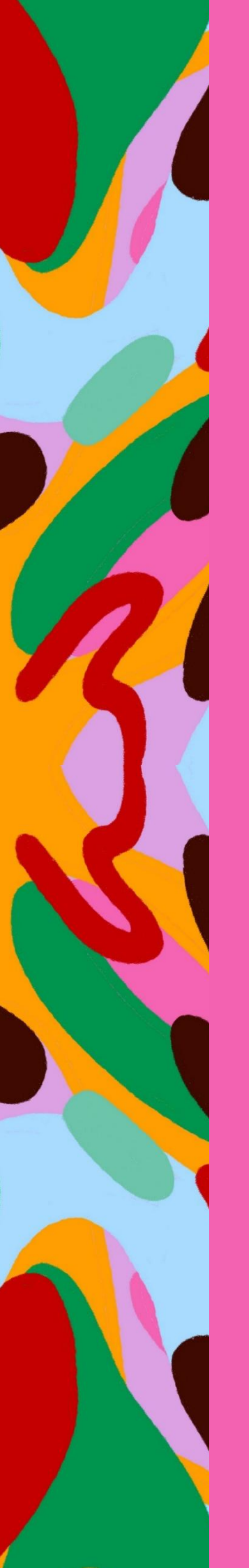

Shuffling perspectives: a card game-based approach to DEI training for higher education professionals

I.R. Que

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Author:
I.R. Que (s1014697)

Thesis supervisor:
Dr. M. Kaufmann

Internship organization:
Collectief Caleidoscopia, Netherlands

Internship supervisor:
M. Kessler

Radboud University Nijmegen
Nijmegen School of Management
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Preface

In a somewhat grim and quickly changing societal and political climate, my ambitions regarding social sustainability have grown over the past years. My life as student in Nijmegen has shaped my ideas on how to put these ambitions into practice. I am thankful for *Collectief Caleidoscopia* and Radboud University for giving me the opportunity to research the Caleidoscopia card game as DEI training tool.

Thanks to all educators of the Fontys Pedagogy department that participated in the training. Witnessing your openness and eagerness to learn during the training has left me with a great sense of joy and hope.

My gratitude also goes out to all members of *Collectief Caleidoscopia*. The amount of knowledge, passion, and commitment you exude continues to inspire me. I feel proud to be able to contribute to your societal mission.

I want to thank Maria Kaufmann for the constructive feedback and support. Her supervision was of great value in this creative, sometimes complex, process. More importantly, she reminded me how much I enjoy burying myself in the big puzzle that is societal research.

I hope you enjoy reading this thesis and that it will inspire you to self-reflect and start some uncomfortable conversations with colleagues, friends, and family. For a world in which all bodies and identities can find their place in education and beyond.

Iris Que

Nijmegen, November 2025

Summary

Over the past decades, Diversity, Equity, and Inclusion (DEI) training and policies have gotten more attention in higher education institutes. The Dutch government emphasizes the need for knowledge on effective interventions to support DEI goals and create more inclusive educational environments to reduce inequalities. Despite these commitments, empirical research on how DEI training works and why certain aspects bring about actual change remains limited. Traditional training formats (e.g. lectures) often lack opportunities for reflection and practice, which are deemed essential for deeper understanding. Serious gaming formats pose a promising alternative approach to counter these barriers. Therefore, this explores the use of an intersectional serious card game as approach to DEI training for higher education professionals.

In order to do so, this research aims to understand how the *Caleidoscopia* card game-based training can enhance intersectional analytical skills and support intended behavioral change. Guided by transformative learning theory (Mezirow, 1978; 1991; 2000; 2003) and intersectionality theory (Crenshaw, 1989; Collins & Bilge, 2020), this study shows how the card game format in this study can contribute to the transformation of perspectives and more inclusive behavior among higher education professionals. The study adopts a mixed-method, quasi-experimental one-group pretest-posttest design, using qualitative and descriptive quantitative data from individual written case analyses (n=6), participant observations (n=9), open-ended surveys (n=7), a group discussion (n=6), Transformative Learning Environments Survey (n=6), and an interview with the trainers and game developers (n=2).

Findings show that participants' intersectional analytical skills improved notably in three of the six intersectionality concepts described by Collins & Bilge (2020): intersecting power relations, relationality, and social justice. Participants showed growing awareness of their own positionality and saviorist tendencies while showing increased motivation to apply intersectional insights in their classrooms and beyond. The card game-based training provided a transformative learning environment characterized by a sense of safety to share, group dialogue, and structured practice with concepts. Both the game and adequate trainer guidance played key roles in creating the conditions for transformative learning.

This research contributes to theory and practice by linking intersectionality and transformative learning through a serious card game-based DEI training format. It shows how game mechanisms can make abstract DEI concepts more tangible and actionable, providing a versatile and theory-backed approach to DEI training for higher education professionals. These mechanisms may also be valuable in the development of broader sustainability education strategies. Findings highlight the importance of institutional support and openness to experimentation with creative alternative methods to build more intersectionally inclusive educational environments and societies.

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Chapter 1: Introduction

Over the past decades, various well-known sustainability frameworks from different fields have defined sustainability and its connection with a social and educational dimension. For example, Elkington's (1994) Triple Bottom Line and its slogan *''People, Planet, Profit''*, that emphasizes the importance of socially equitable environments alongside ecological and economic considerations. Or Raworth's (2012) Doughnut Economics model that includes *''a safe and just space for humanity''* of which gender equality, social equity, and education are foundational. Similarly, the United Nations' (2015) Sustainable Development Goals (SDGs) explicitly calls out equity and inclusion as pillars of sustainable development with SDG 5) Gender equality and 8) Reduced inequalities. Additionally, SDG 4) Quality education aims to ensure that all individuals receive inclusive, equitable, and high-quality education and lifelong learning opportunities (United Nations, 2015). The Dutch Ministry of Education, Culture and Science has also shown their commitment to equitable education with the National action plan for greater diversity and inclusion in higher education and research (2020): *''By inclusion we mean a safe learning and working environment in which everyone feels at home and is able to flourish, and where a broad range of perspectives are considered and brought into play.''* (p.7). A growing body of research shows that beyond individual stereotyping, bias, and discrimination, structural factors related to the functioning of organizations like educational institutions can reproduce social inequalities on a broader level (Autin & Butera, 2016). Morales-Doyle (2017) adds that justice-centered education can play an important part in driving social transformation, emphasizing its role in addressing societal inequalities. Moreover, integration of social equity is an essential component in developing successful sustainability strategies within higher education institutes themselves (Evans et al., 2017).

Discrimination in higher education occurs within and between various dimensions of an individual's body, identity, and environment: where and how you are born and develop, both physically and mentally, influence your experience in higher education, both as student and employee (Vereen & Hill, 2008). Research by independent media from 21 higher education institutions in the Netherlands reveals that anti-racism and gender identity are the topics that provoke the most intense reactions (AD VALVAS, 2023). Additionally, inadequate responses from instructors and administrators to subtle or explicit discrimination lead students to view the classroom as unwelcoming (Garvey & Rankin, 2015). The following section provides a few examples of how different intersecting aspects of one's body and identity form sources of inequality in higher education. Zooming in on gender-based discrimination, Wood et al. (2018) found that female students are significantly more likely to experience sexual harassment than male students, with women facing 86% higher odds of harassment from faculty/staff and 147% higher odds from peers. Looking at sexual orientation, colleges and universities continue to be unwelcoming environments for LGBTQ+ students (Vaccaro,

2012). Additionally, transgender and non-gender conforming students experience significantly higher amounts of harassment compared to cis-gender students, which can severely impact their educational experience and mental health (Garvey & Rankin, 2015). Racism in Dutch higher education is evident in the academic performance disparities, with non-Western minority students consistently underperforming and Western minorities facing challenges despite initially outperforming Dutch students (Isik et al., 2017). Ethnic minority students often experience discrimination through limited faculty support and understanding or other systemic barriers, leading to alienation and decreased motivation (Pásztor, 2010). Moreover, the Dutch self-perception as a tolerant and progressive society often leads to avoidance of discussions on racism and discrimination, attributing ethnic disparities to non-discriminatory factors, which legitimizes inequities and justifies inaction (Mijs et al., 2023). This challenges the effectiveness of current Diversity, Equity & Inclusion (DEI) training efforts (Derrick et al., 2021) in the Netherlands specifically. Looking at physical and mental capabilities, participation in education for people with disabilities is limited by inaccessible curricula, faculty's negative attitudes, and physical barriers (Ferni & Henning, 2006; Fernández-Batanero et al., 2022). Moreover, presence of students with disabilities in universities is increasing and research shows the importance of faculty training on disability-related matters, raising awareness about students with disabilities, ensuring the availability of specific support services, and creating positive attitudes (Morgado et al., 2016). Your (parent's) educational background matters as well. On average, first-generation college students complete fewer credit hours, achieve lower grades, are less likely to graduate on time, and face a higher risk of dropping out compared to continuing-generation college students (Ishitani, 2003; Pascarella et al., 2004; Weisen et al., 2024). Discrimination within higher education thus negatively impacts the educational experience and outcomes. These intersecting forms of exclusion and their detrimental consequences for individuals show how systemic inequalities persist within higher education environments, underlining the need for effective methods to tackle these issues.

1.1 Societal relevance

In order to do so, universities have been investing time and money into DEI programs (Derrick et al., 2021). For example, Radboud University (2024) proposed to yearly spend €300.000 of decentralized employment condition funds (DECF's) on DEI from 2024 to 2028. Another annual €300.000 is going towards Social Safety, of which interventions to make organizational culture safer are essential: *''the discussion about integrity, standards and values, as well as cultural and demographic diversity in terms of employee backgrounds, provides and insight into the causes and effects of behavior and helps us develop social integrity standards for collaboration.''* (Radboud University, 2024). In total, this makes up around 35% of Radboud's total annual DECF's of €1.700.000 (Radboud University, 2024). Unfortunately, the effectiveness of DEI interventions remains difficult to assess (Derrick et al., 2021). Moreover, attempts to make education more inclusive

regularly encounter resistance from both supporters and opponents of diversity policies (AD ALVAS, 2023). This is partly because the debate has moved beyond performance goals (e.g. women quota) to more politically sensitive issues like inclusive teaching, intersectionality, pronouns, and gender-neutral toilets (AD ALVAS, 2023).

But why do we not just push for clearer regulations to solve these issues? Because equal rights on paper does not mean equal opportunities: inequality and implicit bias are not just cognitive issues, but structural ones, embedded in the culture and practices within educational institutions (Liu & Jones, 2024). Though secure funding and policies are conditions for fostering inclusive practices in higher education, training staff to improve capacity for inclusive thinking and behavior is crucial for successful implementation of DEI initiatives and actual institutional and cultural change (El-Amin, 2023). Additionally, effective teaching methods and accessibility tools do not require just appropriate technical resources but also supportive teaching practices (Morgado et al., 2016). Similarly, the Royal Netherlands Academy of Arts and Science (KNAW) notes that formal regulations do not automatically change anything in actual practice and reports tend to be put away and forgotten over time (2022). In response to this advisory report, the Dutch Advisory Committee Diverse and Inclusive Higher Education and Research (DIHOO) (2022) emphasizes the importance of raising awareness of power and privilege and holding discussions on what is deemed normal behavior to ensure cultural change. Moreover, they underline the importance of scientifically proven interventions in awareness-raising and prevention. Similarly, the National action plan (2020) states that an important condition to realize DEI commitments is *''relevant knowledge of working interventions''* (p.9). Additionally, DIHOO's (2022) advice and The National action plan (2020) both emphasize the importance of an intersectional approach to DEI: *''We use a broad definition of diversity, covering not only characteristics that tend to be visible (e.g. gender, cultural background) but also characteristics which may be either less visible or invisible (e.g. disability, psychological illness, chronic illness, sexual preference, socio-economic background, beliefs, religion, talents, working style, education, experience)''* (p.9).

But why may listening to a few lectures on DEI not be enough to make people think and behave differently? As Mezirow (1991) emphasizes in his theory of transformative learning (TL), meaningful change is not achieved through the passive absorption of information. Instead, transformation is a continuous and critical process in which individuals examine, challenge, and revise their underlying assumptions, beliefs, and behaviors. In the context of DEI, transformation is not just a process and practice on personal, interpersonal and systemic levels; it is the goal of cultural change itself (Wong, 2019). Traditional forms of DEI training (e.g. lecture formats) often fail to achieve lasting results due to limited engagement and lack of opportunities for practical application, which are essential for behavioral change and deeper self-reflection in participants (Naidoo, 2023; Wu et al., 2019; Cerceo et al., 2022). Research shows that serious games can effectively enhance knowledge retention, support behavioral change, and adapt to

diverse participant groups, making them a tool with great potential for DEI training interventions (Su et al., 2014; Schuller et al., 2013). Research on the use of card game learning for DEI training thus directly contributes to the objectives of the Sustainable Development Goals (United Nations, 2015), the Dutch National action plan for greater diversity and inclusion in higher education and research (2020), and recommendations from KNAW (2022) and DIHOO (2022). Additionally, outcomes are especially useful for DEI trainers, teachers, managers, DEI officers or other individuals that are looking for empirically studied DEI training methods or tools.

1.2 Scientific relevance

Given the interconnected nature of social inequality and education, the societal relevance to address discrimination in higher education reinforces the scientific relevance of empirically researching specific DEI intervention methods. Moreover, this study contributes to the following fields of research in different and interconnected ways: intersectionality, transformative learning, DEI training, and serious gaming. As the creator of the term intersectionality, Crenshaw (1989) explains, systems of oppression do not act independently but intersect, creating unique experiences of inequality and marginalization for individuals. Intersectionality is therefore a key concept for this research, as it provides the analytical lens to understand how higher education professionals recognize and respond to issues where both their own and other bodies and identities are at play. Moreover, intersectionality is the fundamental concept for the serious card game studied in this research. This research contributes to this field by researching how a game-based approach to DEI training can improve intersectional analytical skills. This aligns with a growing interest in embedding intersectionality not only in theory but also in professional development and educational practice, where non-intersectional approaches can lead to superficial or ineffective DEI efforts (Busche & Hartmann, 2024; Icaza Garza & Vázquez, 2017).

As explained earlier, transformative learning (TL) as described by Mezirow (1991) involves a process of critical self-reflection and revising of one's assumptions and behaviors. TL is therefore a key concept in this research, as it provides a framework for understanding change within individuals as a result of an educational intervention. Framing this DEI intervention within TL, this research examines whether and how a card game-based method fosters critical self-reflection and reassessment of assumptions, which are key mechanisms of TL (Mezirow, 1991). Moreover, this research provides empirical insights into how such interventions can shift perspectives on power, privilege, and systemic inequalities within higher education, which is an essential part of both DEI training practice and research. This study therefore also contributes to the connection of the field of intersectionality to TL, as conscious and informed action towards a more equitable environment is fundamental to intersectionality itself (Collins & Bilge, 2020).

This research contributes to the field of serious gaming by empirically studying a card game-based DEI training intervention as an alternative to traditional, lecture style

approaches that are proven to be less effective in creating lasting behavioral change due to their lack of engagement, dialogue, and practical application opportunities (Salas et al., 2012; Naidoo, 2023; Wu et al., 2019). Card games offer a versatile and low-cost alternative method that can improve self-reflection, collaboration, and open discussion of sensitive topics like discrimination, while increasing knowledge retention and skills (Ward et al., 2019; Joseph et al., 2024; Fanning & Gaba, 2007). By applying this format to a DEI intervention for higher education professionals, this research addresses a gap in empirical research on analog game-based learning, while contributing to the development of more science-backed DEI training methods (Lee, 2012; Wang et al, 2024; Palencsár & Szilágyi, 2023).

1.3 Research aim and questions

In summary, there is a clear public and scientific call for more concrete knowledge on the working of effective tools for DEI training in higher education. The aim of this study is to explore how a card game based approach to DEI training can increase intersectional analytical skills and intended behavioral change. To reach this aim, this study adopts a mix of qualitative and (descriptive) quantitative data collection methods with a one-group pretest-posttest quasi-experiment as overarching research design. The participants in this study are educators from the pedagogy department at a Dutch higher education institute. This leads to the main research question:

> **How can a serious card game-based approach to Diversity, Equity, and Inclusion training support enhancement of intersectional analytical skills and intended behavioral change among higher education professionals?**

This main research question is supported by the following sub-questions:

1. How does participating in serious card game-based DEI training influence participants' ability to recognize and apply intersectionality?
2. How does a card game-based approach to DEI training contribute to the creation of a learning environment that transforms perspectives on DEI topics?
3. In what ways does the card game-based training influence participants' intentions to change their behavior or take action towards a more intersectionally inclusive and equitable higher education environment?

Chapter 2: Literature review and theoretical framework

This chapter consists of three sections. The first contains the existing body of literature related to intersectional DEI training in higher education and card game learning and design. The second section discusses the theories that provide the framework through which the researched connections between the concepts in this study can be analyzed. These first two sections together form the foundation for the research aim of discovering how a card game-based approach to DEI training can increase intersectional analytical skills and intended behavioral change among higher education professionals. Lastly, the third section provides a visual overview of how these concepts are related in a conceptual model and a table containing the operationalization of all concepts.

2.1 Literature review

The following section provides the essential literature for this study. The first section is about the importance and barriers of DEI training in generating change. The second explains card game learning and its potential benefits for DEI training to create societal and behavioral change.

2.1.1 Intersectional DEI training in higher education

Diversity, Equity, and Inclusion (DEI) training refers to educational programs designed to increase participants' awareness and understanding of social and cultural differences, often within organizations (Alhejji et al., 2016; Bezrukova et al., 2012; Sue, 1991). DEI training can improve group dynamics and reduce workplace conflict (Bezrukova et al., 2012) and increase job satisfaction and overall performance (Alhejji et al., 2016). Moreover, DEI training can increase awareness of both personal and systemic biases, which is important for (unintentional) discrimination and creating a more inclusive working environment (Sue, 1991). In higher education, teachers that participate in DEI training are more likely to adopt instructional strategies that support marginalized students and diverse perspectives in the classroom (Wang et al., 2024).

