learners, to assess the game's educational and social impact - qualities that extend beyond the functional attributes of the game itself.

The positive feedback from 8th grade testers indicates that the game somewhat embodies and imparts the values of environmental stewardship and active engagement with climate issues. These are the "qualities" that can be calibrated in the "economy of qualities," where the game's success is not solely measured by sales but also by its capacity to educate and inspire. By focusing on these broader, qualitative aspects of valuation, the game could potentially redefine success in the marketplace as it promotes sustainability, aligning with an emerging consumer emphasis on ethical and socially responsible products (Petro, 2022).

In conclusion, 'Guardians of the Climate' presents a compelling case for market entry as it meets a pressing educational requirement - cf. initiatives such as ‘2030 skoler’ and the case study schools wish to integrate sustainability intro its curriculum and operations - with a product that is both academically and commercially viable.

7 Conclusions

In conclusion, this thesis contributes to the field of sustainable design engineering by merging psychological well-being with participatory design in an educational setting. Tackling the question, “how can a codesigned transformative educational initiative contribute to provoking action for children aged 14 to 16, while avoiding provoking climate anxiety?” this study seeks to navigate the interplay between education, sustainability and environmental action, as well as climate anxiety. The 'Guardians of the Climate' board game, trialed with the 8th graders at Ringsted Ny Friskole, showcases an early stage, yet promising, interactive learning tool intending to stimulate a dialogue on climate issues through fun and competition elements, while intending to safeguard students' psychological comfort. Although the game was well received by the students and their main teacher Kasper, it revealed opportunities for enhancement, particularly in amplifying critical thinking and the involvement of didactical expertise - e.g., in terms of its instructions and use of language - to fully mitigate climate anxiety, and effectively inducing action. This awareness invites continuous refinement and encourages future projects to build on this groundwork. As such, the project not only expand the realm of sustainable design but also advocates for interdisciplinary approaches that navigate the environmental and emotional landscapes of climate education. By doing so, this thesis does not mark an end but a beginning, charting new territory in sustainable design that engages, educates, and empowers, ensuring that today’s students become tomorrow’s agents of change, ready to shape a more hopeful and sustainable world.

7.1 Contributions to Sustainable Design

This thesis project, centered on codesigning a transformative educational initiative with an 8th grade class at Ringsted Ny Friskole, uniquely contributes to the field of sustainable design engineering by integrating social behavioral understandings with environmental education. The approach adopted in this project, extends beyond traditional sustainable design paradigms by emphasizing the mental well-being of the students and intending to foster a sense of agency and empowerment amongst them. This dual focus addresses both the scientific and mental health dimensions of sustainability and climate change, thereby enriching the discourse within sustainable design engineering. Such an approach is crucial in educational settings where young minds are shaped, making it possible to cultivate a generation that is both environmentally conscious and psychologically resilient.

The use of codesign methods within an educational framework too presents an innovative approach to sustainable design engineering. By actively involving students in the design process, the project not only enhances the relevance and applicability of the educational content but also empowers students to contribute creatively to the development of design solutions. This participatory approach ensures that the solutions are culturally and contextually appropriate, thereby increasing the likelihood of social impact and engagement (cf. figure 1 and 2). Moreover, the iterative nature of codesign allows for continuous refinement of the educational initiative based on direct feedback from both students and the teacher (Sanders, E & Stappers, 2008).

By placing the study within the context of an educational institution and applying ethnographic methods, this thesis also provides an overview of how sustainability is taught and received at the unique and sustainability driven case study school. Findings show that by acknowledging emotions regarding climate change, we can unlock new potential pathways to learning and action e.g., through fun, game and competition. This thesis too leverages and contributes to existing sustainability frameworks, such as the SDGs, by demonstrating practical applications in a school setting.

Implementing transformative education principles to foster climate action is also a notable advancement in the field of both sustainable design as well as education. By shifting from traditional teaching methods to a more interactive and student-centered approach, the initiative seeks to align with active learning environments. Despite the room for improvement on the designed educational initiative, this project in its entirety has too been a great place for me to apply my sustainable design skills and competences, and further my understandings of this field via deeper understandings of the unique interplays contributing to - or hindering - commitments to environmental awareness. Ultimately, the development and refinement of the educational board game underscores the transformative potential of sustainable design when it responds to the needs of its users - in this case, the 8th grade students at Ringsted Ny Friskole.

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Appendix 1: Interview Guide

A: Interview 1: With Teacher

A. *What do you, as a teacher, generally consider before classes?*

A.1 *What about classes or workshops on more heavy topics, for example sex education?*

B. *How do you create an interest and enthusiasm for the topics you teach in?*

C. *What would you deem important if you were to teach about the consequences of climate change?*

C.1 *How might being a 2030 school affect this and which frameworks does it involve?*

D. *Can you recommend any teacher theory, such as on didactics, for me to read up on to better understand how to comprehend the design process ahead?*

B: Interview 2: Casual Interview with Teacher

A. *Feedback on design solution; overall design and cosmetics.*

B. *Didactics considerations; language and grammatic.*

C. *Difficulty of educational initiative; is it suitable for the age group?*

D. *Inclusion of the SDGs - suitable or too boring?*