Research shows that training outcomes vary significantly depending on the design, duration, and organizational context (Alhejji et al., 2016; Bezrukova 2016). Bezrukova et al. (2016) analyzed the outcomes of 260 independent diversity training programs and identified the following conditions and barriers that affect effectiveness. DEI training is more effective when (1) delivered over a significant period of time, (2) integrated with broader diversity commitments and initiatives, and (3) it combines awareness with skill development. Moreover, a higher level of psychological safety, where participants feel comfortable engaging with sensitive topics, was also associated with more positive outcomes (Bezrukova, 2016). Finally, group composition also affect outcomes, as a higher percentage of women in a training group was linked to a more favorable response to DEI training (Bezrukova, 2016). Training designs can be broadly categorized into classical/traditional and alternative approaches. Salas et al. (2012) state

that traditional training methods, that often consist of passive learning through lectures and instructions, are less effective due to their lack of interaction and real-world relevance for participants. In contrast, alternative approaches that focus more on participant experiences, feedback, and interactions lead to better training outcomes such as knowledge retention and actual change (Cabler et al., 2022; Salas et al., 2012). Regarding DEI training in particular, Naidoo (2023) and Wu et al. (2019) add that effectiveness of training designs is often limited by barriers such as a lack of practical application of learned concepts. Both found that engagement and practical application are essential for lasting behavioral change. Many classical DEI training programs lack interactive elements and opportunities for open dialogue, further reinforcing these barriers to participation, as meaningful participation requires self-reflection and group discussions (Cerceo et al., 2022). In higher education, for DEI training to be successful, participants' individual characteristics and responses to the training should be considered, while also incorporating opportunities for mentoring and collaborative learning within and among different faculties (Derrick et al., 2021). Moreover, Sukhera (2024) highlights the importance of context in shaping effective DEI education, underlining the need for tailored approaches to support lasting behavioral change.

Regarding the DEI training design, it can be argued that if it is not intersectional, it fails to address real-world inequalities and actual change. From its origin, Kimberlé Crenshaw (1989) conceptualized the term intersectionality precisely to criticize how single-axis (non-intersectional) approaches marginalize those who exist at the intersection of multiple identities (e.g. gender, ethnicity, class). In an organizational context, Purdie-Vaughns & Eibach (2008) describe intersectional invisibility: where individuals with multiple marginalized identity aspects are overlooked by both policy and training programs. Moreover, non-intersectional approaches risk essentializing identities (reducing people to a single characteristic of their body or identity), therefore fail to reflect the complex reality of inequality that consists of interacting dimensions of oppression and in-group marginalization (Bagilhole, 2010; Lee, 2012). For example, women of color, queer people with disabilities, or any other combination of intersections. Thus, without intersectionality, DEI training can center dominant group experiences and unintentionally silence marginalized subgroups, reproducing the same inequalities it seeks to address (Purdie-Vaughns & Eibach, 2008; Bagilhole, 2010; Lee, 2012). Moreover, intersectional DEI training generates more constructive outcomes, as it teaches participants to recognize and address the working of power, history, systemic oppression, and institutional barriers, rather than just personal bias or awareness (Lee, 2012; Wang et al., 2024). In higher education, professionals that use an intersectional approach contribute to a more inclusive educational experiences and outcomes of marginalized groups (Rosalba & Vázquez, 2017). Following the literature, the card game-based training studied in this research is an intersectional alternative DEI training program tailored towards higher education professionals.

2.1.2 Card game learning and game design

In this study, the concept of card game learning refers to the educational approach that utilizes card games as a tool for increasing knowledge and developing skills. Card games can be valuable tools for facilitating open discussions on sensitive topics, such as bias and discrimination, in a safe and engaging environment (Ward et al., 2019). Participants often find game-based lessons more interesting and engaging compared to traditional methods (e.g. classroom-style lectures or presentations), which enhances their willingness to learn (Joseph et al., 2024). The collaborative nature of card games also strengthens teamwork skills, helping participants recognize and appreciate each other's contributions. This promotes mutual respect, a sense of belonging, and the ability to value diverse perspectives (Joseph et al., 2024). Educational games have been shown to improve conceptual and practical learning outcomes, skill development, and knowledge retention. They make lessons more enjoyable, increase motivation, and encourage active participation. They also provide opportunities for visual learning, self-expression, and self-correction while helping participants overcome challenges and build confidence (Selvi & Öztürk-Çoşan, 2018). Fanning and Gaba (2007) observed that to learn, adults favor applying their knowledge, actively engaging in the learning process, and gaining firsthand experience. Moreover, Schuller et al. (2013) identify two benefits of serious gaming to change behavior. Firstly, their broad appeal and capacity to engage specific demographics, such as adolescents, who are often resistant to other forms of direct messaging or intervention. Secondly, serious gaming promotes targeted behavior change to enhance daily habits and behaviors. Additionally, the versatility and affordability of card decks make them a good framework for designing diverse educational games with opportunities for a variety of applications (Palencsár & Szilágyi, 2023). Su et al. (2014) adds that the flexibility of card games makes them effective tools for inclusion training, as they can be adapted to meet the needs of diverse audiences, ensuring the content remains relevant and engaging for all participants. This is especially relevant for the application of the game of this research, as its use is not limited to a specific sector or demographic.

With regards to the game design, all games, both digital and analog, are composed of game mechanisms and mechanics (Sousa et al., 2021). Game Mechanisms are the rules and systems that define how the game operates structurally, out of which Mechanics, Dynamics and Emotions emerge: *''Mechanics result from the combination of multiple activated mechanisms. Mechanics is something between Mechanisms and Dynamics. Dynamics demand player activation of the mechanisms. Mechanisms on the move are the general mechanics of the system. Experiences include all possible human feeling and emoticons.''* (Sousa et al., 2021, p.6). The MMDE framework helps to understand how game design aspects support specific outcomes. In serious gaming this is particularly important, as ''making the player learn something'' is the precondition for a game to be considered serious in the first place. Applied to the Caleidoscopia card

game in this study, the MMDE framework helps to understand how gameplay affects participant experiences. To understand how the game contributes to transformative learning, game aspects are put across the guidelines for fostering transformative learning from Taylor (2009). These entail fostering: (1) individual experience, (2) promoting critical reflection, (3) dialogue, (4) holistic orientation, (5) awareness of context, and (6) authentic relationships. In conclusion, studies show that card games can be effective didactic tools that can promote learning and behavioral change. By combining collaboration, application, and increased engagement, they can be especially useful in DEI training that aims to improve intersectional skills. The card game used in this research is the Caleidoscopia card game and accompanied training for professionals working with (younger) people. More information on the game and training is provided in section 3.1.3.

2.2 Theoretical framework

The following section elaborates on the theoretical frameworks and operationalized concepts used for answering the research questions. The first section explains intersectionality as theoretical concept and analytical framework. The second section elaborates on transformative learning. To research whether participants develop a deeper understanding of overlapping dimensions of inequality, the concept of intersectionality is used as a framework to assess their analytical skills and awareness regarding this concept. Additionally, intersectionality guides the interpretation of the behavior and learning process of the participants themselves during the training. To understand how intersectional analytical skills and awareness develop during the training and contribute to their intention to behave differently, transformative learning theory (TLT) is applied. TLT provides the framework to analyze the process of self-reflection and perspective change through dialogue during the training. Together, these frameworks thus guide the understanding of what participants learn, how they learn, and how they intend to use new skills and knowledge in the future as a result of the card game-based training.

2.2.1 Intersectionality

‘’Intersectionality is the core concept of the game.’’ (Caleidoscopia card game instruction manual, 2023, p.42)

Kimberlé Crenshaw (1989) introduced the term intersectionality as a framework to understand how different forms of oppression, such as racism, sexism, classism, and homophobia, intersect and overlap, particularly in the lives of marginalized individuals. Crenshaw first used the term to highlight how Black women experience both racial and gender discrimination in ways that cannot be understood by looking at race or gender in isolation. Intersectionality examines how systems of power interact to create unique experiences of inequality and exclusion (Crenshaw, 1989). Gloria Wekker expands on

intersectionality, particularly within European and Dutch context. In her work *"White Innocence: Paradoxes of Colonialism and Race"* (2016), Wekker critiques the denial of colonial histories and racial inequalities in European societies, particularly in the Netherlands. She explains how intersectionality reveals hidden power structures and challenges dominant narratives of inclusivity and equality, exposing how marginalized groups are positioned at the intersections of various systems of oppression. Wekker explains that for example, Dutch citizens of color may experience racial discrimination differently depending on whether they are also working-class or gender nonconforming. By using intersectionality, Wekker shows how multiple dimensions of identity shape the way people are marginalized, often in ways that are overlooked when focusing on only one aspect (e.g., race or class). Moreover, Wekker argues that the concept of ‘’white innocence’’ shields white Dutch identities from being confronted with colonial history and racial privilege. This narrative allows white supremacy to persist and prevents important discussions on racial justice and accountability.

Though widely recognized and applied in academia and beyond, critique on the theory and its analytical useability exists. A key critique of intersectionality is its lack of a clearly defined methodology. Nash (2020) argues that while intersectionality is a valuable tool for analyzing identity and oppression, its application in research often lacks a systematic approach, leading to inconsistencies and varied interpretations that may weaken its analytical effectiveness. However, intersectionality is a flexible framework that enables nuanced analysis of social identities and power dynamics, not a prescriptive model (Cole, 2009). Additionally, Rice et al. (2019) state: *‘’Intersectionality theory enables researchers to account for the multiplicity and situatedness of identity, enabling us to recognize the interplay of our many commonalities and differences.’’* (p. 418).

Another critique entails the framework’s focus on Black women as central subject has been criticized for potentially narrowing its scope, overlooking the experiences of other marginalized groups, thus risking the creation of a hierarchy of identities and limiting the inclusivity of intersectional analysis (Nash, 2020; Cho, 2013). Cho (2013) also states that intersectionality may struggle to sufficiently account for the nuances of social positioning, as it potentially overlooks the complexities of power dynamics and the ways in which privilege operates within intersecting identities. However, these concerns are addressed by emphasizing that the core aim of intersectionality is to reveal those complexities (Nash, 2020; Cho, 2013). By exploring how identities intersect, intersectionality provides a framework for understanding systemic inequalities and the broader power structures shaping privilege and oppression (Moradi & Grzanka, 2017)

Another critique entails the conceptual ambiguity of intersectionality. Davis (2008) argues that, despite its widespread use, there is significant uncertainty about its definition and application, which leads to intersectionality being used as ‘’buzzword’’ and losing its critical impact and analytical depth. However, Collins (2015) emphasizes that the conceptual vagueness and fluidity of intersectionality can also be considered a strength, as the term is therefore able to adapt to and be applied to various contexts. In

this research, intersectionality is the core of the game, the training, and the assessment criterium for data analysis based on the six core concepts of intersectionality as described by Collins & Bilge (2020):

Figure 1: core concepts of intersectionality (Collins & Bilge, 2020)

Concept	Explanation
Social inequality	Individuals and groups may experience systemic oppression or privilege based on aspects of their body and/or identity.
Intersecting power relations	Systems of power (e.g. racism, patriarchy, colonialism, etc.) intersect and co-construct one another across multiple domains of power (e.g. structural, cultural, disciplinary, and interpersonal).
Social context	The operation of power relations and their intersections is always context-specific, varying across time, place, and institutional or cultural settings.
Relationality	social categories are interconnected and co-constitutive in nature – dimensions/categories like ethnicity, gender, and class are not separate or additive, but relationally constructed.
Social justice	Intersectionality includes a commitment to a social justice agenda where intersectional analysis is oriented toward addressing and changing structural inequalities.
Complexity	Both intersectional analysis and praxis are inherently complex and require attention to multiple overlapping systems and avoids simplistic or one-dimensional approaches to social issues.

With the fifth core concept, social justice, Collins & Bilge (2020) tie individual and collective action to intersectionality. They explain that conscious action towards social justice grounded in understanding of intersecting systems of power is essential to intersectionality, as the theory itself is fundamentally about justice. In this research, intended behavioral change can be understood as the intention to change the way one acts with the aim of contributing to a more equitable environment. In theory, this intention can be created through the learning process participants undergo during the card game-based DEI training. This learning process can be understood trough transformative learning theory, which is explained in the next section.

2.2.2 Transformative learning

In order to understand transformative learning (TL), it is important to understand its historical context. Mezirow's transformative learning theory (TLT) originates from his 1978 study of women's return-to-work educational programs in US community colleges during the second-wave feminist movement (Hoggan, 2018). This is the social background of societal change that shaped the participants' experiences and Mezirow's interpretations. The women in this study were transitioning from traditional (gender)roles as stay-at-home wives and mothers towards working professionals, reflecting broader societal change in norms, values, and expectations (Hoggan, 2018). Thus, a core element of transformative learning is critical self-reflection, where individuals examine and challenge their assumptions, beliefs, and societal norms for personal growth and transformation (Mezirow, 2003). As a metatheory, a theory concerned with the investigation, analysis, or

description of theory itself (Merriam-Webster, n.d.), transformative learning is defined as *"processes that result in significant and irreversible changes in the way a person experiences, conceptualizes, and interacts with the world"* (Hoggan, 2016). Mezirow's theory is not intended to describe any type of change, but focuses on people gaining insight into and critically evaluating how they interpret and make sense of the world (Hoggan, 2018). Transformative learning thus refers to the process through which individuals change their frames of reference, leading to a more inclusive and integrative perspective. Mezirow theorizes the following steps in the transformative learning process:

- A disorienting dilemma
- Self-examination with feelings of fear, anger, guilt, or shame
- A critical assessment of assumptions
- Recognition that one's discontent and the process of transformation are shared
- Exploration of options for new roles, relationships, and actions
- Planning a course of action
- Acquiring knowledge and skills for implementing one's plans
- Provisional trying of new roles
- Building competence and self-confidence in new roles and relationships
- A reintegration into one's life on the basis of conditions dictated by one's new perspective (Mezirow 2000, p. 22)

Various scholars have critiqued and refuted critiques on the concept of transformative learning. The first critique entails its perceived overemphasis on individual change at the expense of social transformation, due to the neglect of the broader social contexts that influence learning outcomes (Rodríguez Aboytes & Barth, 2020; Alam, 2022). However, Mezirow's framework emphasizes the role of dialogue and social interaction in the learning process, thus underlines its role in creating critical consciousness within social groups (Stuckey et al., 2022). Additionally, TLT promotes discourse that fosters collective action and social change, empowering individuals in educational setting to challenge societal norms and injustice (Lorenzetti et al., 2016), making it a suitable framework to assess DEI training efforts.

An important critique on the theoretical foundation of TLT comes from Newman (2012), who argues that transformative learning is mere theoretical, with little practical relevance, and suggests that what is often called transformative learning is simply effective, ''good'' learning. Dirkx (2012) responds to this critique by stating that Newman's critique relies on a predominantly sociological view of self-formation, overlooking the psychological dynamics of conscious development, which are integral to a critical theory of self and transformative learning. Moreover, Cranton (2006) states that according to Mezirow, the whole purpose of adult education is transformative learning. As the goal of this DEI training is educating adult education professionals, transformative learning lies

at the core of its educational purpose. In other words: if the participants experience ‘’good learning’’, it has been transformative learning. In this research, TLT is applied as framework to assess to what extent the participants have experienced the training environment as transformative (appendix 4).

Critique on the cultural dimension includes the argument that TLT overlooks cultural contexts in shaping transformative learning experiences and that its literature often reflects Western cultural values, therefore neglects the significance of context in shaping transformative learning experiences (Merriam & Ntseane, 2008; Cox & John, 2016). This indicates that TLT is not a one-size-fits-all theoretical approach. However, its adaptability as metatheory (Hoggan, 2016) and useability to assess to both individual and collective learning contexts and outcomes (Stuckey et al., 2022), combined with its application in this research that is conducted in a Dutch higher education setting, the supposed negative effects of the overlooking of (non-western) cultural contexts remain arguably minimal. Moreover, this research is not aimed at making universal claims about whether this specific mode of card game learning and instruction will result in a transformative learning experience for everyone, everywhere, in every context.

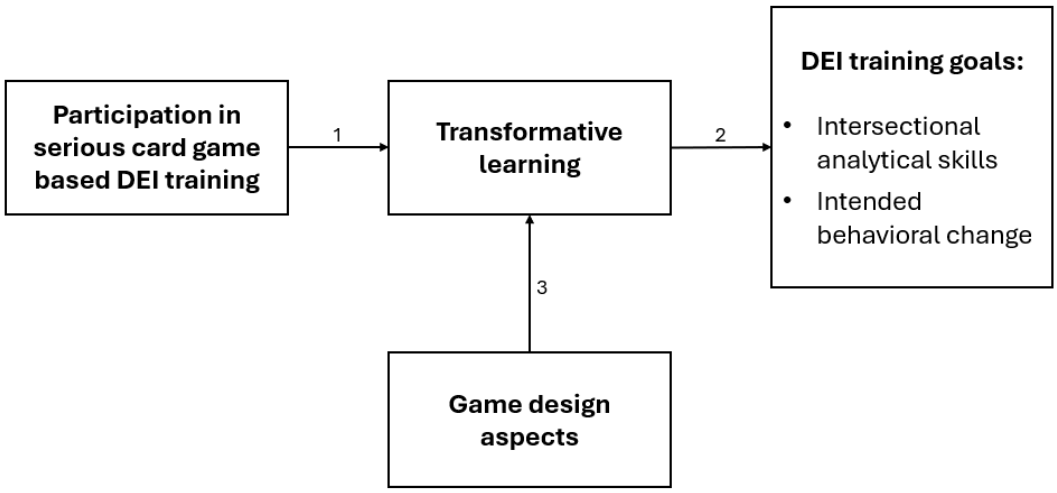
When it comes to behavioral change, transformative learning suggests that changes in worldview or perspective (the outcome of TL), are expected to lead to changes in action, as people move from new understandings to new behaviors that are more critically aware (Mezirow, 2000). Moreover, behavioral change can be framed as an expression of new commitments aligned with these transformed perspectives (Mezirow, 2000). Though Mezirow’s original theory focuses on the individual, later scholars have argued that transformative learning should not just aim at personal transformation, but at collective and structural change. For example, O’Sullivan (1999), primary figure of the field of planetary/eco-social transformative learning, emphasizes that the ultimate goal is not just individual emancipation or change, but societal transformation towards more just, sustainable, and equitable systems. Moreover, from an intersectionality-informed transformative learning perspective it is argued that transformation is incomplete if it remains at the level of inner change without engagement in changing oppressive structures and systems (Tisdell, 2003; Taylor & Cranton, 2012). Thus, TL provides a suitable framework to understand intended behavioral change with regards to the goal of the card game-based DEI training to make participants behave more intersectionally inclusive in the future.

The literature shows that game-based learning can significantly enhance motivation, engagement, collaboration, and knowledge retention. Additionally, TLT views behavioral change as an outcome of transformed perspectives. Extending TLT, its potential for societal change lies in how individuals that have redefined their perspectives and assumptions about power and identity act collectively. These key elements make transformative learning a good framework to assess the learning environment of card game learning in DEI training that aims to change perspectives, behavior, and ultimately society as a whole.

2.3 Conceptual framework and operationalization

The following section consists of two parts. The first part shows the conceptual framework that shows how concepts are connected and what three causalities (arrows) are researched in this study. After that, figure 3 shows a table containing the operationalization of the concepts.

Figure 2: conceptual framework



Following the arrows in the conceptual framework, three causalities are identified:

> C1: Participation in serious card game-based DEI training contributes to DEI training goals by affecting the state of intersectional analytical skills and intended behavioral change in higher education professionals.
>
> C2: Whether participants experience transformative learning in the card game-based DEI training affects to what extent training goals of increasing intersectional analytical skills and intentions to change behavior are met among higher education professionals.
>
> C3: The game design aspects affect the learning process and experiences of participants during the training.

Building on the conceptual model above, the table below shows the operationalization of the concepts shown in the conceptual model. More information about the leftmost box in the conceptual framework, participation in the card game-based DEI training, is provided in chapter 3.1.3. on the game material and training. The first section of the methodology chapter, directly after the operationalization table, contains the figure with an overview of all research methods and how they measure what concept.

Figure 3: operationalization of concepts

Concept			Operationalization
Core concepts intersectional analysis (Collins & Bilge, 2020)	Social inequality		Recognizes that individuals or groups may experience oppression or privilege based on their body and/or identity.
	Intersecting power relations		Recognizes that intersecting power relations exist across different domains of power.
	Social context		Recognizes that working of domains of power and intersections are context-dependent/situated.
	Relationality		Recognizes that categories are not oppositional; examination of interconnections; categories are not separate or additive.
	Social justice		Recognizes/formulates some commitment to pursuing a social justice agenda.
	Complexity		Recognizes that intersectional analysis and intervention is difficult / multifaceted.
Intended behavioral change	From Transformative Learning Theory (Mezirow, 2000)		Acting differently becomes possible as one thinks differently after the occurrence of transformative learning, due to perspective change and critical self-reflection.
	From core concepts of Intersectionality (Collins & Bilge, 2020)		Intersectionality is not just about understanding, it is about making change: taking action to transform unjust/inequal systems.
Transformative Learning Environments (Walker, 2018 p.40)	Disorienting dilemma	Student	The extent to which students perceived a disorienting dilemma.
		Environment	The extent to which the instructor used disorienting dilemmas as a part of instruction.
	Self-reflection	Student	The extent to which students critically perceived their subjective perceptions of knowledge.
		Environment	The extent to which the instructor created opportunities for student critical self-reflection.
	Meaning Perspectives & Critical Discourse	Student	The extent to which students perceive their meaning objectives.
		Environment	The extent to which the instructor creates opportunities for critical discourse.
	Acting	Student	The extent to which students perceive a change in their behavior.
		Environment	The extent to which the instructor creates an environment for students to demonstrate change in behavior.
Game design aspects (MMDE) (Sousa et al., 2021)	Mechanisms		Formal rules and systems of the game – design pattern (e.g. card deck with nine dimensions of diversity and a blank card; turn-taking; collaboration)
	Mechanics		Player interactions with mechanisms (e.g. selecting, placing, and swapping cards)
	Dynamics		Dynamics that emerge from interacting players and mechanics (e.g. structuring of analysis and conversation; perspective sharing and swapping; collaborative learning)
	Experience		Total player experiences, including aesthetics, emotions, and engagement (e.g. feelings during gameplay; effect of colors and illustrations)

Chapter 3: Methodology

The following chapter consists of the research strategy and applied methodologies. The first section of this chapter provides the research philosophy and design. The second section provides the operationalization of the research strategy, an overview of the tools and processes used to collect and analyze data. The last section elaborates on the reliability and validity of the study. To start off, building on the conceptual model (figure 2) and table of operationalized concepts (figure 3) in the previous section, figure 4 below shows an overview of all research methods with explanation on the data type, what it measures in this study, and the main related concepts.

Figure 4: overview of research methods

Method	Data type	What it measures:	Main concepts
Pretest before training day 1 (n=6)	Qualitative (individual written case analysis)	Baseline intersectional analytical skills.	Intersectionality
Posttest after training day 2 (n=6)	Qualitative (individual written case analysis)	Post-measurement to understand if and how participating in the card game-based training changed intersectional analytical skills.	Intersectionality
Observation training day 1 (n=7)	Qualitative	How participants engage with the game material, behave, interact with other participants and trainers.	Intersectionality; TL; Game design; Intended behavioral change
Observation training day 2 (n=6)	Qualitative	As on day 1, but also changes or similarities with regards to training day 1.	Intersectionality; TL; Game design; Intended behavioral change
Open-end survey after day 1 (n=7)	Qualitative (five open ended questions on paper)	Initial reaction/opinion and reflection on the first training day, collecting (potential) first ideas to apply new knowledge/skills in the future.	Intersectionality; TL; Game design; Intended behavioral change
Open-end survey after day 2 (n=6)	Qualitative (five open ended questions digital)	Opinions on the training and game format, reflection on total participation and future plans to apply new knowledge/skills.	Intersectionality; TL; Game design; Intended behavioral change
TL Environments Survey (n=6)	Quantitative (Likert scale assessment)	Whether conditions for a transformative learning environment are met.	TL; Intended behavioral change
Post-training group discussion (n=6)	Qualitative (focus-group style session)	How participants have experienced the training and game materials, and if/how they want to apply training content in the future.	Intersectionality; TL; Game design; Intended behavioral change
Interview with trainers /developers (n=2)	Qualitative (semi-structured in-depth online interview)	Investigating the relationship between the intentions/goal of the game and participant experiences.	Intersectionality; TL; Game design

3.1 Research strategy

The following section outlines the strategic approach to address the research questions and achieve the research aim. The first section starts with the underlying assumptions of this research: the ontology, epistemology, axiology, and philosophical orientation. The second section explains the adopted research design, elaborating on the methods and techniques used in this study. The third section provides information on the card game and accompanied training that is researched.

3.1.1 Research philosophy

Ontology refers to assumptions about the nature of reality (Saunders et al., 2015). This research aligns with the definition of critical realism: reality is captured by broad critical examination (Moon & Blackman, 2014). This research assumes that social inequalities are real and must be resolved and understood through people's experiences, thus, both relativism and realism are not applicable in this research. **Epistemology** refers to assumptions about knowledge, what constitutes acceptable, valid and legitimate knowledge, and how we can communicate knowledge to others (Burrell & Morgan, 2017). While the quasi-experimental design of this study incorporates measurable variables and explores potential causal relationships, it does not assume that knowledge is fully objective or value-free. Thus, the epistemological stance of this research is post-positivist, which acknowledges that while objective reality may exist, our access to it is always partial and influenced by context (Moon & Blackman, 2014). This research explores patterns and potential effects of card-game based DEI training, but remains critical of the limitations of purely empirical claims. Effectiveness is interpreted through participant perception and experience, not as universally measurable outcome. This approach to causalities aligns with the post-positivist epistemology, which includes critical interpretation in empirical observation. **Axiology** refers to the role of personal values and ethics, and they affect the research process and interpretations (Saunders et al., 2015). The research aim is exploring how card game learning can be used. However, useability is subjective and context dependent. Moreover, the extent to which the effects of card game learning align with DEI training goals is also subjective, as different people or groups of people may have different views on what the goals exactly are and/or when the goals are achieved. As so, my personal norms and values regarding DEI training affect both data collection and interpretation, as well as practical recommendations I may derive from the research outcomes. The **philosophical orientation** that guides this research is pragmatism, as it focuses on practical knowledge that supports action and answers research questions for future use (Saunders et al., 2015). This research aims to both increase understanding and support practical DEI interventions, making a pragmatic approach a good fit that aligns with the goal of contributing to a more intersectionally inclusive and just society. Moreover, pragmatism acknowledges that

complex real-world problems require methodological flexibility. This research combines both post-positivism, through measurable variables and a quasi-experimental design to explore patterns of change, and constructivism, by emphasizing the contextual, subjective nature of participant experiences. These orientations are not considered incompatible, but complementary and necessary to study the complex dynamics of learning in DEI training.

3.1.2 Research design

In line with the pragmatist theoretical perspective of this research, the following methods and techniques are applied to research how card game learning can be used for DEI training of people working in higher education. The overarching design of this study is the **one-group pretest-posttest design**, a form of quasi-experimental research. *Quasi* means resembling, as quasi-experimental research shares similarities with true experimental designs but lacks key elements, like random assignment (Chiang et al., 2015). In a pretest-posttest design, the dependent variable is measured before and after the intervention (Chiang et al., 2015). This design is similar to a within-subjects experiment, however, in the pretest-posttest design, the order of conditions cannot be altered, as participants cannot ‘’unlearn’’ the intervention (Chiang et al., 2015). The main limitation of this design is the lack of internal validity because, unlike a true experiment, it does not use random assignment to create equivalent groups. This increases the risk that pre-existing differences between participants (e.g., motivation and prior knowledge) explain observed outcomes, rather than the intervention itself, complexifying the establishment of a clear causal relationship. However, quasi-experiments are strong in real-world applicability, as the findings are more likely to reflect what happens in actual practice. In the context of this research, the quasi-experimental approach made it possible to work with participants embedded in the context relevant to the intervention: Dutch higher education. Additionally, the choice for a quasi-experiment is practical: it was not feasible to acquire a group of higher education professionals randomly and include a control group in the time set out for this research. Additionally, my influence on when and where the training took place was minimal. Reflection on (internal) validity is further discussed in chapter 3.3.

Aligned with the pragmatic approach, this research adopts a mixed methods approach, combining quantitative (TLES survey) and various qualitative (observations, semi-structured interviews, group discussion, open ended evaluation questions, pre- and posttest assignment) research techniques to answer the research questions. The quantitative TLES survey adds to the assessment of the transformative learning potential of card games in DEI training. The qualitative methods add in-depth knowledge from both trainers and trainees in order to further assess and contextualize the how card game learning can be used in DEI training for higher education professionals.

3.1.3 Research material: the card game and training

This section describes the main intervention tool used in this research: the Caleidoscopia card game and accompanied Train-the-Trainers training, aimed at training people working with students or children. The primary purpose of the training and card game is to support educational professionals in developing intersectional thinking, self-reflection, and the ability to recognize and respond to exclusionary dynamics in their working environment. It also teaches them understanding and application of intersectionality in both their educational practices and personal lives. Structure wise, the training consists of two sessions, each lasting four hours, with two weeks in between. Participants are introduced to the theoretical foundations of intersectionality and engage with the card game through a variety of exercises, reflection, and group dialogue. This way, participants experience the working of the cards themselves, while learning how to apply the cards in their own setting, with their own students, colleagues, or other target groups. The Caleidoscopia card game uses physical cards with different colors that represent nine given identity dimensions in ten different languages and a blank card to fill in freely with another dimension of choice.

Figure 5: the ten Caleidoscopia cards

During exercises, participants pick and combine these cards to analyze fictional or real-life situations and positions through an intersectional lens. This supports DEI training objectives by supporting intersectional analysis, conversation, and critical reflection on the complex nature of overlapping aspects of bodies and identities that shape experience. More information on the organization, game and the exact contents of the training exercises is provided in appendix section 2.

3.2 Research methods

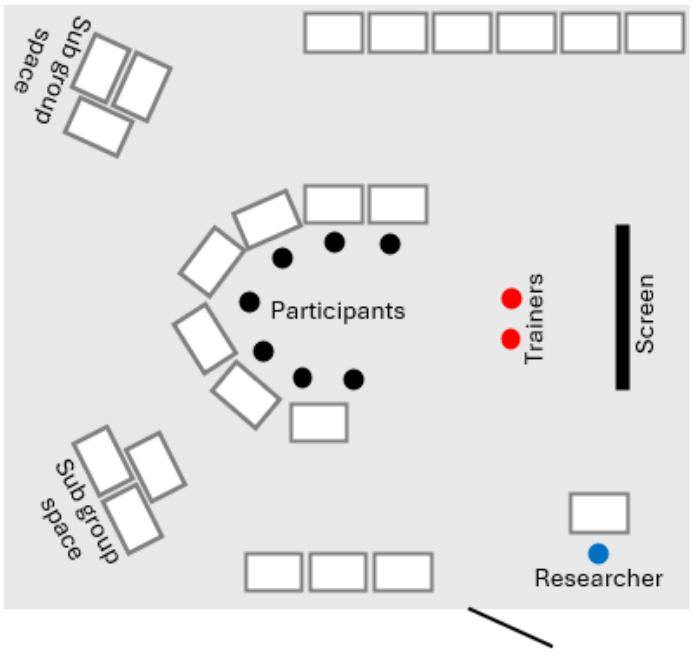
The following section contains all information on the operationalization of the research strategy. Section one elaborates on the setting and sample. Section two explains all research methods as shown in figure 4. Section three shows how data is analyzed, including the coding strategy and validation of thresholds.

3.2.1 Setting and sample

The setting of the study is at Fontys University of Applied Sciences Tilburg, an institute for higher education in the Netherlands. The setting that is studied is the ''train-the-trainers'' training from Collective Caleidoscopia. The aim of this training is to teach professionals about intersectionality and how to work with the Caleidoscopia card game with their own target group. The trainers conduct various exercises and games with the cards and are challenged to think about how they would apply it. The training consists of two four-hour sessions, 2 weeks apart. This study includes one training group consisting of 6 participants that were included in the pre- and posttest, both training days, evaluation forms, the survey, and group discussion (P1 to P6) and one that participated only on training day one and its evaluation form (P7). Additionally, the two trainers are part of the observation, group discussion, and are interviewed together but from the participants. The sample consists of teachers from the pedagogy department at Fontys University of Applied Sciences Tilburg. Participation in the training was voluntary and out of our control. Representability and intersectionality of the sample is reflected on in the limitations section of the conclusion.

Figure 6 on the right shows the classroom setting during plenary exercises and conversations. During exercises in sub groups, the participants move in random, self-selected subgroups to the sub group spaces on the left side of the classroom. Then, trainers move around the classroom to check in on participants and researcher moves along.

Figure 6: overview of the setting



3.2.2 Data collection and storage

The following section provides a description of all data collection methods used in this research as shown in the overview in figure 4. The methods were selected with the pragmatic approach in mind: what data is needed from who to figure out how the card game-based approach to DEI training contributes to reaching the DEI training goals.

1) Pre- and post- training individual assignment (stored in Atlas.TI)

The pre- and posttest are a core component of this study's quasi-experimental, one-group pretest-posttest design, as described by Chiang et al. (2015) in section 3.1.2. These tests enable close comparison of learning through an intervention. To assess participants' development of intersectional analytical skills as a result of the DEI training, individual written assignments were administered before and after the two training sessions. Each assignment required the participants to analyze a fictional case situated in a classroom setting where a DEI-related issue was present. The assignments were developed in collaboration with the internship organization to ensure they reflected a realistic scenario and encouraged intersectional thinking without explicitly revealing to participants that intersectional analytical skills were being tested. Though the two fictive cases differed in specific content, they were conceptually and structurally similar, allowing comparison between the two to reveal potential changes in intersectional analytical skills (appendix 8). Moreover, it may suggest how the participants would change their own behavior in similar situations. In the pre- and posttest, participants were asked to identify key issues in the case in an open-ended question format. Open-ended written responses are a good fit to assess intersectional analytical skills in this pragmatic research approach, as this represents the real-world situation of an educator dealing with discrimination in a classroom better than a closed question format. Moreover, understanding reasoning behind answers is essential in assessing intersectional analyses, which is not measurable through closed questions (Züll, 2016).

Limitations of this method include the possibility that writing skills and interpretation of the assignment may vary among participants, which is not possible to check without easy access to clarification or probing. However, there was private e-mail contact between researcher and participants, in which it was emphasized that participants could always reach out with questions or remarks. Additionally, if a response would come in where it is clear that the participant did not understand the assignment, it would also be possible for the researcher to reach out to the participant for clarification. Though the one-group pretest-posttest design does not support generalized causal claims, it offers a pragmatic way to evaluate the effects of an educational intervention on a specific group of people. Moreover, the aim of this research is to explore the working of the card game and learning processes rather than generalizability. For more in-depth discussion on the validity and reliability of this design, see section 3.3.

2) Observations (stored in Atlas.TI)

In this study, observations were conducted during the two days of the card game-based DEI training. According to Cresswell & Cresswell Báez (2021, p.126), observing is *''the process of gathering unstructured, open-ended, firsthand information by watching people and places at a research site.''*. In a mixed methods research design, the value of observations lies in their ability to provide contextual insights that deepen the understanding of the object of research (Cresswell & Plano Clark, 2018). In this research, the observations are essential for understanding how participants actually engage with the game, each other, trainers, and the rest of the learning environment. It links specific changes reported by participants to how and why they happened during the training. Observations were thus crucial for researching non-verbal and unconscious behaviors, emotional responses, discussions, and group dynamics. This adds credibility to the findings by creating the opportunity to compare what participants say they learned and experienced during the training with what they actually did or said during the training. Moreover, observations allow for the identification of the specific elements of the training that support transformative learning, which participants might have forgotten during post-training data-collection methods. Following Cresswell & Cresswell Báez (2021), this research adopts the six steps for conducting a good qualitative observation (p. 121-126) as follows:

Figure 7: the six steps of a good observation (Cresswell & Cresswell Báez, 2021)

Step of the observation process	**Adaptation in this research**
Step 1 – Selecting the research site	The pedagogy department of Fontys was selected for practical reasons, as the request for the Caleidoscopia training came from their administration. Access to this field for research was also granted by administration.
Step 2 – Developing the observational protocol	Protocol and guides were developed in advance, including pre-determined observation categories and indicators (see appendix 6), including interpretations. Each entry includes dates, time stamps and training session context.
Step 3 – Focusing the observation	After observation of the overall environment, focus shifted towards key behaviors relevant to the research questions, like signs of critical reflection, use of language, and expressions that indicate (potential) change. Additionally, notes of contextual factors that may influence engagement (e.g., group dynamics, time of day, prior knowledge of DEI concepts). This approach allowed the observations to remain grounded in the central activity/phenomenon while being open for new insights besides the pre-determined categories/indicators.
Step 4 – Determining the observer role	Observations in this research were conducted through a complete observer role: observing without participation or attracting notice. Other observer roles include a more or less participating role. These were not a good fit for this research aim, as detailed notes on specific interactions and behaviors were necessary here. Researcher was positioned at approx. two meters' distance from the participants in the

	corner of the classroom. This allowed for taking comprehensive notes of behaviors and responses without interfering in the training process. Researcher position was aimed at remaining as unobtrusive as possible. Moreover, all participants agreed with being observed beforehand and responded ''no'' to a check-in on day one whether researcher presence affected their participation.
Step 6 – Recording field notes	Notes were taken systematically using the observational guides, categories and indicators (appendix 6). Descriptive notes included verbal, emotional, and non-verbal expressions and behaviors, guided by the sub questions as stated in section 1.3 of the introduction. The notes are structured/categorized by training context in chronological order. Reflective notes include interpretations regarding dynamics or emerging themes, which were noted as potential codes for analysis in Atlas.TI.
Step 6 – Withdrawing from the site	After rounding up on both training days, participants were thanked for their participation in both the training and research. They were reminded that they would receive the results from the study and were allowed to contact the researcher if any hesitations regarding participation emerged (for example, if they wanted specific quotes not to be included).

3) Open-end surveys (stored in Atlas.TI)

To gain insight into individual reflections and opinions on participation in the training, two open-ended surveys were conducted (appendix 7). The first consisted of five questions on paper and were filled out directly at the end of training day one. The second consisted of six questions and was distributed digitally after training day two, allowing participants some time to reflect on their overall experiences and ideas for potential future use of new knowledge and tools. Open-ended questions are particularly valuable in understanding reasoning and associations of respondents (Züll, 2016). Moreover, this method allows the respondent to express themselves without influence of group dynamics or an interviewer. However, responses vary in length and depth. Also, absence of an interviewer means that unclear or incomplete responses cannot be followed up. These risks are mitigated through data triangulation, as survey outcomes are compared with data from all other qualitative and quantitative research methods.

4) Transformative Learning Environments Survey (TLES) (stored in qualtricsXM)

To assess whether the training supported transformative learning, this study uses the TLES, developed and validated by Walker (2018). Grounded in Mezirow's transformative learning theory, the TLES is designed to evaluate the presence of the conditions that facilitate the transformative learning process. The survey therefore aligns with the theoretical framework of this research that conceptualizes changes in intersectional analytical skills and intended behavioral change related to DEI as a result of transformative learning. The TLES consists of sixteen questions rated on a Likert scale with five points, ranging from (1) ''strongly disagree'' to (5) ''strongly agree''. The survey

collects participants' perceptions related to a learning environment to assess the conditions for transformative learning. In this study, the TLES is used to assess to what extent the participants consider the card game-based DEI training a transformative learning environment. To do so, the questions were (minimally) altered to fit the DEI training and translated to Dutch (appendix 4). The survey was conducted via QualtricsXM after the second and last training session. As a validated instrument, the TLES provides a structured and theoretically grounded approach to assessing learning environments in a replicable way. The Likert scale format allows for efficient data collection and revealing of general patterns in participant perceptions. However, the main limitation of this format is that the closed question format can fail to reflect nuances of individual experiences. Therefore, this quantitative data is used as descriptive statistics to support and triangulate qualitative data from other the other research methods. Mainly the observations, group discussion and open ended evaluation questions add qualitative nuance regarding *why* and *how* the training can be considered a transformative learning environment.

5) Post-training group discussion (stored in Atlas.TI)

Following the second training session, a semi-structured, relatively informal group discussion was conducted to gain insights into the learning process and experiences of participants. The discussion was facilitated by the trainers who were provided with instructions beforehand. This choice was made to keep participants comfortable with personal plenary sharing, as this session took place directly after rounding up on day two. Moreover, this was a practical choice in terms of time and effort to get all participants together in conversation about the training. Following Patton's (2015) notion on group interviews, the aim of this discussion was to share reflections and generate interaction among participants. The following questions were used as guide:

- Did you change in terms of perspective or attitude as a result of this training? Was there a specific moment that this happened?
- What would you want to do differently as a result of this training?
- How would the card game as physical tool help you?

The setting made it possible to observe how participants responded to and built upon each other's reflections and perspectives. This method thus allows for individual and collective meaning-making of experiences. However, as with most group discussions, there is risk of social desirability bias, where participants may give responses based on other's opinions or (alleged) expectations. Additionally, this discussion only reflects immediate reactions: people may think differently after letting their training experiences sink in. Therefore, comparing outcomes from this discussion with the individual evaluation form answers is essential. Taking these considerations into account, the group discussion is valuable in addition to the other qualitative and quantitative data collection methods.

6) Semi-structured interview with trainers (stored in Atlas.TI)

After the two training sessions, an online semi-structured in-depth interview was conducted with the two trainers/game developers. The interview with both trainers present was conducted and recorded via Zoom after the second training session, after which it was transcribed and stored in Atlas.TI. The choice for an online interview was practical in terms of time and travel distance. Also, both trainers use online meetings and calls as their most used form of communication, making it a comfortable and well-known environment to conduct the interview. This interview type in a qualitative data collection method that uses a flexible interview guide with key topics while allowing both researcher and participants the freedom to elaborate on their own terms (Patton, 2015; Seidman, 2013). It combines the consistency of pre-formulated questions with the opportunity for new themes or topics to emerge from the conversation, making it a good method to research personal experiences. The interview guide (appendix 5) was emailed to the trainers in advance. The joint interview also enabled interaction between both trainers and game developers, creating the opportunity for the interviewees to agree or disagree with each other, add nuance or clarification, and ask each other questions. Additionally, potential future (alternative) use of the card game was discussed, aligned with the pragmatic approach of this research. However, as the trainers were also the developers, there is potential for confirmation bias. To address this issue, this interview was used to gain in-depth view of the intentions behind the game and training. After that, it was used to assess how the goals of the training and game, the intentions of the trainers/developers compare to participant experience, opinion, and engagement. Moreover, it aligns with the pragmatic approach of this research, as it is a logical step in understanding practical application of the card game.

3.2.2 Data analysis

Data analysis focused on two main elements: comparison to explore potential change and finding explanations for this change through the lens of intersectionality and transformative learning. To understand the working of the training, these elements were analyzed on three levels: within participants, across participants, and across participants and trainers. To reach this aim, the following data analysis process was conducted as described in the two sections below. Firstly, the coding strategy and scheme. Secondly, the numerical threshold validation for the pretest-posttest and TLES analysis.

3.2.2.1 Coding strategy and scheme

An abductive thematic coding strategy in Atlas.TI was adopted for the observations, open-ended surveys, group discussion and interview with trainers. This strategy is good for applied, theory-informed research, as it allows for iterative movement between established theoretical concepts and new insights from the data (Miles et al., 2014). Abductive coding was chosen over inductive (all codes emerge from the data) or

deductive (only using pre-defined codes) approaches because it allowed the analysis to stay grounded in the concepts while also giving room for new and unexpected themes to emerge (Miles et al., 2014). Given the exploratory and experimental nature of this research and the interaction between the concepts in theory and in practice, the abductive strategy provided the necessary flexibility without reducing theoretical coherence. Additionally, methodological codes were established to identify what themes came forward through which method.

Analysis of the pretest and posttest assignments was conducted with coding according to the six core concepts of intersectionality provided by Collins & Bilge (2020), assessing whether participants show recognition/application of what core concept per answered question. The next section elaborates on the thresholds that were used to assess change. Additionally, responses were compared qualitatively to identify any other interesting changes in analytical or problem solving approaches. The figure below shows the final coding scheme in this research.

Figure 8: coding scheme

Game aspect:	Transformative learning:	Key concepts of intersectionality:	Condition:	Self-reported change:	Method:
aesthetics	disorienting dilemma	Social inequality	game facilitation	analytical skills	discussion
deep conversations	critical self-reflection	Intersecting power relations	knowledge	knowledge	evaluation form
giving language	meaning perspectives & critical discourse	Social context	organizational culture		interview trainers/ developers
interaction with cards	acting	Relationality	practice		observation
something to hold		Social justice			pretest-posttest
versatility/ flexibility		Complexity			
visualizing/ understanding					**Improvement suggestion**

3.2.2.2 Threshold validation: analyzing the pretest-posttest and TLES

To analyze change in intersectional analytical skills, this research uses thresholds to identify notable or meaningful patterns of change before and after the training/intervention. These thresholds were also applied in the TLES data analysis. According to Walker (2018), a learning environment can be considered transformative when participants report consistently high agreement across the dimensions included in the survey. The thresholds are used as guide to what is considered high agreement. Due to the small sample size (n=6), inferential tests are not applicable.

Patton (2015) explains the advantages of context-specific thresholds for interpreting change in small-sample qualitative research. To support analysis, Patton (2015) recommends defining context-based decision rules that he describes as thresholds of meaningfulness that guide interpretation of change in small-sample analysis, emphasizing that these thresholds should be derived from the research purpose rather than universal statistical criteria. This is supported by Maxwell (2013), who emphasizes the real-world importance of research findings rather than mere statistical significance. Though Patton (2015) and Maxwell (2013) do not provide mathematical rules, they do present a line of argumentation that is applicable for the threshold validation in this research. The choice for establishing thresholds in this research is in line with Patton (2015) and Maxwell (2013) in the following ways. It supports (1) analytical clarity: a rule to identify notable changes, (2) contextual relevance: the small sample size of six participants and research focus on meaningful change, and (3) the pragmatic research approach: to establish a rule that supports practical utility of outcomes. The practical utility of this research does not lie in accepting or rejecting the effectiveness of the card game-based training. Outcomes of the pre- and posttest will not lead to a conclusion that the training is able or unable to bring about change in the same way for everyone. Results are interpreted in the context of this specific group of participants. Researching which concepts may have developed more than others and why for this group is useful for future implementation in this and other groups. For example, if a concept shows little change without explanation, future training sessions can include exercises specifically targeting development regarding that concept. For new groups, for example from different faculties, it may help trainers to anticipate which concepts may require extra attention.

Most importantly, these thresholds are not considered universal indicators of statistical significance, but used as a tool to help interpret what counts as notable or meaningful change. Moreover, these thresholds are in support of qualitative interpretation, not as substitute. Ultimately, this comparative analysis of the pretest-posttest and the TLES are part of an extensive set of research methods used in this study. A single difference in occurrence or frequency of occurrence can be the result of many reasons, from both participant and researcher. Also, assessment to what extent the

answer of the participant reflects a certain analytical skill is affected by researcher subjectivity and unknown external factors. For example, a participant may have used words that I interpreted differently than they intended, spent more time on the pre- or posttest, was very tired during the pre- or posttest, or any other circumstance. Therefore, for it to be considered notable, the cut-off score for total group difference in occurrence (whether a concept is applied in the test overall; YES/NO) and for difference in group occurrence frequency (the amount of answers a concept is applied per test; SCORE 0-4) is ≥2. If the individual difference in occurrence rate is ≥3, this is also a notable difference that is elaborated on further, though this cannot be used to support general arguments about the effects of the training on a change in intersectional analytical skills for this group. Similar thresholds are used for analyzing TLES results. If ≥2 participants disagree or strongly disagree with a statement, this is further looked into for potential individual explanation. Moreover, if this is the case with ≥2 of the four TL concepts, it is highly likely that training environment cannot be considered transformative.

In this research, there are cases where the participant recognizes a concept of intersectionality in the pretest, but does not in the posttest. Also, some participants apply a concept more in the pretest than the posttest. Though this could be interpreted as regression, it may also indicate that participants become less confident in applying knowledge because they are confronted with conceptual complexity (Mezirow, 1991; Taylor, 2007). This is explained further in the discussion.

3.2.4 Research ethics

To ensure ethical research conduction, this study adopts the GREIP research group guidelines from Dooly et al. (2017) as follows:

Figure 9: ethical considerations (Dooly et al., 2017)

Ethical requirement	**Application in this thesis**
1: Consider potential harm	Potential harm may occur when people discuss feelings, experiences, and opinions on sensitive topics like oppression and discrimination. This is always a consideration in DEI training settings. The first part of the training therefore consists of a discussion and rule-setting session where all participants form agreements on how they will aim to make the training environment enjoyable for the whole group.
2: Provide sufficient information	Provide education institute overview of what and how this is researched. Regular updates on research process with thesis supervisor and internship supervisor.
3: Obtain informed consent	Participants sign up for the research and training at the same time. Inform participants on data use and anonymity.

4: Possibility of opting out	Inform participants they can opt out.
5: Confidentiality	Protect anonymity of participants; no names.
6: Personal data protection	Personal data will only be used to support the research aim, no other purposes.
7: Data deletion	Participants can argue for objectionability of data which then can be deleted.
8: Access to raw data	Only I as researcher and my thesis supervisor have access to the raw data.
9: Data processing	Remove information that jeopardizes anonymity: participant information in the appendix is simplified according to the relevance for this research, as the raw data (mainly on socialization/life vision) ties potentially identified participants directly to sensitive info like political preferences. Raw data is findable in Atlas with other data.
10: Data use	Processed data can be used for educational or academic purposes (as described in the information waiver provided with the register form for the training)
11: International collaboration	Not applicable

3.3 Validity and reliability

Overall validity and reliability is supported with both data and methodological triangulation, as described by Denzin (1978). Firstly, data triangulation: data from a variety of trainees as well as trainers is collected in the course of the two training sessions that are four weeks apart. Secondly, methodological triangulation: a variety of methodologies, both quantitative and qualitative are used in this research. Reliability refers to the consistency of a measure. Jhangiani et al. (2019) identify three types relevant to pretest-posttest quasi-experimental research:

1. Test-retest reliability – when researchers measure a construct that they assume to be consistent across time, then the scores they obtain should also be consistent across time. Test-retest reliability is the extent to which this is actually the case (p.92).
2. Internal consistency – the consistency of people's responses across the items on a multiple-item measure (p. 94).
3. Interrater reliability – the extent to which different observers are consistent in their judgments (p. 95).

Test-retest reliability is supported by focusing data analysis on more general mechanisms of change, rather than exact content, because every person has a different baseline and background. Moreover, both transformative learning and intersectionality

are theories commonly applied in analysis with tested and validated concepts. Internal consistency is supported by addressing potential outliers in the results. Additionally, all items are conceptually aligned with the theoretical framework. Interrater reliability is not applicable in this research, as only one researcher was involved with data analysis. However, to strengthen interpretive consistency, the coding process was guided by predefined themes linked to transformative learning and intersectionality theory, linking to the learning objectives of the game/training.

Validity is the extent to which the scores from a measure represent the variable they are intended to (p.95). Jhangiani et al. (2019) identify four types:

1. Face validity – the extent to which a measurement method appears "on its face" to measure the construct of interest (p.96).
2. Content validity – the extent to which a measure "covers" the construct of interest (p.96).
3. Criterion validity – the extent to which people's scores on a measure are correlated with other variables (known as criteria) that one would expect them to be correlated with (p. 96).
4. Discriminant validity – the extent to which scores on a measure are not correlated with measures of variables that are conceptually distinct. (p. 97).

Face and content validity was supported by thesis supervisor feedback on the research methods and advice from the trainers/game developers. Moreover, the research is designed for data analysis that is grounded in intersectionality theory, which is also the guiding theory behind the goal of the game and training itself. Additionally, transformative learning is an extensively applied theoretical lens to analyze adult learning in a broad sense. Overall validity is supported through methodological triangulation, testing co-occurrence of changes reflected in self-assessment, analytical skills, and observed behavior. Additionally, Chiang et al. (2015) identify the following factors that can influence outcomes in the pretest-posttest research process and may compromise internal validity:

1. History – *''other things might have happened between the pretest and the posttest.''*
2. Maturation – *''participants might have changed between the pretest and the posttest in ways that they were going to anyway because they are growing and learning.''*
3. Regression to the mean – *''refers to the statistical fact that an individual who scores extremely on a variable on one occasion will tend to score less extremely on the next occasion.''*
4. Spontaneous remission – *''the tendency for many medical and psychological problems to improve over time without any form of treatment.''*

Effects of history and maturation are both mitigated by asking self-assessment questions in a *''because of the training I…''* format, though it is never guaranteed that participants are completely self-aware of how they have changed because of the training or how they would have regardless. However, both data and methodological triangulation mitigate the effects of this factor by supporting self-assessment with analyzing to what extent this aligns with observed behavior and perspectives/intentions from the trainers. Moreover, individual participant behavior that potentially affects pretest-posttest outcomes, like doing more research on and thinking/talking about DEI related topics outside of the training, may not be considered in misalignment with training effectiveness, as this is arguably an argument supporting the contribution of participation to behavioral change (if proven to be the case). Regression to the mean is mitigated through methodological triangulation, as the pretest-posttest outcomes are supported by all other data collection methods. Additionally, the analysis of pretest and posttest went beyond scoring answers according to the intersectionality concepts by Collins & Bilge (2020) by qualitatively analyzing broader changes in both participant answer content and strategy. The fourth factor is not relevant for this research, as this training is not aimed at treating medical/psychological conditions.

Chapter 4: Results

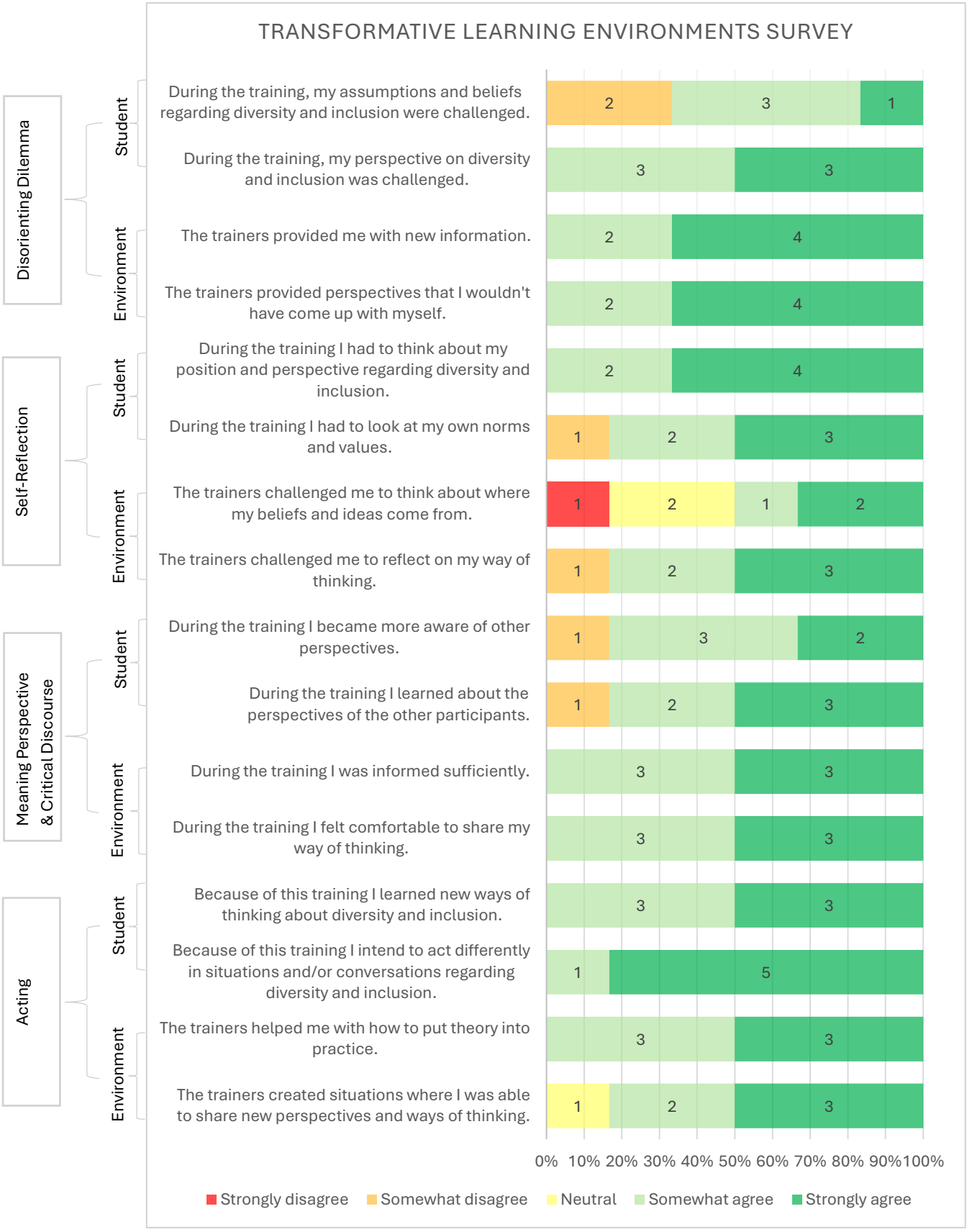
The following chapter presents the findings of this research that explores the use of a card game-based approach to DEI training for higher education professionals. The research aimed to understand how this approach can enhance intersectional analytical skills and support intended behavioral change among these professionals. Intersectionality and transformative learning (TL) provide the theoretical framework to understand the effect of the training on the participants. The analysis is structured around the main research question: *how can a serious card game-based approach to DEI training support enhancement of intersectional analytical skills and intended behavioral change among higher education professionals?* This question is supported by three sub questions, focusing on (1) the recognition and application of intersectionality theory, (2) the creation of a transformative learning environment, and (3) participants' intention to act differently.

The extent to which the DEI training goals are met are understood as a result of transformed learning and increased understanding of intersectionality. Findings that explain how TL and intersectionality contribute to these goals is therefore included throughout the sections on these goals, not the section on the Transformative Learning Environments Survey (TLES). This leads to the following structure of this chapter. The first section shows the results of the TLES. The second and third section contain findings regarding the DEI training goals as described in the conceptual model (figure 2): (1) improving intersectional analytical skills and (2) intended behavioral change. The fourth section shows how the game design aspects affect the learning process and participant experience. The last section contains all findings related to potential barriers, conditions, and suggestions for improvement of the training.

4.1 Transformative Learning Environments Survey (TLES)

Figure 10 below shows the results of the TLES, adopted from Walker (2018). This is an online Likert-scale survey conducted after the second training day to assess whether the conditions for a transformative learning environment were perceived as present. The survey items/statements reflect the core concepts of transformative learning theory as described by Mezirow's work. Participants rated their agreement with the statements on a 5-point scale (1 = strongly disagree – 5 = strongly agree). These findings show that overall, the card game-based training is perceived as a transformative learning environment by the participants.

Figure 10: Transformative Learning Environments Survey



4.2 DEI Training goal 1: increasing intersectional analytical skills

The table below shows the results of the qualitative pretest-posttest aimed at assessing the development of participants' intersectional analytical skills as a result of participating in the card game-based DEI training. Participants completed individual written case analyses before training day 1 (pretest) and after training day 2 (posttest), responding to a similar fictional scenario where discrimination takes place in a classroom setting. Each answer, four per test, was analyzed for success or failure to apply each of the six concepts of intersectionality by Collins & Bilge (2020). Though the sample size is small and statistical inference is not applicable, figure 11 below shows that comparison of individual responses suggest an overall increase in participants' ability to apply intersectional analysis.

Zooming in on the concepts, figure 11 shows that for this group, the training increased intersectional analytical skills for three out of six key concepts of intersectionality. Additionally, differences per concept per participant vary: some concepts differed whereas others were consistent. This first section shows the concepts without notable group differences: social inequality, social context, and complexity.

Figure 11: pretest-posttest results

PRETEST-POSTTEST INTERSECTIONAL ANALYTICAL SKILLS						
Key concept intersectionality (Min-max value)	**Pretest occurrence** (0-6)	**Pretest occ. freq.** (0-24)	**Posttest occurrence** (0-6)	**Posttest occ. freq.** (0-24)	**Difference: occurrence** (0-6)	**Difference: occ. freq.** (0-24)
Social inequality: groups may experience oppression or privilege based on certain aspects of their body and/or identity	P1: YES P2: YES P3: YES P4: YES P5: YES P6: YES ---------- + 6	P1: 2 P2: 1 P3: 2 P4: 1 P5: 2 P6: 2 ---------- + 10	P1: YES P2: YES P3: YES P4: YES P5: YES P6: YES ---------- + 6	P1: 2 P2: 1 P3: 1 P4: 2 P5: 1 P6: 3 ---------- + 10	Post-T: 6 Pre-T: 6 ---------- - **Gr. diff. = 0**	P1: 0 P2: 0 P3: -1 P4: +1 P5: -1 P6: +1 ---------- + **Gr. diff. = 0**
Intersecting power relations: intersections exist across different domains of power	P1: YES P2: NO P3: NO P4: NO P5: YES P6: YES ---------- + 3	P1: 1 P2: 0 P3: 0 P4: 0 P5: 1 P6: 2 ---------- + 4	P1: YES P2: YES P3: NO P4: YES P5: YES P6: YES ---------- + 5	P1: 1 P2: 1 P3: 0 P4: 1 P5: 4 P6: 3 ---------- + 10	Post-T: 5 Pre-T: 3 ---------- - **Gr. diff. = +2**	P1: 0 P2: +1 P3: 0 P4: +1 P5: +3 P6: +1 ---------- + **Gr. diff. = +6**
Social context: working of domains of power and intersections depend on context (situatedness)	P1: YES P2: YES P3: YES P4: YES P5: YES P6: YES ---------- + 6	P1: 3 P2: 4 P3: 2 P4: 3 P5: 1 P6: 3 ---------- + 16	P1: YES P2: YES P3: YES P4: YES P5: YES P6: YES ---------- + 6	P1: 1 P2: 4 P3: 1 P4: 3 P5: 3 P6: 4 ---------- + 17	Post-T: 6 Pre-T: 6 ---------- - **Gr. diff. = 0**	P1: -2 P2: 0 P3: -1 P4: 0 P5: +1 P6: +2 ---------- + **Gr. diff. = +1**
Relationality: categories are not oppositional; examination of interconnections; recognition that categories are not separate/additive	P1: YES P2: NO P3: NO P4: YES P5: NO P6: NO ---------- + 2	P1: 1 P2: 0 P3: 0 P4: 1 P5: 0 P6: 0 ---------- + 2	P1: YES P2: YES P3: YES P4: YES P5: NO P6: YES ---------- + 5	P1: 1 P2: 1 P3: 1 P4: 2 P5: 0 P6: 3 ---------- + 8	Post-T: 5 Pre-T: 2 ---------- - **Gr. diff. = +3**	P1: 0 P2: +1 P3: +1 P4: +1 P5: 0 P6: +3 ---------- + **Gr. diff. = + 6**
Social justice: related to some commitment to pursuing a social justice agenda	P1: YES P2: YES P3: NO P4: YES P5: NO P6: YES ---------- + 4	P1: 1 P2: 2 P3: 0 P4: 2 P5: 0 P6: 1 ---------- + 6	P1: YES P2: YES P3: YES P4: YES P5: YES P6: YES ---------- + 6	P1: 2 P2: 3 P3: 2 P4: 1 P5: 1 P6: 3 ---------- + 12	Post-T: 6 Pre-T: 4 ---------- - **Gr. diff. = +2**	P1: +1 P2: +1 P3: +2 P4: -1 P5: +1 P6: +2 ---------- + **Gr. diff. = +6**
Complexity: intersectional analysis and intervention is difficult (multifaceted)	P1: YES P2: YES P3: NO P4: YES P5: YES P6: YES ---------- + 5	P1: 1 P2: 3 P3: 0 P4: 2 P5: 1 P6: 2 ---------- + 9	P1: YES P2: YES P3: YES P4: YES P5: NO P6: YES ---------- + 5	P1: 1 P2: 1 P3: 3 P4: 2 P5: 0 P6: 2 ---------- + 9	Post-T: 5 Pre-T: 5 ---------- - **Gr. diff. = 0**	P1: 0 P2: -2 P3: +3 P4: 0 P5: -1 P6: 0 ---------- + **Gr. diff. = 0**

All participants recognize social inequality and social context in both pretest and posttest. Also, the number of questions it is applied in total does not differ notably. The total amount of times it is applied (group occurrence frequency) has not changed either, suggesting that participants were already capable of recognizing that body- and identity-related oppression exists and operates differently across contexts. This aligns with their background in higher education and pedagogy. However, P6 showed an increase from 0 to 2, suggesting relative individual development. Although only P1 had prior experience with DEI training, all participants were familiar with some conceptions of diversity and inclusion in a higher education context. The concept of complexity was recognized by five out of six participants in both tests, though this is not the same participant. This shows that participants already had the ability to recognize the multifaceted, difficult nature of intersectional analysis and intervention. While the overall frequency remained unchanged, P3 showed a notable increase from 0 to 3, suggesting a strong individual development in analytical skill regarding this concept.

More notable changes emerged for the concepts of intersecting power relations, social justice, and relationality. Two participants who did not recognize intersecting power relations in the pretest, did so in the posttest. The group occurrence frequency for this concept increased by six, with P5 showing a notable individual increase. This indicates enhanced capacities to apply the concept in different questions. Findings thus suggest that the training enhanced participants' ability to recognize that intersections exist across different domains of power (structural, disciplinary, cultural, and/or interpersonal). Similarly, two participants who did not initially recognize social justice did so in their posttest responses. The frequency of the group occurrence for this concept also increased by six, indicating a stronger shared capacity to relate intersectional analysis to commitments to a social justice agenda. As this concept strongly relates to intended behavioral change, section 4.3.2 provides more findings regarding this concept. The concept of relationality also showed meaningful improvement. Three additional participants applied this concept in the posttest who had not done so in the pretest, with P6 increasing from zero to three applications. This shift indicates an enhanced capacity to see categories not as separate or additive, but as interdependent and co-constructed. A telling example occurred on the first training day when P3 noted: *''as I hear you all talking, I could have chosen everything!''*, after which everyone agrees. This reflects the core intersectional insight that identities are not singular.

When asked to self-evaluate differences between their pre- and posttest assignments, participant responses varied. Three participants reported little change, either due to already having substantial theoretical knowledge (P2), or feeling like their answers remained similar (P3, P5). However, P2 and P5 do state that the card game helped with both understanding and applying the complex concept of intersectionality. The three others (P1, P4, P5) reported changes in how they approached the second case. P5 reports knowing better how to act. P1 reported realizing the importance of appealing to shared responsibility in the classroom clarifying equality versus equity to students. P4

reports that because of the training, they have gained a better grasp and more language for understanding what makes the actors respond differently to a situation. The words/cards provided them with something concrete to use when discussing this with the actors. P1 and P4 both emphasize the use of language, explanation, and understanding as important reason for their reported change. Supporting the development of a more nuanced vocabulary, P1 used ‘’position’’ instead of ‘’function’’ in their posttest, indicating a more relational understanding of power. Moreover, P2 described people who fail to recognize discrimination as the ‘’dominant group’’, indicating new attention to privilege or oppression.

These results suggest that though the degree of change differed across participants and concept, the card game-based DEI training had a positive and varied impact on participants' intersectional analytical skills. Improvements were notable in their ability to recognize intersecting power relations, relate analysis to a commitment to social justice, and recognizing interconnections between dimensions of diversity. These shifts are supported by more nuanced language use and understanding of intersectionality itself and behavior. This is further elaborated on in the section below.

4.3 DEI Training goal 2: intended behavioral change

The following section shows the findings that explain how the training supported intended behavioral change among participants. Following the operationalization, intended behavioral change is understood through transformative learning theory and intersectionality, specifically the commitment to social justice.

4.3.1 Change as a result of transformative learning: critical self-reflection

Findings suggest that acting differently became possible for participants as they began to think differently about themselves and their role in diversity-related classroom situations. A key moment occurred early on training day one, when trainer 1 asks *‘’where lies the discomfort?’’*, explaining that *‘’discomfort and anger cause inability to respond’’*. This moment served as a disorienting dilemma that triggered critical self-reflection among participants. For instance, during a case analysis, P6 shared an example where they were watching a documentary with the class where a black man spoke about his feeling of having to justify himself as non-threatening in back alley. Then, a female student of color was asked by other students if she ever experienced something similar:

> P6: *‘’it felt uncomfortable that she was being pushed into a box, how do I deal with that?’’*
>
> P2: *‘’imagine <u>she</u> feels uncomfortable, that is also behind it?’’*
>
> P6: *‘’she said it was okay, but was it really? In response I froze, and she just started talking, so I left it at that. …It felt like I wanted to save something. I wanted to do the right thing. So yes, it is about me, but out of care for someone else.’’*

Trainer 1: *''so, who is this about?''*

P6: *''yes… About me…''*

Trainer 1: *''we often try to resolve our own discomfort''*

This moment, and others like it, made participants aware of how their own need to resolve discomfort may stand in the way of genuinely supportive action. On training day 2, P6 reflected again: *''What stuck with me is that you asked ''whose discomfort is this?'', that kept me thinking. My part about who do I want to save.''*. Others mention similar reflections, thinking about their tendency to take on the role of savior (P3, P5) and the assumption that you have to solve something for another person (P5). P1 and P3 add that the question *''who are you doing it for?''* was their biggest moment of perspective change. These reflections show how the training made participants critically examine their own motivations and personalities. For example, P3 explains: *''The freeze: balancing between 'can I say something as a majority group, white woman, am I doing something wrong?', whilst you also want to do the right thing. I will encounter discomfort often.''*. Participant 2, 3, 4, 5, and 6 all mention that the training has helped them with the sense of discomfort they experience in the classroom when something happens where diversity and inclusion plays a role. P6 explains:

> *''I think this helps me to actually act in similar situations, instead of keeping doubting and then doing nothing out of insecurity.''*

This suggests that though questions regarding real life application remain, participants feel more equipped to deal with situations where diversity plays a role in the classroom. Two participants also mention discomfort of the teacher in their posttest assignment as a cause of (P4, P6) and key to solving (P6) DEI related issues in the classroom. Related to this sense of discomfort leading to inaction, in the pre- and posttests, P1 and P4 use the Dutch word from the educational field *handelingsverlegenheid*, which translates into 'the inability to act adequately in a certain situation'. Or as P4 explains:

> *''When someone shares feelings that we do not recognize in ourselves, cannot immediately empathize with, feel attacked by, or fall short on, we get defensive or avoid a difficult situation.''*

Similarly, P2, P3, and P6 report increased awareness of discomfort, both their own and that of others, and a willingness to engage with it instead of avoiding it. This suggests an increase in sensitivity to emotions and interpersonal dynamics. Findings show that discomfort and a related sense of saviorism form important barriers to action for these higher education professionals. This relates to findings from the interview with the trainers, who emphasized that the game and training are specifically designed to prompt self-reflection among participants from dominant or privileged groups. As Trainer 1 explains:

''People in marginalized positions often already think about themselves, they have already conformed. For them it is a different kind of process of gaining awareness. They see much quicker where they are excluded and why than the dominant group that thinks 'oh, but everyone is equal right?' or 'no, but I don't do anything, I'm very inclusive!' or 'my door is always open' ''

These findings show that critical self-reflection, particularly around discomfort and saviorism, enabled participants to better understand themselves and helped them moving from inaction to more conscious, inclusive responses in the classroom.

4.3.2 Change as commitment to social justice: a more inclusive classroom

Findings indicate that participating in the training has taught these participants to recognize and analyze diversity-related situations better, enabling action/intervention to consciously create a more inclusive higher education environment. All participants self-report the intention to change either in behavior, thinking, or both. Related to the learning process described above, results from evaluation forms show that participants have various concrete ideas on how they would respond differently to make their classroom a more inclusive space. P4 emphasizes adopting a more process than content-oriented approach, for example asking questions like ''what is happening here, now?''. Similarly, P3 and P6 emphasize making issues more open for discussion, and P1 adds that asking ''would you like to answer this question?'' could make the classroom a safer space. Aligned with the pretest-posttest results, all participants report an increase of insight and knowledge on intersectionality as a result of the training. Importantly, findings show that this went beyond theoretical knowledge and included increased awareness of its importance in practice. During training day one, all participants agree when P2 states the following during a conversation about why they didn't pick certain cards during the exercise:

''As if this has nothing to do with you, like it is not important. But you have to acknowledge it. I'm in a luxury position that I leave those cards out. You need a keen eye for that: not 'that's not relevant for me, so it isn't for anyone'.''

This suggests growing awareness of positionality and privileges that shape your perception of what aspects of your body and identity are relevant to your experiences, which is a core element of intersectional thinking. Moreover, it shows the implications of intersectional thinking for one's own actions and responsibilities. In the evaluation, P2 acknowledges already being familiar with intersectionality because of their work as educator but emphasized the added value of practicing and exchanging experiences for deepening insights. Similarly, P1 and P7 say that the first step towards acting more consciously has been made, but requires a lot more practice and knowledge of tools. On putting this knowledge into practice, all participants express various ideas and intentions, both in professional and personal contexts. All participants mention working

with students, while P3 and P6 also explicitly mention colleagues. P4 and P5 also extend this to their personal lives. As P4 noted:

> *''In assessing professional and private situations where I experience discomfort; to then conduct an analysis.''*

P5 emphasized a broadened perspective:

> *''Seeing more perspectives, calling out the discomfort, recognizing mechanisms, realizing that someone else is standing on an intersection and doesn't embody a single aspect, more empathy and insight (also into my own perspectives)!''*

P1 makes a more general statement:

> *''I realized how important I find this topic. I feel a calling to do more with this. Thank you for that!''*

Similarly, P6 says on training day 2:

> *''I feel the urgency. I will start small and familiar and spread it like an oil spill.''*

Looking at pre- and posttest answers, several participants made more practical and actionable suggestions in the posttest. P1, P2, and P4 all proposed using the card game as tool to analyze classroom dynamics and facilitate student conversations. P1 suggested initiating working agreements with students for sensitive discussions and P4 mentioned repeating specific sentences used by the trainers to help create a safer environment. These examples suggest a translation of intersectional thinking into pedagogical strategies to make the classroom a more inclusive space. On a more systemic level, P5 emphasized the importance of policies and institutional commitment to inclusion in their posttest, which they did not in their pretest. P5 and P6 also mention organizational culture as key area of influence, again only after the training. These additions suggest enhancement of the capacity to look beyond interactions on the individual level and consider the role of structural dimensions, a foundational element of intersectionality.

These findings show how participants started to translate analytical insight into emotional awareness and understanding. Moreover, how this understanding moves them to action-oriented intentions towards more inclusive behavior. This reflects a commitment to social justice as key concept of intersectionality. Overall, participants express potential for both practical application and personal development, though the extent and depth of intended use vary.

4.4 Game design aspects

This section shows how the game design aspects contribute to the learning process, analytical skills, and overall training experience of the participants. This is structured according to the MMDE framework by Sousa et al. (2021):

Mechanisms: formal rules/systems (simple actions, not game-specific)
Mechanics: player interactions with mechanisms
Dynamics: dynamics that emerge from interacting players and mechanics
Experience: total player experiences, including aesthetics, emotions, and engagement

To illustrate how the game mechanisms bring about mechanics and dynamics, the table below categorizes interpreted interactions from participants with the cards on both training days, throughout all exercises in both subgroups and plenary. Beneath are pictures from the training showing some of these interactions. After that, findings regarding total player experiences are shown.

Figure 12: Mechanisms, Mechanics, and Dynamics of gameplay

Mechanisms (simple actions)	**Mechanics (need a set of mechanisms)**	**Dynamics (resulting from mechanics)**
Spreading cards across table	Scanning cards	Gaining overview of possible dimensions for analysis Getting new vocabulary to talk about DEI Going into deep and personal conversations fast Structuring of analysis Evoking discussion and collaborative analysis Reflection and possible rectification Conversation structuring Clarification of current topic of conversation Making eye-contact or not
Shuffling cards through hands	Orienting	
Holding the cards as fan in hands		
Moving cards across the table		
Picking up and putting down cards	Card selection and deselection	
Placing cards on top of each other		
Splitting cards in two sections: applicable and non-applicable		
Placing/switching cards in various sequences on the table		
Looking at the cards while speaking about the dimension at hand	Supporting speaking	
Putting down card when done talking about that dimension and picking up next card		
Pointing at specific cards on the table while talking		
Moving cards on the table while talking		
Shuffling through cards while talking		
Picking up a specific card to answer a question from the trainer		
Moving/bending cards without looking at them while others are speaking	Supporting listening	
Looking at own cards while others are speaking		

Figure 13: photo's illustrating gameplay

An important asset of the cards is giving language and definitions of different dimensions of diversity. Participant 4 and 5 emphasize that the clear terminology provided a sense of safety, offering literal and figurative ''grip'' during conversations. Similarly, all agree when P3 adds that not having to make eye contact while speaking makes the sensitive conversations easier and safer. During the introductory exercise, participants had to pick three cards (dimensions of diversity; e.g. gender, education, and socialization) that meant something to them right now as a person and share with the group. During this sharing, participants share various thoughts, feelings, and experiences. Emotions played an important role during this first exercise: all participants express laughter, nods and smiles of agreement when others share something, but also tears from two out of seven participants sharing feelings regarding their personal background. After the introductory exercise, trainer 1 says that the cards help with immediately going deeper during an introduction, after which the entire group of participants agree. In the interview, both trainers emphasized this aspect as well. Moreover, the trainer 1, who joined the organization later, also notes that seeing this working of the game played an important role in inspiring them to get involved with developing the second card game.

After these interactions with the cards, during the group discussion at the end of training day 2, participants discussed the value of the card game as physical tool. All participants agreed that the appealing design draws people in and encourages active participation. Similarly, participants respond positively to the design and other aspects of the game's physical appearance in the post-training evaluation form. P1, P2 and P4 associate the use of colors and multiple languages with both inclusivity and

attractiveness. P1 and P2 also emphasize that the cards feel nice in your hands. Observations and the group discussion show similar results. This aligns with the ideas and intentions of the developers/trainers, as they explain that the design was picked and externally reviewed by both adults and teenagers. However, not all participants are convinced of its contribution to reaching DEI training goals. Though neither explain why, P3 and P6 are hesitant in making that connection, with P6 expressing ambivalence. P5 raises a practical concern, saying that the design is simple and accessible, but that the purpose and use are not immediately clear from its appearance or manual. This aligns with findings from the group discussion and is addressed in section 4.5.

During the group discussion after day 2, participants discussed application of the game. They emphasized that the cards help to visualize intersections that you do not immediately think about. They agree on the versatility in application, when P5 notes that you can put the cards on everything for analysis: your own and other's experiences in any fictional or real-world context. Moreover, participants start brainstorming and come up with a variety of not only new applications but also new materials with the same concepts: dices with the dimensions on the sides, a monopoly style game, K'NEX, pieces of cake, and Triviant. This aligns with how the trainers/game developers use the game, as trainer 1 explains:

> *''I got involved because I saw the game and found it very interesting to talk about the theme diversity, inclusion, and equity in a different way through such a set of cards. And yes, I use it a lot in my work, different workshops and trainings I give. I continue to see more opportunities, so that is very fun.''*.

They continue with describing how they use the tool in a variety of professional settings: training sessions, team-building activities, and leadership development. The core purpose, as stated in the manual, is to think and speak differently about differences between people and social positions/hierarchies. Beyond education, the trainer sees potential for the cards in policymaking, specifically in the evaluation and assessment of the inclusivity of policies:

> *''I also use the cards to analyze cases. Recently, I saw something on LinkedIn about how policy should be evaluated more intersectionally, and I thought these cards could be useful for that too. For civil servants evaluating policy: which citizens are being overlooked? Who is the policy targeting? Which groups are you unconsciously excluding? Because with all those dimensions of diversity, the cards help to make that visible.''*

Results show that participants recognize the versatility, flexibility, and pleasing aesthetics of the card game, which aligns with the experience in application and intentions from the trainers/game developers.

4.5 Conditions, barriers, and suggestions for improvement

Understanding the conditions under which a DEI tool like the card game in this study is used is important for successful implementation in the future. Moreover, these insights are useful for possible adaptations and alternative applications. Aligned with the pragmatic approach, this section shows results on conditions, barriers, and suggested improvements on both the physical game and accompanied training.

The role of the trainer and their expertise in intersectionality and group guidance were consistently identified as important for the learning process and outcomes. As trainer 2 stated in the interview:

> *''You can use the cards, but it is about how you guide it, which questions you ask, how you respond to what is happening in a group. That means you have to be aware of the process during the game, and able to handle that. The most important skill to do this is knowledge on intersectionality and what is happening in society to make connections between these and ask the questions that allow participants to make those connections themselves.''*

Participants and trainers also agreed that the game, though valuable, needs the training. All emphasize the need for sufficient context and knowledge on intersectionality, the dimensions, and group guidance to successfully facilitate gameplay. Moreover, P4, P5, and P6 reported that the training was essential to understand the theoretical background. Trainer 1 emphasized that selling the game without mandatory training risks misuse, especially for people without prior DEI experience that may think too lightly about it. Additionally, participants and trainers both emphasized the importance of self-awareness of the facilitator. Knowing what intersections you find yourself on and what this means for your experiences and behavior is considered essential for successful and inclusive game facilitation. Trainer 1 also explains that the game can offer a way to deal with triggering comments from participants:

''We are constantly challenged to look at what is effective in these conversations and what is my role in that. And what happens if people say things that trigger me? That also requires something from me. With participants and trainer, you could look at what aspect, card, or dimension triggered

Creating a sense of safety was seen as a fundamental condition. Participants noted that working agreements on behavior and communication and the physical game itself contributed to a safe(r) training environment. Visible vulnerability from others (including trainers) contributed as well. P5 explains:

> *''I noticed that safety during the training and within myself was a particularly important theme. On one side you are quickly sharing very personal stuff, and on the other side, how do you deal with what someone else shares?''*

Regarding recognition and the game making people feel safer to share, trainer 1 explains:

> *''The more diverse the group, the more interesting it gets, because then you have more different stories. More differences that people talk about creates openness and space to talk about them. Even if people maybe avoid certain topics, for example that color or ethnicity plays a role in the organization. By playing the game, people get space to talk about that.''*

The trainers mention a lack of resources in time and money are a barrier they often run into. Additionally, a DEI training may just be a check on the diversity policy commitments list, rather than true commitment to the cause. The importance of sufficient time is also reflected in the evaluation form, where P4 states: *''the training could be longer with more time for literature, backgrounds and concrete assignments in between to conduct with the target group you're working with. Then there would be (more) opportunities to discuss difficulties that you run into in practice.''*. Similarly, P2 and P3 note the importance of practice and exchanging experiences and P7 emphasizes that consciously applying newly gained knowledge requires time to settle down. This also emerges in the observations, where P1, P2, and P5 all express the importance of continuous practicing with the concepts, aligning with the trainers' perspectives.

Findings show that organizational culture also plays a role. During the training, participants reflected on the tension between personal values and professional expectations within the organizational culture of their institution. P1 questioned whether they should or could remain politically neutral in the classroom. This prompted reflection on the blank and life vision card from the game. P2 emphasizes that in pedagogy, value-neutrality in unrealistic. P5 adds that pedagogy is shaped by broader political and institutional contexts, which students need to understand. This example suggests awareness of how teaching is embedded in cultural norms and how educators may position themselves within that culture. Additionally, both trainers emphasized the reflexive capacities, openness, and eagerness to learn in the group, to which P5 responds *''we've been reflecting for years!''*, after which everyone laughs. All agree that meaningful participation in DEI training comes from feeling and sharing, which is not always self-evident in organizations. This is further explained by trainer 1 in the interview:

> *''It matters what kind of organization it is for how deep people are willing and able to dig into themselves. I noticed that in higher education, people are very enthusiastic and more comes out of it, because their reflective abilities are better, as they are used to working in that field, but also because these topics do not scare them off.''*

Moreover, P2 says the game may not fit every group, due to the conceptual complexity of intersectionality, suggesting a certain level of cognitive capacity may be required. However, others mention that the game helps to understand the complexity by visualizing intersections and structuring analytical exercises, which is also underlined during the group discussion and by the trainers in the interview.

Regarding improvement, participants and trainers made various concrete suggestions. For example, increasing inclusiveness by adding braille and videos with both sign language and sound. The trainers mention adding Spanish, pictograms, the dimension skin color, and improved accessibility for colorblind people. They add the notion from the game manual that language is in constant development, which is something they continue to take into account as game developers and trainers. Also, participants expressed desire for more working methods and guidelines to support them in future application. They emphasized that applying the concepts during the exercises was the most difficult but also the most valuable, aligning with results from the evaluation forms and interview with trainers.

Chapter 5: Conclusion and discussion

This research is a response to a growing societal, governmental, and academic demand for evidence-based approaches to Diversity, Equity, and Inclusion (DEI) training in higher education. The research explored how a card game-based approach to DEI training contributes to the development of intersectional analytical skills and behavioral change among higher education professionals. Applying transformative learning and intersectionality theory in a quasi-experimental pretest-posttest design, this research answered the following main research question:

> *In what ways can card game learning be used in Diversity, Equity, and Inclusion training to increase intersectional analytical skills and intended behavioral change among higher education professionals?*

This main research question was supported by the following sub-questions:

1. How does participating in serious card game-based DEI training influence participants' ability to recognize and apply intersectionality?
2. How does a card game-based approach to DEI training contribute to the creation of a learning environment that transforms perspectives on DEI topics?
3. In what ways does the card game-based training influence participants' intentions to change their behavior or take action towards a more intersectionally inclusive and equitable higher education environment?

5.1 Findings

This study found that the card game-based training positively influenced participants' intersectional analytical skills in both self- and case analysis. Notable change was found in recognizing intersecting power relations, relationality, and social justice. This suggests that the training improved participants' ability to connect individual experiences to broader systems of power and to view identity dimensions as co-constructed rather than separate. The increased attention to social justice indicates a growing awareness of the role of responsibility and concrete commitments in improving inclusivity in higher education. Participants also became increasingly aware of the importance of personal intersections and their effect on their own experiences, behavior, and role as educator or game facilitator. Moreover, all participants reported plans to change their own behavior or thinking, expressing concrete strategies to increase more inclusive classrooms, such as asking reflective questions, improving safety, and using the card game as pedagogical tool. Several participants extended these intentions beyond the classroom, aiming to influence colleagues or personal environments. The game and training also helped participants develop more precise and reflective vocabulary, indicating deeper understanding of intersectionality theory and practice. In contrast, the more stable recognition of social inequality, social context, and complexity likely reflects participants'

existing familiarity with DEI topics through their personal and/or pedagogical backgrounds.

The card game-based training format created conditions that align with the core elements of a transformative learning environment. Firstly, participants experienced disorienting dilemmas: the initial requirement of a transformative learning experience, triggering the questioning of existing assumptions and beliefs. In this group, the questions *''who are you trying to save?''* and *''who are you doing it for?''* were clear examples in this research. What dilemmas are considered disorienting is very personal. In this case, these specific dilemmas were disorienting for a group of all white, cisgender teachers in the pedagogy department. The disorientation set in motion a process of self-reflection, where participants recognized, questioned, and discussed their discomfort and saviorist tendencies and how this forms a barrier to constructive action when dealing with DEI related issues in the classroom. Another element of transformative learning is learning about other perspectives and feeling comfortable to share your own, to facilitate meaning perspectives and critical discourse. In this DEI training context, sense of safety emerged as an important theme related to this requirement. A variety of aspects increased feeling safer to share for participants. Firstly, making working agreements on behavior and commitments. Secondly, recognizing vulnerability, from both trainers and other participants, invites others to do the same, thus producing and reproducing this sense of safety. Moreover, the cards gave words, structure, and something to hold and look at during complex or emotionally sensitive exercises. The last element of transformative learning environments is about changing behavior. By participating in the training, participants gain insights that lead to intentions to change behavior on both a broader and a more practical action level. On an abstract level, participating in the training evoked a sense of awareness and commitment to broader DEI goals, like wanting a more inclusive classroom, learning more about diversity and inclusion in general, and being more aware of their own position and background in the classroom. On a practical level, results show an increasing motivation to apply concrete interventions, exercises and use specific words to reach these goals. Moreover, results show strong enthusiasm to transfer the newly learned insights to other colleagues and students. Experiencing first-hand how specific interventions, words, or agreements made the teachers themselves feel safer also contributed to their intentions to apply this in their own environments: in the classroom, with colleagues, and personal lives.

The game design contributed to the transformative learning environment by supporting the six key elements as described by Taylor (2009). Firstly, gameplay drew directly on participants' individual experiences by requiring them to reflect on their own identities and social positions across multiple diversity dimensions. Everyone received the same set of cards and was encouraged to consider where they personally stood in relation to each category, connected the game and learning process to their own lived experiences. Secondly, this promoted critical reflection by encouraging participants to think deeply about privilege, oppression, intersectionality, and their own position and/or

complicity in systemic inequalities. Moreover, gameplay required sorting and discussing abstract concepts with provided words and definitions, making critical reflection both necessary and more tangible. Thirdly, the card game facilitated dialogue by providing visual and conceptual grip to structure discussions and thinking processes. The cards gave a shared vocabulary and definitions for complex concepts, making it easier and safer for participants to engage in open, vulnerable, and emotional conversations regarding DEI topics. Moreover, the *Caleidoscopia* card game visualizes the complexity of intersectionality theory by showing participants multiple dimensions of diversity that they can use to understand different experiences of groups and individuals in training exercises. Practically, this approach helped translating intersectional theory into practice, a step often missing in traditional DEI training. Fourthly, the card game-based training adopts a holistic orientation to teaching by integrating emotional, experiential, cognitive, and physical engagement in the learning process. Participants were not just thinking about DEI with passive listening, but were actively interacting with the concepts through speech, touch, collaboration, and visualization. Fifthly, the game design supported awareness of context by allowing participants to apply DEI concepts to both their own real-world experiences and fictional cases. Rather than providing general knowledge on DEI, this training was situated in social dynamics relevant to their professional lives in higher education. Lastly, the game supported the establishment of authentic relationships among participants and with trainers. Participants acknowledged how making working agreements, noticing vulnerability in the trainers, and getting asked critical questions affected their experience positively during the training. Reflecting on the first TLES questions, with only the first statement ≤2 participants disagreed. This question was about whether the trainers made them question their beliefs regarding DEI. Disagreement is likely explained by pre-existing awareness of or commitment to DEI topics because of personal and/or professional background, similarly to why some concepts regarding intersectional skills have not changed as a result of the training.

This research shows that the Caleidoscopia card game-based DEI training can be a transformative learning tool. However, its working depends on skilled facilitation, a strong sense of safety, and sufficient time for reflection, dialogue, and practice. Trainers' expertise in intersectionality and group dynamics are important to connect theory to practice and safe, constructive discussion of DEI topics. Institutional culture and commitment also play a role. Potential barriers are limited time, money, and reflexive capabilities among employees. Concrete suggestions for training material development and implementation are provided in section 5.5.

5.2 Contributions to the field

This study contributes to the fields of intersectionality, transformative learning, DEI training and serious gaming by addressing the gaps in how these fields intersect in both theory and practice. Moreover, it answers a call for empirically researched interventions that can improve intersectionally inclusive thinking and behavior in higher education.

Although intersectionality (Crenshaw, 1989) is widely recognized as valuable analytical framework, vagueness regarding definition and practical application can lead to a loss of its critical impact and analytical depth (Davis, 2008). This study contributes to this field by explaining how intersectionality can function not only as a theory but also as a practical method for DEI training in a game-based format. This also supports current academic efforts to embed intersectionality into educational programs and professional development (Busche & Hartmann, 2024; Icaza Garza & Vázquez, 2017), showing a concrete approach to improving intersectional analytical skills and intentions for more inclusive behavior among higher education professionals.

Transformative learning theory (TLT) (Mezirow, 1991) provided the conceptual framework for understanding how participants may have experienced perspective changes and intentions to act differently because of the training. This study adds to the field of TLT by exploring how a card game-based approach to DEI training can support key mechanisms of transformed learning. Moreover, these findings strengthen the theoretical connection between intersectionality and transformative learning, showing that critical self-reflection on yourself and intersecting systems of privilege and oppression can drive personal and professional development. In doing so, findings of this research explain behavioral intention as a result of both transformative learning and enhanced intersectional skills (Collins & Bilge, 2020).

This research also contributes to the broader field of DEI training design and assessment. Traditional training formats (e.g. lecture based) lack engagement and practical relevance needed to support long-term change (Salas et al., 2012; Naidoo, 2023; Wu et al., 2019). This study addresses these limitations by assessing a format that proved to enforce interaction and practical application suggestions. Therefore, the findings contribute to the evidence base for alternative DEI training formats that aim to overcome the barriers that hinder current arguable effectiveness (Derrick et al, 2021).

Lastly, this study contributes to the growing field of serious gaming by evaluating an analog, card-based intervention in a professional adult learning context. As opposed to digital serious games, empirical studies on analog games (especially for DEI purposes) remain scarce. This research shows how a card game can support dialogue and engagement while discussing complex sensitive topics like privilege, discrimination, and identity (Ward et al., 2019; Joseph et al., 2024). Findings add that the cards do this by increasing a sense of safety, structure, and words for these conversations. Moreover, findings support that the card game format is versatile and can be adapted to different exercises and groups.

5.3 Discussion

This section interprets the results of this study in relation to the theoretical framework and previous research on intersectionality, transformative learning theory (TLT), DEI training and game design.

The training enhanced intersectional analytical skills in three of the six key concepts defined by Collins & Bilge (2020): intersecting power relations, relationality, and social justice. No notable development was found for social inequality, social context, or complexity, and results varied across participants. Additionally, differences per concept per participant vary, meaning the exact effects differ per concept and per participant. This is also unsurprising, as a group always has varying levels of baseline knowledge, skills, or experience with the topics at hand. The absence of change in recognizing social inequality and social context is consistent with participants' professional backgrounds. As educators in Dutch higher education, they are already exposed to institutional guidelines on discrimination and likely entered the training with some awareness of DEI related issues (Wang et al., 2024). Their voluntary participation further suggests a pre-existing interest in this topic (Naidoo, 2023). Given their experience as both students and teachers in this setting, the concept of social context was likely already integrated into their thinking. While results suggest potential growth in recognizing complexity, data from this study provides insufficient evidence to make this claim. Vice versa, it is unsurprising that training enhanced the recognition of the concepts intersecting power relations, relationality, and social justice among these participants. The game and training required participants to analyze real-world and fictional cases that made privilege, oppression, and power dynamics visible and discussable. Doing this collaboratively, participants automatically engaged with relational thinking, comparing how identity aspects intersect and affect experiences. Moreover, throughout both training days, conversations about practical application of skills/tools and personal motivations to create a more inclusive classroom and/or world supported the social justice dimension of intersectionality. These changes align with what the participants did not yet practice (e.g. complex relational analysis, specific actions to improve inclusivity), rather than what they already knew (e.g. basic conceptions of inequalities in different contexts). This suggests that the training helped participants to gain a more advanced understanding of power dynamics and intersecting identities, countering superficial perceptions of DEI (Busche & Hartmann, 2024; Icaza Garza & Vázquez, 2017).

These learning patterns align with TLT (Mezirow, 1991; 2000), as critical self-reflections and disorienting dilemmas were found as key drivers of the learning process and outcomes of participants. Interestingly, several participants applied one or more concepts of intersectionality in their pretest, but did not do so in their posttest. In some cases, the frequency or depth of use was more evident in the pretest than the posttest. This pattern could be interpreted as a regression in analytical skills or awareness, though a more positive interpretation is also possible. According to TLT, a key element of learning

is the process of becoming aware of the limitations of your previous assumptions, which can lead to uncertainty and discomfort (Mezirow, 1991). This means that participants may become less confident in applying DEI concepts after the training because they were confronted with the complexity of intersectionality. Moreover, some participants were not familiar with the concept of intersectionality at all before the training. This also aligns with Taylor's (2007) review of empirical research on transformative learning processes, where they found that participants often experience temporary cognitive withdrawal as they reorient their frames of reference and assumptions. From this perspective, a decline in concept application frequency may actually reflect progress. This pattern might also be a potential limitation in the training design. More attention to training dynamics and personal experiences may help participants to move beyond regression. However, question remains whether this is desirable, as this is also a logical symptom of aspects crucial to the transformative learning process such as disorientation and self-questioning. Ultimately, it suggests that transformative learning is not linear, just like individual or societal change.

Participants expressed increased motivation to act on insights from the training. This aligns with the social justice aspect of intersectionality, linking analysis to intended behavioral change (Collins & Bilge, 2020). Participants did not only express increased motivation to act inclusively, they also critically reflected on their saviorist tendencies, with the majority acknowledging internal barriers to action such as fear of making mistakes, guilt, or self-identification with a ''helping'' role. White saviorism, and its gendered variant female saviorism, describes how individuals, often well-intentioned white women, position themselves as rescuers of marginalized groups rather than engaging in collective, accountable, and constructive action (Heron, 2007; Berlant, 2009). These patterns can reproduce power hierarchies by centering the helper's moral identity and distract from systemic causes of inequality. This study found that the card game-based training helped the participants transition from vague moral intentions to constructive action, underlining its positive effects on intended behavioral change. This study thus supports previous findings (Cabler et al., 2022; Salas et al., 2012) that interactive DEI training can shift attitudes and behaviors.

The design of the card game shaped participants' learning experiences in various ways. Applying the MMDE framework (Sousa et al., 2021), the mechanisms and mechanics of the game created dynamics that supported complex analyses and conversations by providing language, structure, and an increased sense of safety. This made it easier to engage in emotionally charged discussions. This aligns with research showing that game-based learning can increase psychological safety and openness (Ward et al., 2019; Joseph et al., 2024). As everyone has the same cards/dimensions, the *Caleidoscopia* game shows potential to counter potential epistemic exploitation. This refers to the burden placed on marginalized people to educate others about their oppression, often requiring them to perform emotional labor that benefits only the privileged group (Berenstain, 2016). Aligned with Palencsár & Szilágyi (2023) and Su et al.

(2014), the versatility and flexibility of the card game is considered impressive and valuable. However, findings from this research show that this also underlines the need for clear guidelines, background knowledge, and continuous practice for successful and confident application of the game. Building on Rodríguez Aboytes & Barth (2020) and Alam (2022) who explain TL principles in broader sustainability education, card games pose an interesting tool in supporting the conditions for a transformative learning environment.

5.4 Limitations

Addressing the limitations of this research, generalizability of conclusions remains the main challenge, as is the case with most experimental research designs. Replicating this research with different faculties, professions, and individuals will lead to very different results. However, this research does not claim to make universal statements about the exact content and insights that future participants may or may not learn. The useability lies in the identification of more general mechanisms of potential changes. Moreover, the aim of this research is not to find or defend a one-size-fits-all approach to DEI training or societal change. However, though individual outcomes will vary, group processes and (potentially) outcomes are influenced by the composition of present bodies and identities among both trainers and participant. That brings us to the second limitation, the small and not very diverse research group (white cis-gendered women), due to practical circumstances. This might be a limitation, but may also be a realistic representation of Dutch pedagogy departments and voluntary DEI training participation in higher education in general. Additionally, this allowed for specific themes to emerge and be discussed, like saviorism. If anything, this underlines the importance of conducting cross-faculty intersectional research. Thirdly, there are limitations caused by external factors that might influence outcomes related to the pretest-posttest design, besides those discussed in chapter 3.3 on reliability and validity. Three important concerns that came up in this research were (1) time spent on pretest and/or posttest, (2) circumstances while making the pretest and/or posttest, and (3) time between training and pretest and/or posttest. These were factors that varied among participants but with unknown effects. These effects could have been mitigated by creating a structured environment for making the pretest and posttest. However, this was practically unfeasible for this research, due to limited time for the training during participant working hours. Moreover, this attempt at equalizing circumstances would bring new unknown effects into the results, as learning processes are highly individual. For example, some may need more time than others to let newly learned insights sink in before they can successfully apply them.

5.5 Recommendations for praxis

For people that want to start working as game facilitator, four recommendations can be derived from this research. Firstly, get training on how to work with the game, as the *Caleidoscopia* card game play should be guided by someone with sufficient knowledge on intersectionality and group dynamics. This is essential to prevent incorrect use of intersectionality theory and unwanted situations. Moreover, self-awareness of your own co-constructed identity and how this affects your experiences and behavior is considered important for good game facilitation. Secondly, pay attention to psychological safety by making working agreements, responding adequately to potentially unsafe behavior, and modeling vulnerability. Though the game itself supports safety by providing structure and language, the facilitator remains essential in creating a safe and open learning environment. Thirdly, evoke critical self-reflection through disorienting dilemmas; do not be scared to ask confrontational questions. These are crucial to set the transformation of perspectives and assumptions in motion. Lastly, adapt to your group's backgrounds. As game play requires abstract theoretical thinking and emotional engagement, the facilitator should tailor their communication and game content to the group at hand.

For institutions and policy makers the following. Firstly, provide DEI efforts with sufficient structural time and money. Effective DEI intervention and change requires continuous practice, engagement, and expertise. Following this, look at the organizational culture, as openness to learn and reflexive capabilities are drivers of transformative learning and change. Secondly, dare to explore exciting alternative approaches, they may be more effective than lectures.

For the game and training developers the following. Firstly, they should continuously reflect on the material to improve inclusiveness and adapt to current societal and theoretical developments. Concrete suggestions include adding Spanish, braille, pictograms, and videos with sign language and sound. Secondly, include a manual with structured exercises to apply theoretical concepts, as putting theory to practice is essential for change and skill development (e.g. a guide to case analysis). Lastly, look at TL concepts in training design development. Its principles show a promising approach to changing problematic frames of reference and fixed assumptions.

5.6 Future research recommendations

Firstly, more empirical research on DEI training tools in different contexts is needed for more knowledge on effective interventions. Moreover, comparative research of tools can help trainers and institutions decide on which would be most effective in their context. Building findings from this study, future research could unpack the effectiveness quantitatively, as this research group consisted of only six participants. As organizational culture emerged as interesting conditional factor, future research can be done on the application of this training and serious card game across various institutions or faculties within higher education to assess how working in different disciplinary cultures affect DEI training processes and outcomes. As the card game principles show promising results in supporting transformative learning, future use in a broader sustainability education context would be interesting. Moreover, more diverse participant groups are interesting for further research into the influence of in-group diversity. To further investigate long-term effectiveness, longitudinal research is essential to assess what conditions contribute to sustained transformation over time. Additionally, conducting a comparative analysis of voluntary versus mandatory participation can offer insights into the influence of motivation on training outcomes, which is especially relevant for managers, policymakers, or others that have the power to decide on this matter. Finally, future research could focus on knowledge and skill transfer by studying how participants work with the serious card game with their students or colleagues.

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Appendix

1. Participant information

Trainer 1

Age/phase of life → 63, middle-aged
Function → Consultant/advisor, trainer, coach, transformative mediator, dialogue facilitator, systemic worker, counselor, volunteer
Gender identity → Cisgender woman
Ethnicity → Surinamese-Hindustani, parents and grandparents born and raised in Suriname, great-grandparents in India
Sexual orientation → Heterosexual
Education → MAVO – HAVO – VWO – University, studied public administration and followed many other training on personal and professional level (e.g. reiki, constellation work, certified mediator, dialogue facilitator)
Socio-economic position → Middle-class
Physical and psychological variety → Physically and mentally no mayor disabilities, farsighted

Trainer 2

Age/phase of life → 69, retired
Function → Member Collective Caleidoscopia, game developer
Gender identity → Cisgender woman
Ethnicity → Indonesian
Sexual orientation → Heterosexual
Education → University
Socio-economic position → Middle-class
Physical and psychological variety → No issues

Participant 1
Age/phase of life → 36, mother of young children
Function → Teacher/coach fulltime students Pedagogy
Gender identity → Cisgender woman
Ethnicity → White, Dutch
Sexual orientation → Bisexual
Education → HBO
Socio-economic position → Average income
Physical and psychological variety → Healthy/fit

Participant 2
Age/phase of life → 53, working, living with partner and mother, studying children

studying (in student housing)
Function → Teacher pedagogy, primarily in parttime
Gender identity → Cisgender woman
Ethnicity → White, Dutch
Sexual orientation → Heterosexual, one partner
Education → University
Socio-economic position → Middle class, homeowner
Physical and psychological variety → No disabilities

Participant 3
Age/phase of life → 44, senior at work, at home children in puberty
Function → coach, chairman education committee, study advisor
Gender identity → Cisgender woman
Ethnicity → White, Dutch
Sexual orientation → Heterosexual
Education → University
Socio-economic position → Above average
Physical and psychological variety → Physical: early menopause. Mental: difficulties with focus/concentration

Participant 4
Age/phase of life → 46, studying children.
Function → Teacher/coach
Gender identity → Cisgender woman
Ethnicity → White, Dutch
Sexual orientation → Heterosexual
Education → University
Socio-economic position → Middle to upper class
Physical and psychological variety → Cancer in the past, now living with physical difficulties because of that.

Participant 5
Age/phase of life → 55
Function → Teacher
Gender identity → Cisgender woman
Ethnicity → White, Dutch
Sexual orientation → Heterosexual
Education → University
Socio-economic position → Middle class
Physical and psychological variety → Chronic disease (partly)

Participant 6
Age/phase of life → 45, adult

Function → Teacher
Gender identity → Cisgender woman
Ethnicity → I am Dutch, but born in Germany, where I lived for 14 years. This was a military village where Dutch soldiers lived with their families. Though I've lived in the Netherlands since I was 14, I still feel very connected to this.
Sexual orientation → I've always been in love with men. I can imagine also being able to fall in love with women, but that hasn't happened to this day.
Education → I finished the master in Pedagogy in 2022.
Socio-economic position → I interact a lot with people that contribute to society with their work.
Physical and psychological variety → I'm mentally as well as physically in a position that I can 'move' easily, both physically and mentally. I'm aware of different learning preferences and how I can apply those.

Participant 7 (not included in pretest-posttest and absent on day 2)
Age/phase of life → 54 years
Function → HBO teacher pedagogy
Gender identity → Cisgender man
Ethnicity → White, Dutch
Sexual orientation → Heterosexual
Education → HAVO-HBO-HBO master
Socio-economic position → Middle class
Physical and psychological variety → Physically and mentally healthy.

2. The Caleidoscopia card game and training

Picture retrieved from www.caleidoscopia.nl

Mission of the organization (from www.caleidoscopia.nl)

''Onze missie is bij te dragen aan een (meer) inclusieve samenleving. We doen dat vanuit de visie dat als we mensen op een gelijkwaardige manier met elkaar in gesprek brengen over diversiteit zij de kans krijgen over zichzelf en elkaar te leren. Dit leidt tot meer begrip en respect in de omgang met elkaar en het herkennen en erkennen van mechanismes die leiden tot ongelijkheid en uitsluiting.''

''De visie vindt haar theoretische onderbouwing in een caleidoscopisch perspectief op diversiteit met de volgende uitgangspunten:

- *Gelijkwaardigheid en wederkerigheid*
- *Intersectionaliteit*
- *Insluiten in plaats van uitsluiten*
- *'En…en' denken in plaats van 'of…of' denken''*

Explanation train-the-trainer course (from www.caleidscopia.nl)

''Je leert werken met het Caleidoscopiaspel zodat jij kunt werken met de kaarten in jouw team of groep. Naast het verdiepen in diversiteitsdimensies en hoe deze uitwerken voor jou en de andere deelnemers, krijg je theorie over intersectionaliteit oftewel het kruispuntdenken aangereikt. Je leert hoe je het spel in de praktijk methodisch kunt toepassen op de doelgroep die jij voor ogen hebt. Je oefent in subgroepen zodat je vaardig wordt om het gesprek te begeleiden en om te gaan met ingewikkelde situaties die zich voor zouden kunnen doen.''

Training structure and content – DAY 1

Training part	Content
Plenary opening	Short introduction round of trainers, researcher, and participants.
Working agreements	Group dialogue: *how do we want to interact and communicate?* Theory on creating safe(r) spaces.
Plenary introduction exercise	Choose 2-3 cards that are important for you right now and explain what they say about you as a person and in your profession.
Introduction exercise in subgroups of 3-4 and plenary reflection	Place the cards on the table in a composition that means something to you. Share guided by the following questions: *1: What meaning do you give to this composition?* *2: What does the composition say about your role, function, or profession?* *3: Why didn't you pick the other cards?* Reflection guided by the following questions: *1: Do you have questions about this exercise?* *2: How was it to do this exercise yourself?* *3: What insights does this exercise give you to fulfill your role more intersectionally?*
Theory on intersectionality	On the origins, impact, and application of the concept intersectionality. Room for questions.
Dice game exercise	Roll the dice twice for two random dimensions and think about your position within these dimensions, how they intersect, and how this works out in your thinking and doing in your role, function, and profession. Reflection guided by the following questions: *1: Do you have questions about this exercise?* *2: How was it to do this exercise yourself?* *3: What insights does this exercise give you to fulfill your role more intersectionally?*
Plenary case analysis	Reflection guided by the following questions: *1: Do you have questions about this exercise?* *2: How was it to do this exercise yourself?* *3: What insights does this exercise give you to fulfill your role more intersectionally?*
Preparation day 2	Explanation of homework: reading article *''Wrijving geeft Glans''* (Twie Tjoa, 1993), practice with the game, and prepare questions for day 2.
Rounding up	Group dialogue: *what are you taking with you from today?*

Training structure and content – DAY 2

Training part	Content
Introduction Sharing experiences	Check-in with participants about what resonated, whether they have questions, and experiences with the cards. Reminder of the working agreements from previous day.
Practicing in subgroups and plenary reflection	Group 1: explain intersectionality.

	Group 2: explain the dimension of diversity you find the most difficult. Plenary presentations from both groups where the other group asks critical questions. Feedback from each other and trainers.
Theory: mechanisms in working with DEI	Definitions of Diversity, Equity, and Inclusion. Mechanisms that create inequity/exclusion/discrimination. Dealing with these mechanisms in practice. Room for questions.
Make-over dice game	Answer the following questions for yourself: 1: How do you look at Fontys as your employer? 2: How do your colleagues see you? 3: To what extent do you feel comfortable? Perspective exchange: roll the dice seven times and get a new body and identity. Write down who you've become, think, and answer the same questions above from your new identity. Reflection guided by the following questions: *1: Do you have questions about this exercise?* *2: How was it to do this exercise yourself?* *3: What insights does this exercise give you to fulfill your role more intersectionally?*
Plenary conversation: you as trainer	Guided by the questions: *1: What do you bring from your position and background?* *2: What do you miss from your position and background?* *3: What goals do you have with your target group?* *4: What is your challenge in applying the game?* *5: What do you need to guide the game successfully?*
Rounding up	Evaluation of both training days. *How will you leave today and what do you take with you?* Suggestions for relevant literature on DEI topics.

3. Information letter to participants (in Dutch)

Beste deelnemer van de Train-de-Trainer van Collectief Caleidoscopia,

Zoals eerder vermeld is er een afstudeeronderzoek dat tijdens deze training plaatsvindt, gericht op het onderzoeken van serious card gaming in Diversity, Equity, and Inclusion (DEI) Training binnen het hoger onderwijs. Graag geef ik hier wat meer uitleg over in deze informatiebrief.

Achtergrond en doel
Ondanks de toename van DEI-initiatieven binnen het hoger onderwijs, blijven de effectiviteit en impact van deze trainingen een uitdaging. In dit onderzoek kijk ik hoe serious card gaming, en in het bijzonder het Caleidoscopia kaartspel, aan deze opgave kan bijdragen. Het doel van dit onderzoek is inzicht verkrijgen in de effectiviteit en werking van deze methode om inclusieve bewustwording, kennis en eventuele gedragsverandering. De resultaten dragen bij aan het ontwikkelen van effectieve DEI-trainingen en daarmee aan zowel organisatorische als maatschappelijke verandering.

Wat houdt deelname in?
Als deelnemer van het onderzoek wordt het volgende verwacht:

- Beoordelen van een korte fictieve casus vóór dagdeel één en na dagdeel twee (ca. 15 minuten)
- Deelname in het groepsgesprek waarin jouw ervaringen en ideeën omtrent de training en het spel besproken worden (inbegrepen in dagdeel twee)
- Invullen van de Transformative Learning Environments Survey na afloop van het tweede dagdeel (5-10 minuten)

Ook ben ik er tijdens de trainingsdagen bij voor algemene observaties.

Praktische informatie omtrent ethiek
Jouw naam wordt niet vermeld in het onderzoek. Overige persoonlijke gegevens (zoals leeftijd, functie, genderidentiteit, etc.) wordt alleen gebruikt wanneer dit het onderzoeksdoel dient (bijvoorbeeld bij het reflecteren op de inclusiviteit van dit onderzoek). Je kunt ten alle tijden ervoor kiezen niet meer mee te willen doen met het onderzoek, of wanneer je niet wil dat specifieke data gebruikt wordt in het onderzoek. Verwerkte data wordt alleen gebruikt voor educatieve/academische doeleinden.

Graag zou ik het **uiterlijk 31 maart** willen weten wanneer je **niet** wilt deelnemen aan het onderzoek. Voor verdere vragen en/of opmerkingen over deelname of het onderzoek ben ik bereikbaar via en 0681979615. Tot 3 april!

Met vriendelijke groet,

Iris Que

4. Transformative Learning Environments Survey (TLES)

Description of the TLES (Walker, 2018 p.40) and adaptation in this research.

Actor	Scale	Scale Description	Example items	Adaptation (in Dutch)
Student	1. Disorienting Dilemma	The extent to which students perceived a disorienting dilemma.	In this class... ...My assumptions were challenged. ...My viewpoints were challenged.	Tijdens de training werden mijn aannames en overtuigingen op het gebied van diversiteit en inclusie uitgedaagd. Tijdens de training werd mijn perspectief op diversiteit en inclusie uitgedaagd
Environment		The extent to which the instructor used disorienting dilemmas as a part of instruction.	In this class, the instructor... ...Provided me with unsettling information. ...Used a different frame of reference than I would have.	De trainers hebben mij voorzien van nieuwe informatie De trainers hebben perspectieven belicht die ik uit mezelf niet had bedacht
Student	2. Self-Reflection	The extent to which students critically perceived their subjective perceptions of knowledge.	In this class I... ...Had to think about my position on the topics. ...Had to look closely at my own values.	Tijdens de training moest ik nadenken over mijn positie en perspectief in het kader van diversiteit en inclusie Tijdens de training moest ik naar mijn eigen normen en waarden kijken
Environment		The extent to which the instructor created opportunities for student critical self-reflection.	In this class, the instructor... ...Asked me to think about where my ideas came from. ...Asked me to reflect on my ways of thinking.	De trainers hebben mij uitgedaagd om na te denken waar mijn overtuigingen en ideeën vandaan komen De trainers hebben mij uitgedaagd om te reflecteren op mijn denkwijze
Student	3. Meaning Perspective & Critical Discourse	The extent to which students perceive their meaning objectives.	In this class... ...I became aware of the perspectives of others. ...I realized other students' perspectives.	Tijdens de training ben ik meer bewust geworden van andere perspectieven Tijdens de training leerde ik de perspectieven van mijn trainingsgenoten kennen

Environment		The extent to which the instructor creates opportunities for critical discourse.	In this class… …I had full information. …I felt comfortable defending my way of thinking.	Gedurende de training werd ik voldoende geïnformeerd Tijdens de training voelde ik mij comfortabel om mijn denkwijze te delen
Student	4. Acting	The extent to which students perceive a change in their behavior.	As a result of this class, I… …Adopted new ways of thinking about class topics. …Have made different decisions related to class topics.	Door deze training heb ik nieuwe manieren geleerd om na te denken over diversiteit en inclusie Door deze training ben ik van plan om anders te handelen in situaties en/of gesprekken omtrent diversiteit en inclusie
Environment		The extent to which the instructor creates an environment for students to demonstrate change in behavior.	In this class, the instructor… …Helped me make any new ways of thinking obvious. …Set up situations where I could express any new viewpoints.	De trainers hebben mij geholpen met hoe ik de verkregen informatie moet toepassen in de praktijk De trainers hebben situaties gecreëerd waar ik nieuwe denkwijzen en perspectieven kon delen

5. Interview guide (trainers/game developers)

1. Opening questions
    a. Can you briefly introduce yourselves and describe your background in DEI training and game development?
    b. What inspired you to develop this particular card game for DEI training?
    c. How has your perspective on DEI learning evolved throughout the development process?
2. Effectiveness of the card game approach
    a. From your experience, what aspects of the game were most effective in facilitating discussions on intersectionality and diverse perspectives?
    b. Were there any moments that stayed with you while working with the game?
    c. Are there contextual aspects, like organizational culture or other practical issues that may affect the working of the game?
    d. Is the game enough to foster DEI? What else could be necessary?
3. Challenges and limitations
    a. What were the biggest challenges you encountered in designing the game?
    b. Were there any participant reactions or dynamics that you found surprising or difficult to navigate?
4. Reflections on game development
    a. How did you balance game mechanics with the educational objectives of DEI training?
    b. What feedback have you received from previous playtests, and how has it influenced the game's evolution?
5. Improvements and future use
    a. Based on your experience, what improvements would you make?
    b. How do you see this game fitting into broader DEI goals and plans in higher education?
    c. Do you think the game would be a good alternative for ‘’classic’’ DEI training?
    d. How do you think that this way of working, a card game with various dimensions, could be applied to other fields of work or with other educational purposes? For example, difficult conversations regarding climate?
6. Closing questions
    a. Is there anything else you’d like to add about the development, working, or something else about the game?

6. Observation guides, categories, and indicators

General notes – DAY 1

Time	Training part	Notes
START-	Plenary opening	
	Working agreements	
	Plenary introduction exercise	
	Introduction exercise in subgroups of 3-4	
	Theory on intersectionality	
	Dice game exercise	
	Plenary case analysis	
	Preparation day 2	
-END	Rounding up	

General notes – DAY 2

Time	Training part	Notes
START-	Introduction Sharing experiences	
	Practicing in subgroups and plenary feedback	
	Theory: mechanisms in working with diversity, inclusion, and equity	
	Make-over dice game	
	Plenary conversation: you as trainer	
-END	Rounding up	

Observation categories and indicators:

1. Engagement and participation
    a. Engagement with exercises, trainers, participants and game material
    b. Body language and emotional responses.
2. Transformative learning
    a. Disorienting dilemmas
    b. Self-reflections
    c. Behavior/circumstances facilitating meaning perspectives & critical discourse
    d. Changes in behavior/acting and verbalized intentions to do so
3. Intersectional analytical skills
    a. References to prior knowledge vs. new insights.
    b. Using/applying more DEI related terminology as the training progresses
    c. Discussions related to intersectionality and diverse perspectives.
4. Intended behavioral change
    a. Verbalized intentions to apply DEI learning in professional settings.
    b. Verbalized intentions to apply DEI training learning in personal settings.
    c. Reflecting on previous behaviors and mechanisms behind them

    d. Expressing commitment to broader DEI related goals
5. Challenges/barriers, conditions, and improvement
    a. Confusion or misunderstandings about game instructions or concepts.
    b. Resistance or defensiveness to theory or exercises.
    c. Group dynamics that may hinder engagement.
    d. Technical or logistical issues affecting gameplay.
    e. Suggestions for improvement.

7. Open-ended surveys

After day 1 (on paper)

- Do you think your knowledge and understanding of intersectionality has increased because of the training?
- And how do you think you could use these insights in the future?
- Would you perceive or judge situations differently now? If yes, in what way?
- And would you respond or act differently? If so, what would you be able to do differently?
- Do you already have ideas about for who and how you are going to use the card game? If so, for who and how?

After day 2 (digital)

- Do you think that the card game can improve intersectionality, diversity, inclusion, and equity within your target group? Why yes or no?
- In your opinion, does the game contain enough information about intersectionality, diversity, inclusion, and equity? Why yes or no?
- Do you think that the visuals and physical characteristics of the game contribute to the goals of the game? Why yes or no?
- Did you notice a difference when making the second case analysis (posttest) as opposed to the first (pretest)? If so, what? If not, why not?
- Have you ever participated in another training regarding this subject? If so, in what way did the Caleidoscopia training differ from that training?
- Is there anything else you would like to share regarding your experience at the training and/or with the card game?

8. Pretest – posttest cases (in Dutch)

Pretest (casusopdracht 1)

Dit is een fictieve casus. Eventuele overeenkomsten in namen en/of situaties zijn per toeval.

Lisa (24), een student-assistent, leidt tijdens een college een gesprek over succesvol samenwerken. Een van de studenten, Omar (19), deelt zijn ervaring over hoe hij zich buitengesloten voelt bij groepsopdrachten. Hij heeft het idee dat hij alleen de makkelijke taken krijgt. Ook vertelt hij dat hij zich ongemakkelijk voelt wanneer zijn groepsgenoten hem napraten en lachen wanneer zijn Somalische accent naar voren komt. Een andere student, Sophie (19), reageert en zegt dat iedereen moeite heeft met groepswerk en dat Omar gewoon meer van zich moet laten horen. Student Fons (20) reageert op Omar door aan te geven dat samenwerken nou eenmaal lastig is en daarvoor goede afspraken nodig zijn, waar Omar zich ook aan moet houden. Student Anouar (20) valt Omar bij en geeft aan dat hij ook weleens het gevoel heeft niet serieus genomen te worden in een groep waarmee hij samenwerkt. Er wordt bijvoorbeeld raar opgekeken als hij een biertje afslaat. Student Geeske (19) zegt dat Omar minder bescheiden moet zijn bij het verdelen van taken. Zij heeft nooit iets gemerkt bij Omar dat hij dat vervelend vindt. De hoofddocent, Jan van Dijk (58), knikt instemmend en gaat verder met het volgende onderwerp zonder de situatie te benoemen. Later bespreekt Lisa het incident met haar collega Mark (26), een andere student-assistent. Mark suggereert dat het niet hun rol is om in te grijpen in klassikale discussies, omdat studenten moeten leren om dergelijke situaties zelfstandig aan te pakken. Lisa maakt zich zorgen dat Omars negatieve ervaringen niet serieus werden genomen. Ze denkt dat zulke ervaringen een negatieve impact kunnen hebben op studenten. Lisa twijfelt wat ze moet doen en vraagt zich af:

- Waarom reageert iedereen op deze manier?
- Hoe kan ze ervoor zorgen dat Omar zich minder buitengesloten voelt?
- Met wie moet ze dit bespreken? En waar en wanneer dan?
- Hoe kan ze een inclusievere leeromgeving bevorderen?

Aan jou de volgende vragen om Lisa op weg te helpen:

1. Wat gebeurt hier? Probeer de verbanden tussen de achtergronden en het handelen van de actoren zo concreet mogelijk te beschrijven.
2. Hoe verklaar je de gevoelens en reacties van de actoren in deze casus?
3. Wat zouden de actoren in deze casus kunnen doen?

4. Waar moet Lisa rekening mee houden wanneer ze met deze problemen aan de slag gaat?

Posttest (casusopdracht 2)

Dit is een fictieve casus. Eventuele overeenkomsten in namen en/of situaties zijn per toeval.

Amina (28), een junior docent aan de hogeschool, begeleidt een bijeenkomst waarin studenten hun groepswerk bespreken. Tijdens de bijeenkomst vertelt Fatima (20) dat zij zich soms niet fijn voelt in haar projectgroep. Ze heeft het idee dat haar groepsgenoten niet willen dat ze de presentatie doet, terwijl ze al twee keer heeft laten vallen dat zij dit graag op zich wil nemen. Ook spreken ze vaak te laat af en op een tijdstip dat voor Fatima meestal slecht uitkomt om aan het project te werken. Regelmatig wordt afgesproken op een verdieping in de bibliotheek waar de lift niet komt, wat voor haar moeilijk te bereiken is met haar rolstoel. Een andere student, Laura (21), reageert en zegt dat iedereen obstakels tegenkomt in groepswerk en dat Fatima gewoon moet aangeven wat ze nodig heeft, desnoods bij het schoolbestuur of management. De hoofddocent die bij de bijeenkomst zit, Hans Meijer (47), luistert kort en benadrukt dat zelfstandigheid belangrijk is in het hoger onderwijs. Vervolgens gaat hij verder met de bespreking door een andere junior docent het woord te geven, zonder het onderwerp verder te behandelen. Na de bijeenkomst bespreekt Amina de situatie met haar collega Ruben (32), een andere junior docent. Ruben meent dat het aan Fatima is om zelf met oplossingen te komen en dat het niet de verantwoordelijkheid is van docenten of medestudenten om hier extra aandacht aan te besteden. Amina twijfelt echter of haar uitdagingen serieus genoeg worden genomen en of zij zich daadwerkelijk gehoord voelt binnen de groep. Amina twijfelt wat ze moet doen en vraagt zich af:

- Waarom reageert iedereen op deze manier?
- Hoe kan ze ervoor zorgen dat Fatima zich fijner voelt in de groep?
- Met wie moet ze dit bespreken? En waar en wanneer dan?
- Hoe kan ze een inclusievere leeromgeving bevorderen?

Aan jou de volgende vragen om Amina op weg te helpen:

1. Wat gebeurt hier? Probeer de verbanden tussen de achtergronden en het handelen van de actoren zo concreet mogelijk te beschrijven.
2. Hoe verklaar je de gevoelens en reacties van de actoren in deze casus?
3. Wat zouden de actoren in deze casus kunnen doen?
4. Waar moet Amina rekening mee houden wanneer ze met deze problemen aan de slag gaat?

9. Statement on AI use

To start off, a general statement: I have been aware of the risks and limitations of AI tools for the entirety of the research process. I acknowledge the harmful impact of AI use on the environment and its role in reproducing systemic inequalities. Among other things, this research seeks to address these inequalities. Therefore, AI was not used as a replacement for regular search engines and generated output was never taken over without critical questioning. Moreover, no generative AI models were used for the analysis or interpretation of data. Neither was AI used for the development of argumentation lines or recommendations. However, as discussed in the supervisor meetings, AI tools can be beneficial to the research process if used correctly. For example, to find specific papers, reports, or public data. Contents from these results were never directly taken over from the AI generated answer but from the data source it referred to. In this study, the AI research tool Consensus was used in the following ways:

- As search engine for research papers in addition to google scholar and RUQuest
- To find relevant public reports from the Dutch government
- To find public statements from Radboud regarding DEI funding
- Suggestions for structure when a google search yielded vague or contradictory results (e.g. *''In what section of a methods chapter should I include practical information about specific research tools that I used?''*)
- Retrieving the DOI, ISBN, or other required info for Zotero if this was not clear from the paper, report, or book (section) itself